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Higher Education: Handbook of Theory and Research

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Higher Education: Handbook of Theory and Research

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The Role of Information in the Policy Process: Implications for the Examination of Research Utilization in Higher Education Policy

Erik C. Ness

To what extent do policymakers rely on research evidence during the legislative process? Do they use research to shape policy or merely to reinforce their preferred solutions? What are their preferred sources of evidence? Are policy advocates providing useful information? We know surprisingly little about these questions, especially given the mounting evidence and experience with varied education policies. Yet, the extent to which states rely on research evidence to craft policy remains under-studied.

The need to connect research with policy and practice remains one of the most commonly identified challenges for education researchers.[1] For instance, the theme of the 2008 Association for the Study of Higher Education (ASHE) Annual Conference "Research and Practice: Embracing Connections" encouraged papers aimed at bridging this divide. The past two ASHE Presidential Addresses have reflected on the impact of research on campus-level practice in the dean's office (Eisenmann, 2009) and on state-level policymaking (Johnsrud, 2008). Indeed, this has been a recurring charge to higher education researchers from Patrick Terenzini's (1996) ASHE Presidential Address which urged a stronger link between public policy and higher education and from David Leslie and Joseph Beckham's (1986) edited special issue of *The Review of Higher Education* related to the relevance of higher education research.[2] As Jim Hearn (1997) points out, eminent scholars of higher education have colorfully described our field's research as "trees without fruit" (Keller, 1985) and "shipyards in the desert" (Weiner, 1986) for its disconnect with what policymakers and practitioners consider useful. Adriana Kezar's (2000) more recent appraisal of higher education research, which focuses exclusively on research-to-practice, confirms this divide yet suggests that this gap may be based on a false dichotomy between theory and practice that can be traversed more easily than it appears. Can the research-to-policy divide be traversed as easily? Many studies on the topic suggest that it cannot based on fundamental differences in language, norms, and values between "policy makers and policy scholars" (Birnbaum, 2000) and between the "two cultures" of science and government (Snow, 1961).

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Given these stark differences, it seems that researchers may under-estimate the obstacles to bridging research and policy and thereby expose a pejorative undertone implying that if only policymakers considered research evidence and made decisions accordingly that our public policies would be much more efficient and effective. Rich (1991) cautions researchers, however, to acknowledge these normative assumptions regarding knowledge utilization and to extend the descriptive, conceptual, and empirical understanding of the role that information plays in the policymaking process.

The study of research utilization or use of research evidence has again become ascendant among political scientists and policy scholars (Nutley, Walter, & Davies, 2007). In the past decade, for instance, politics and policy researchers have extended our conceptual understanding of research utilization on theories of the policy process (Jones & Baumgartner, 2005; Weible, 2008), on interest group activity (Wright, 2003), and on policymakers' preferred sources of research information (Hird, 2005, 2006; Rich, 2004). Education researchers, most notably Frederick Hess's (2008) book on "how scholarship influences education policy," have also increasingly examined the research and policy nexus. In fact, policy-related journals such as *Policy Studies Journal* and *Educational Policy* have respectively published four and two articles on the topic in the last 5 years, yet surprisingly no studies on the use of information in the policy process have been published recently in three of the leading higher education journals: *The Journal of Higher Education*, *Research in Higher Education*, and *The Review of Higher Education*. Given the frenetic wave of higher education policy adoptions (e.g., merit-based aid programs, college savings plans, accountability initiatives, governance restructuring, tuition and appropriations alignment, P-16 movements) and the ever-expanding base of empirical studies analyzing these policy issues (e.g., Heller, 1997; Perna & Titus, 2004; St. John et al., 2004; Zumeta, 1998), the examination of research utilization in the higher education policy process seems prudent and promising.

This line of inquiry could complement both the anecdotal observations of higher education leaders and scholars and the growing number of politics- and policy-oriented studies recently undertaken by higher education researchers. As a sector, higher education has historically preferred to avoid the fray of politics, but has recently become much more active in lobbying and actively advocating preferred policies (Cook, 1998; Parsons, 1997, 2004). Likewise, higher education researchers have increasingly analyzed higher education political phenomena through the contemporary models of political science and public policy. In fact, since Michael McLendon (2003b, 2003c) urged higher education researchers to apply these conceptual frameworks of the policymaking process, studies have applied such frameworks to examine statewide governance reform (Leslie & Berdahl, 2008; McLendon, 2003a; Mills, 2007), budgeting and finance (McLendon, Hearn, & Deaton, 2006; Shakespeare, 2008), and merit aid programs (Cohen-Vogel & Ingle, 2007; Cohen-Vogel, Ingle, Albee, & Spence, 2008; Doyle, 2006; Ness, 2008). Application of these theories has led to many insights of the higher education policy process (i.e., state political, economic, social, and demographic characteristics matter), but we still know very little about the impact of research on the policymaking

process. While many of the policy frameworks that McLendon recommends incorporate the role of information to varying degrees, none of the higher education studies have deeply examined research utilization in the policymaking process.

This chapter follows three primary objectives to synthesize studies of research utilization and public policy theory and to suggest future research directions. First, I review studies related to research utilization, the "two-communities" perspective, and sources of information in public policymaking. This initial section includes education-related studies, but also reviews classic studies drawn from political science, policy analysis, and evaluation for their conceptual insights. Second, I distill from five leading theories of public policymaking how each framework specifically addresses the use of information. This substantive review draws deeply from the original (and updated) conceptual frameworks on the policy process and also reviews how higher education researchers have applied these frameworks. Third, I discuss the implications of research utilization on higher education policymaking. Conceptually, I focus on how two theoretical frameworks (diffusion and multiple streams) might be expanded to more fully account for the role of information. Finally, I discuss the influence of two types of intermediary organizations—state higher education agencies and regional compacts—on research utilization in the higher education policymaking process.

Research Utilization

The study of research utilization in the public policymaking process over the past four decades is best described as a U-shaped curve bounded by the "golden age" of research utilization in the latter-half of the 1970s through the mid-1980s and the more recent attention by researchers beginning in the mid-2000s. In fact, this progression tracks neatly to two peer-reviewed journals dedicated entirely to this topic. First, the U.S.-based journal *Knowledge: Creation, Diffusion, Utilization* published articles on the topic from 1979 until 1994 when the scope of the periodical was expanded along with the title, *Scientific Communicator*. More recently, the U.K.-based journal *Evidence & Policy* was established in 2005 to examine the nexus of research evidence and concerns of policymakers. Yet, despite these publication outlets and a critical mass of scholars from the public policy, political science, health sciences, and education fields, surprisingly few studies examine the role of research utilization in the higher education policy process. As such, this section reviews the seminal studies from the "golden age" and the more recent work, especially studies related to research utilization in determining K-12 education policy. Before doing so, however, it is first necessary to define and explain the most relevant terms.

The title of this chapter includes two terms that seem straight-forward enough—information and research utilization. However, these terms are used interchangeably in some studies and are identified as quite distinct from one another in other studies. For example, the term "information" is less precise and thus includes a wide range of documents, data, opinions, empirical research, policy

briefs, and polling information that might exist in the policymaking process. Some scholars have modified the term as "technical information" (Guston, Jones, & Branscomb), "policy-relevant information" (Rich, 1981), and "expert-based information" (Weible, 2008) to distinguish data-oriented or research-based information from general sources such as letters and phone calls from constituents (Mooney, 1991). Lindblom and Cohen (1979) add clarity by distinguishing "professional social inquiry"—systematic research or analysis conducted by academics or other trained, professional researchers—from "ordinary knowledge"—which includes information generated from casual experiences and non-scientific methods of discovery. They argue that findings generated through professional social inquiry are most likely to influence policy once they become popularized as ordinary knowledge.

The term "research utilization" (Weiss, 1977, 1980) more specifically identifies the type of information (research-based) and the extent to which it is used in the policymaking process. Similar terms are often used interchangeably, such as "use of research evidence" (Nutley et al., 2007), "knowledge utilization" (Dunn, 1983; Larsen, 1980), "research use" (Weiss, 1979), "social science utilization" (Mitchell, 1981a, 1981b; Rich, 1981), and "science" or "scientific knowledge" (Jasanoff, 1990; Ozawa, 1991). Notwithstanding this wide range of terms, researchers most commonly refer to two definitions of knowledge utilization. First, Lester (1993) opens his article on the use of policy analysis by state legislators with the following definition of the study of knowledge utilization as being "concerned with understanding and improving the utilization of scientific and professional knowledge in settings of public policy and professional practice" (Dunn, Holzner, & Zaltman, 1985). Second, in an earlier article titled "Knowledge utilization: What is it?," Larsen (1980) explains, "knowledge utilization is a complex process involving political, organizational, socioeconomic, and attitudinal components in addition to the specific information or knowledge" (p. 424). As these definitions suggest, despite the many overlapping terms, research utilization essentially converges around a simple question: how is information used to make policy decisions? Since so few higher education studies examine this question, this section broadly reviews the role of information in the policymaking process rather than limiting consideration, for example, only to use of empirical research evidence by policymakers.

Background on Research Utilization

While the perspectives from which researchers consider research utilization in the policymaking process seem to have varied over time, these studies as a whole enrich the understanding of how information influences policy decisions. Douglas Mitchell (1981b) outlines the use of social science research across five historical periods beginning in 1832 with the federal government's first sponsored research project to study steamboat boiler explosions. These periods track closely with the establishment of national associations, such as the American Social Sciences Association

in 1865 (second period), and of federal agencies, such as the National Institutes of Health in 1944 and National Science Foundation in 1972 (fourth period). The third historical period is bounded by the two World Wars and is tied most closely to the election of President Woodrow Wilson, who was a social scientist himself, and to President Franklin Roosevelt's New Deal policies informed directly by social science research. The fifth and final period that Mitchell outlines, however, seems of particular relevance as it coincides with the "golden age" of research utilization studies. Beginning in the mid-1960s, the legitimacy of federal social policies was being called into question and along with it the usefulness of social science research (Adams, 1976). As a result, federal research funding shifted from basic to applied research on topics outlined and framed by policymakers rather than researchers. It is within this context that many of the classic research utilization studies emerge.

In the late 1970s scholars studying research utilization seemed to be responding to the reduced role of research on the policymaking process. This era, less than a decade removed from the prominent role of research in shaping the Great Society programs, sparked examination of the research and policy nexus. Indeed, Caplan, Morrison, and Stambaugh (1975) studied the utilization of social science research by federal agencies by collecting and analyzing interview data with more than 200 upper-level government officials, which yielded 575 self-reported instances of research influencing policy decisions. The fundamental challenge to research use by federal agencies, Caplan et al. argued, was the "gap" between the perspectives of policymakers and social scientists that constrained knowledge transfer. In another study, Caplan (1977) identified a series of "minimal conditions" necessary for research use, which included factors related to policymakers' perspectives on decision making and on ethics and related to characteristics of the research findings (e.g., intuitive, politically feasible). One of the most pressing reasons to study research use during this "golden age" was the desire to better understand and perhaps mitigate the challenge posed by the conflicting (if not, competing) worldviews of political decision-makers and researchers. In fact, Wildavsky's (1979) classic book, *Speaking Truth to Power*, urges researchers to use evidence and analysis to influence policymakers' decisions. However, Carol Weiss (1980) cautioned colleagues to avoid a normative approach to the topic: that more research and/or increased utilization of research will lead to better public policy. Instead, Weiss aimed to empirically examine "when and how research has an influence" (p. 1). Similarly, Rich (1991) identified four normative assumption of research utilization scholars: (1) information provided to policymakers is of value; (2) the public would benefit from the use of this information; (3) political and bureaucratic considerations should not guide the use and acquisition of information; and (4) use of information by policymakers should be guided by the quality of information (p. 320). These cautions by Weiss and Rich extended the study of research utilization beyond its initial concern that policymakers were under-utilizing research evidence to instead call attention to empirical examination of the role of information in the policy process.

Rather than proceed immediately to review the literature related to the various meanings and settings of research utilization, the next section considers in more depth the apparent deep divide between policymakers and researchers in order to

provide the necessary background undergirding decades of research on knowledge utilization.

Fundamental Challenge to Research Utilization: The Two-Communities Perspective

Popularized by C.P. Snow's (1959) classic "two cultures" study of the humanities and sciences within academia, the "two-communities" perspective essentially holds that researchers and policymakers are members of separate communities each with its own language, values, norms, and goals. In his Godkin Lecture at Harvard University, Snow delivered an address on "Science and Government," in which he described how the former might (and might not) influence the decisions of the latter. Through a compelling narrative account of the role that two scientific experts played within Great Britain's government during World War II, Snow (1961) offered a vivid description of power and politics within the "black box" of the policymaking process. In particular, Snow detailed how scientific knowledge can be marginalized in "closed politics" situations where personalities and personal relationships matter most. Ultimately, Snow urged scientists to better understand the political environment, offered a few prescriptive conditions to maximize the effectiveness of a government-science commission, and warned of placing too much power over decision-making in the hands of a single scientist. The following statement seems to best capture Snow's conceptual, if somewhat normative, interests in the role of science in the policymaking process:

> I mean my description of politics to be taken as neutral statements. So far as I have been able to observe anything, this is how the world ticks—not only our world, but also the future world one can imagine, juster and more sensible than ours. It seems to me important that men of goodwill should make an effort to understand how the world ticks; it is the only way to make it tick better (p. 66).

During the "golden age" of research utilization studies, two authors in particular personified the link between the two communities of research and policy. Thomas Wolanin and Samuel Halperin served both as academics and as senior staff members in the federal government. Their essays pursue Snow's interest in "how the world ticks" from the perspectives of both policymakers and educators. Halperin (1974) emphasizes the perceptions that the two communities hold of one another: politicians are only interested in re-election and thereby short-term results; and, educators are arrogant, poor communicators, and have little understanding of the political process. Wolanin's (1976) primer on federal policymaking identifies many obstacles which tend to prevent information from influencing policy decisions, such as omnibus bills that lump together dozens of loosely related bills thereby encouraging log-rolling by policymakers. These descriptive studies, without explicitly doing so, lend support to the "two-communities" perspective as an explanation for the non-use of information in the policy process.

Three of the most prominent scholars of research utilization have characterized the two-communities perspective variously as "theory" (Caplan, 1979), as "metaphor" (Dunn, 1980), and as "misguided" (Rich, 1991). Caplan (1979) was the first to invoke the term and attributed the under-utilization, or non-utilization, of research to "action-oriented" policymakers who were not interested in "'pure' science or esoteric issues" (Caplan, 1979, p. 459). By outlining the significance of the "gap" between these two communities, Caplan argues for increased collaboration between researchers and policymakers, particularly at the conceptual-level of defining the questions and understanding the causes and antecedents of problems. For Caplan, the two-communities theory offers an explanation for why research evidence rarely influenced policy and highlights the entrenched value differences between researchers and policymakers.

Rather than an over-arching theory, Dunn's (1980) characterization of two-communities as a metaphor emphasized the conceptual and descriptive utility of considering different models of how research is used in the decision-making process. Through an exploratory case study of more than 100 cases of policy adoption at multiple levels of government (local, state, national), Dunn examines five models of research utilization: (1) product-contingent, (2) inquiry-contingent, (3) problem-contingent, (4) structure-contingent, and (5) process-contingent. By examining the constructs underlying the two-communities metaphor, Dunn argues that researchers will be better able to distinguish between the factors representing "cultural" and "structural" differences between their organizations (e.g., think tanks, government agencies, universities) and government decision-making entities. For instance, one key finding of Dunn's study is that in the process-contingent model, which emphasizes the scope and tenor of communications between researchers and policymakers, knowledge use is moderately more likely, despite the cultural difference between the two communities, if both stakeholders are active in all stages of the policymaking process.

Unlike the above characterizations of two-communities as a "theory" and "metaphor" that emphasize the competing cultures and values that minimize the likelihood of research utilization, Rich (1991) argues that these attempts are misguided and misrepresent Snow's (1961) original perspective on science and government. Essentially, Rich claims that Snow primarily examined the effectiveness of relationships, rather than the narrow concerns of communication skills or broad challenges of the chasm between two worldviews. In particular, Rich highlights the direct attention that Snow pays to politics, which many research utilization scholars have relegated to the "black box" or to the two-communities perspective. Indeed, Snow's quote above regarding the importance of "how the world ticks" underscores the importance of understanding the political landscape. Nevertheless, Snow's original "two cultures" theory of academia (Snow, 1959) continues to shape the two-communities divide because researchers believe that knowledge accrues through theory and method and thus they emphasize reliability and validity, in contrast with policymakers, who believe that knowledge emerges from experience and thus emphasize common sense.

Indeed, much of the recent studies of research utilization in education policymaking are grounded in a two-communities approach. Many of the chapters in Hess's (2008) edited volume, for instance, examine the gap between researchers and policymakers with regard to "school leaders use of research in decisionmaking" (Fusallari, 2008), "incentives that drive education research" (Goldhaber & Brewer, 2008), and "the weak incentives to use research in policymaking" (Wong, 2008). Moreover, Henig's (2008a) chapter summarizes the evolution of this two-communities divide in response to increased corporate presence in K-12 education and increased federal research spending on education. Through his examination of how research is used in the debates surrounding charter school adoption, Henig (2008b, 2009) identifies five dimensions along which researchers and policymakers differ: (1) time, good research often takes long periods of time while policymakers need answers to policy problems immediately; (2) cumulative evidence, researchers evaluate evidence based on the cumulative work on the topic while policymakers are more interested in finding the silver bullet or "killer study"; (3) causality, researchers recognize the nuances of this most vexing challenge while policymakers are more likely to place their bets based on compelling narratives; (4) abstraction, researchers prefer to use evidence from individual cases to support broader themes with wider implications for future research and practice while policymakers prefer concrete evidence related to specific policies and conditions; (5) simplification, researchers associate complicating factors and nuance with sophisticated analysis while policymakers prefer bullet points and sound bytes to communicate their positions in the brief and fleeting windows of opportunity. Although these dimensions illustrate stark differences between researchers and policymakers, Henig warns both communities to avoid the urge to "meet in the middle," which would require researchers and policymakers to disregard the norms of their respective contexts.

Perhaps because of its intuitive appeal, this dichotomizing perspective also seems to be firmly embedded throughout the higher education literature. In fact, without citing "two-communities" explicitly, Apfel and Worthley (1979) use its rationale to explain why state governments so seldom rely on universities for technical assistance. Indeed, their study concludes that "language barriers" and "heterophily—a condition in which sender and receiver are unlike one another in many respects" account for this trend. Similar to the earlier essays by Wolanin (1976) and Halperin (1974), William Sederburg (1989), a Michigan state senator and former Michigan State University political scientist, identified a dozen hypotheses for the language gap between state legislators and academics and, ultimately, recommends that university leaders adopt a statewide perspective and a deeper understanding of the political process. Many higher education researchers are likely most familiar with the two-communities perspective through Robert Birnbaum's (2000) article "Policy scholars are from Venus; Policy makers are from Mars," which argues that the work of scholars and policymakers should remain "two distinct knowledge-producing activities whose insights might inform each another but are not dependent on each other." Birnbaum's article seems contrarian. Instead of arguing for a bridge between these two communities, Birnbaum defends their differences in aims and contexts, placing the onus of a research-policy connection on intermediaries such as

governmental agencies' or non-governmental organizations' policy analysts, thereby excusing researchers and policymakers from any demands to alter their respective orbits. Having outlined the challenge to research utilization posed by the two-communities perspective from Snow's "two cultures" to Birnbaum's direct application to higher education, the next section reviews various classifications of research use in the policymaking process.

What is Research Utilization?

Just as there are many definitions for research utilization, scholars identify many different types of uses of information in the policymaking process. Most reviews (e.g., Amara, Ouimet, & Landry, 2004; Dunn, 1983; Neilson, 2001; Nutley et al., 2007; Tseng, 2007) of this literature identify three basic types of research utilization. First, *instrumental use* refers to the direct application of research to specific policy decisions. This model of research utilization follows most closely the rational choice model of decision-making in which a problem is identified, information is gathered about possible solutions, then the optimal solution is adopted. Research utilization scholars (Caplan, 1979; Weiss, 1977) have argued that the use of information in the policy process has been under-estimated, at least in part because researchers were looking solely at the instrumental use of information.

The second type of research utilization, *conceptual use*, refers to the broader, longer-term role that research can have on policymakers' understanding of certain policy issue. Considering federal student financial aid policy as an example, the instrumental use of research evidence might show the direct impact of increasing the Pell grant award amount on increased enrollment rates of lower-income students. The conceptual use of research evidence, however, would include the cumulative effect of a broad range of studies on the impact of college affordability on student enrollment, retention, and persistence even if this research does not immediately inform a specific bill or policy decision.

The third type, *political use*, refers primarily to the tactical or symbolic use of information by policymakers. Usually this entails a policymaker using research evidence to bolster support for previously held positions or policy preferences, as opposed to using research to identify the optimal policy solution. Policymakers might make political use of research by distributing research findings to fellow legislators as a means of gaining support for an issue important to their district. Formal testimony or hearings before legislative committees is often another form of tactical research use, especially when all the experts in a panel provide evidence in support of policymakers' preferred policies. These three broad types of research use are distilled from typologies, models, and stages of research utilization outlined in many studies. Arguably, however, no researcher has been more influential in identifying the "many meanings of research utilization" than Carol Weiss (1979). As such, this section first reviews Weiss's work on the topic, then briefly reviews other important contributions.

Beyond the instrumental, conceptual, and political uses of research, Weiss offers a more nuanced classification for meanings of both "use" (1979) and "research" (1991). First, Weiss (1979) identifies the following seven "meanings" of research utilization in an effort to clarify and guide future inquiry on the topic lest these vastly different meanings become conflated:

1. Knowledge-driven: applied research tests concepts and findings of basic research to policy-relevant problems
2. Problem-solving: research helps policymakers solve a specific problem; policymakers and researchers agree on nature of the problem and solution
3. Interactive: policymakers consider multiple sources of information, including their own experience, to support the decision-making process; usually involves multiple iterations between policymakers and researchers
4. Political: political positions are fixed and unyielding; policymakers seek information to bolster support for previously determined decision
5. Tactical: research used as strategy, often as a means to delay action; researchers can be blamed for unpopular decisions or used to give legitimacy to decision
6. Enlightenment: education of policymakers gradually over time through the accumulation of research
7. Intellectual enterprise: policy research is one of many forms of research that may be of interest based on wide social concerns

The first three of Weiss's meanings of "research" generally follow the *instrumental use* concept that intuitively rests upon research directly influencing policy decisions. In a more recent study, Weiss introduces an additional meaning of instrumental research utilization—*imposed use*—based on the dynamics associated with the adoption of D.A.R.E. programs and the policy mandates included in the No Child Left Behind legislation (Weiss, Murphy-Graham, & Birkeland, 2005). The remaining four meanings of the original seven uses, however, constitute Weiss's primary contribution by calling the attention of researchers to the *political* and *conceptual uses* of information. By broadening research utilization to include aspects that are not immediately observable, Weiss provides useful classifications to describe the use of information. Specifically, research utilization scholars credit Weiss for identifying the "enlightenment" function that research evidence has on policymakers (Dunn, 1983; Neilson, 2001; Nutley et al., 2007; Rich, 1991).

Similar to these insights on meanings of "use," in a subsequent study, Weiss (1991) identified three models of "research" each of which roughly aligns with one or more of her meanings of research utilization.

1. Research as data: most influential when few alternatives are sharply opposed and when policymakers are analytically sophisticated
2. Research as ideas: most influential in early stages of policy process, when current policy is unfavorable, and when uncertainty is high
3. Research as argumentation: most influential when conflict is high and after the policy decision has been made

These classifications respectively fit the instrumental, conceptual, and political uses of research. Weiss's (1991) models also refer to the conditions under which research is most likely to be utilized, thus adding clarity to the consumption of research in the policymaking process. Recently, research utilization scholars (e.g., Nutley et al., 2007; Tseng, 2007) have noted that our understanding of the demand-side is much more limited. Indeed, the two-communities perspective often emphasizes the problem with the "supply" of research (i.e., too technical, too narrow, not focusing on current issues). By contrast, studies that clarify the "demand" for research emphasize the sources and types of information preferred by policymakers, which will be addressed in greater detail in the next section, and in the discussion of theories of the policymaking process.

In one such demand-side study, Knott and Wildavsky (1980) outline seven standards of research use with increasing levels of utilization: (1) reception, (2) cognition, (3) reference, (4) effort, (5) adoption, (6) implementation, and (7) impact. These standards also roughly correspond to stages of the policymaking process. Standards 1–4, which seem to occur at the agenda-setting or pre-adoption stage offer the lowest threshold for what constitutes research use; over time, however, the first four standards could be associated with the broader enlightenment function of research use. Standards five and six, respectively, occur in the policy adoption stage and implementation stage. According to Knott and Wildavsky (1980), full utilization is not realized unless the seventh "impact" standard is fulfilled.

Another related term, *policy analysis*, often is used synonymously with research utilization, with one apparent distinction: policy analysis is always conducted with the aim of being relevant to and having an impact on the policymaking process. As outlined above, not all research, even analysis of pressing practical problems, is conducted with the explicit goal of impacting policy. Perhaps this distinction has led to claims of "the end of policy analysis" (Kirp, 1992) and, less alarmingly, "the paradox of policy analysis" (Shulock, 1999), which both emphasize that as long as policy analysis is viewed as a rational process it is unlikely to be perceived as having a significant influence on the policymaking process.

It seems natural that the role of policy analysis would evolve similar to the conceptual frameworks of the policymaking process. In recent decades, policy process theories have emerged to offer alternative perspectives to the linear and rational approach. In particular, the stages model of policy formation in which a problem is identified, solutions (or policy alternatives) are explored, then one policy is adopted, implemented, and evaluated does not reflect the current conceptual understanding of how policy is made (deLeon, 1999; Lindbolm, 1959). Recent research views the policy process as more fluid than linear and more serendipitous than rational. Policymaking is described by models such as "multiple streams" (Kingdon, 1995; McLendon, 2003a; Ness, 2008), "punctuated equilibrium" (Baumgartner & Jones, 1993), and "advocacy coalition" (Sabatier & Jenkins-Smith, 1993). Given more recent conceptualizations of the policymaking process, Shulock (1999) argues that policy analysis should not be viewed as research prepared specifically for policymakers to address certain problems, but rather as an "instrument of the democratic process" that policymakers and interest groups, media, and citizens can use to influence public opinion and the policy process.

What Sources of Information Do Policymakers Prefer?

As a means to better understand both the supply- and demand-sides of research utilization, scholars have examined policymakers' preferred sources of information. Studies conducted during the "golden age" (e.g., Caplan et al., 1975; Rich, 1981; Weiss, 1980) primarily explored how policymakers utilized specific social science research as opposed broader sources of information that influence their decision-making. For instance, Rich's (1981) study considers only the use of survey data generated by the Research Applied to National Needs Division (RANN) of the National Science Foundation. Likewise, Weiss (1980) controls for the sources of information by generating hundreds of standardized two-page abstracts of research findings that federal agency staff then rate and assess in terms of perceived usefulness. While these seminal studies produced much of the conceptual development undergirding the study of research utilization, they were of a much narrower focus than more recent studies, which have sought to capture the specific types of information that policymakers are most prone to utilize. Furthermore, these "golden age" studies were limited often to policymaking processes at the federal U.S. level; more recently, researchers have examined the role of information at the state-level. The following sub-sections outline relevant sources at the level of the American states: insider versus outsider, constituents, legislative research agencies, state agencies, and think tanks.

Insider versus outsider sources. For the most part, researchers find that policymakers prefer "insider" sources of information, such as legislative staff and fellow legislators, to "outsider" sources, such as the media and academics. Rather than rely solely on surveys and interviews with elected officials, Mooney (1991) examines state legislators' use of information by analyzing the extensive bill files for 12 human services bills of 29 legislators in three states. Through these 348 information searches and interviews with all 29 legislators, Mooney (1991) finds that legislators prefer each of the three information sources at a different stage of the legislative process: (1) insider sources are preferred at voting decision stage, (2) outsider sources are preferred at the development stage, and (3) middle-range sources, such as interest groups, are preferred at the "persuasion" or policy formulation stage. Due to time constraints, re-election concerns, and the broad array of policy issues on which elected officials must act, legislators tend to adopt a "satisficing" approach to collecting information, which entails conducting an efficient search that ends when an adequate, though rarely optimal, solution is identified by a trusted source (Simon, 1957). Mooney (1991) contends that this strategy leads legislators to rely upon one another for their specific areas of expertise at least in part because they are able to "speak the same language" and also based on the willingness of legislators to trust fellow members with similar ideological views. Another study at the federal-level attributes legislators' tendency to become issue experts on one or two policy issues to the legislative organizational structure, particularly the committee system (Krehbeil, 1991).

Similarly, Webber (1987) finds that "legislative colleagues" rank highest in usefulness and frequency of policy information sources. Yet, both Webber and Mooney

find evidence of legislators relying on external sources for the *conceptual use* of information. Webber, for instance, finds that legislators who value their role as "policy conveys," those who translate and communicate public policy issues and solutions to the broader public, are much more reliant on external sources, such as university and research organizations. These sources are more likely than insider sources, such as legislator committee staff or state agencies, to conduct research rather than synthesize its core findings. However, Nutley et al. (2007) highlight the substantial role that insider staff and agencies can have as "intermediary organizations," which serve to translate the most relevant and current research into plausible policy solutions. Oftentimes these agencies are also more likely to be perceived, especially among legislators who do not value their roles as policy conveyers, as trustworthy based on their familiarity with the state's political and cultural context. For example, Ness and Mistretta's (2009, in press) recent studies of merit aid adoption suggest that in North Carolina, unlike neighboring states, outside experts are not relied upon to provide policy information. Instead, insider sources such as officials in the state higher education governing board provide information culled from statewide data and summarized from leading research in the field.

Constituents. Based on legislators' inherent re-election interests, constituents serve as another influential source of information. Mayhew's (1974) classic and elegant electoral-connection perspective famously characterized elected officials as "single-minded re-election seekers." Accordingly, the best indicator of legislators' policy preferences is the public opinion of citizens in their districts, which permit the legislator to satisfy voter demands and thus become re-elected. As mentioned above, Mooney (1991) finds that constituents serve as valuable outsider sources of information, especially in driving the development of legislation. In fact, his examination of legislators' bill files reveals that constituent letters and phone call logs generated much bill-drafting activity, but exerted a notably low level of influence on the ultimate voting decision itself. Gray and Lowery (2000), in a single case study of Minnesota legislators and staffers, find that the importance of constituents as an information source rank the second highest for both identifying problems and voting behavior. Wright (2003), too, argues that constituents' preferences can significantly influence legislators' voting behavior. Specifically, Wright urges interest groups to employ information-sharing techniques, particularly at the district-level so as to identify constituents' preferred policies, rather than traditional lobbying techniques (i.e., grassroots mobilization and campaign contributions). A recent study of merit aid adoption, in fact, finds that such strategies were ultimately effective in determining merit scholarship eligibility criteria in Tennessee. In this policy episode, I identify the significant impact of testimony from out-of-state university scholars and representatives from the College Board that disaggregated eligibility projections disaggregated by county. This district-level information allowed legislators to see the proportion of eligible students from their districts dwindle as the eligibility criteria become more rigorous and thereby influenced the adoption of more widely attainable scholarship criteria (Ness, 2008).

Legislative research agencies. Policymakers have long relied upon their aides for policy information needed to perform effectively their roles (Guston, Jones, &

Branscomb, 1997). Recent studies, however, have more closely examined the roles of various types of legislative staff, including aides assigned to their capitol and district offices, staff to support legislative committees, legislative caucus and leadership aides, and legislative research agencies, and the differences in these roles between states. Using survey data of legislators' rankings of 16 different information sources collected in 19 states, Hird (2005) explores the growth of legislative research agencies and their increasing influence in the policymaking process. Unlike other legislative aides, these non-partisan policy analysis organizations (NPROs) are not beholden to a political party; rather their function is to provide neutral, non-partisan analysis of policy issues. Notwithstanding the wide variability of funding, staff, and expertise among the states,[3] Hird (2005, 2006) finds that state legislators identify non-partisan policy research agencies as the most important source of information for understanding and reaching public policy decisions with the sole exception of their constituents. Despite this important *conceptual* or *enlightenment use* of information, legislators rank NPROs as having among the least influence over policy adoption as compared to other sources.

State agencies. The many state governmental agencies, usually under control of the executive branch, serve as another common source of policy information. As captured by the earlier research utilization studies (Caplan et al., 1975; Rich, 1981; Weiss, 1980), policymakers (both elected and senior agency officials) rely upon information from federal agencies such as National Institutes of Health (NIH), National Science Foundation (NSF), and cabinet-level agencies such as the Department of Agriculture. More recent state-level studies have found mixed results. For example, one study considering the importance of various sources of technical information ranks executive agencies as second only to NRPOs (Guston et al., 1997). According to Gray and Lowery (2000) and Webber (1987), on the other hand, legislators rank state agencies as only moderately useful and as an infrequent source of information. However, among legislators who value scientific and technical information, Webber finds a strong correlation to the usefulness of state agency information. Although not specifically examining information use, another study using an "ethnography of education policy" approach (Hamann and Lane, 2004) highlights the role of state-level education agencies as mediators in the implementation of federal U.S. policy by reframing policies to reflect local mores. Specifically, Hamann and Lane find that state agencies intercede to help school districts comply with No Child Left Behind requirements. Finally, in one of the few research utilization studies to consider higher education policy adoption, Shakespeare (2008) examines the role of the governing board systems, State University of New York (SUNY) and City University of New York (CUNY), in the budget decision process. Shakespeare's analysis reveals that multiple, competing coalitions rely heavily upon SUNY and CUNY data and analysis to bolster their position in favor of or in opposition to altering the state's Tuition Assistance Program.

Think tanks. This final source of information has become increasingly more prevalent in the policymaking process. With the swelling number of think tanks in recent decades, these organizations have varied agendas and missions ranging from research producers, research translators, issue advocacy, and ideological advancement. Andrew Rich's (2004) recent book on the role of think tanks on

federal public policy states that policymakers perceive think tanks to be "more marketing than research organizations, with styles of behavior that mimic interest groups rather than universities." Similar to Henig's (2008a, 2009) characterization of the politicization of charter school research, which included high-profile education experts debating policy findings and quarrelling over methodological approaches in national newspapers, Rich argues that think tanks' aggressive marketing efforts have blurred the boundaries between experts and advocates. Through interviews with policymakers and leaders from funding organizations and think tanks, Rich finds that the credibility of think tanks has been especially diminished by their ideological and partisan alliances. Indeed, only a single centrist organization (Brookings Institution) ranks among the top four influential think tanks as rated by policymakers and journalists from both parties. In addition to Brookings' second place rating, Rich's respondents rated three conservative think tanks in the top four: Heritage Foundation (1), American Enterprise Institute (3), and Cato Institute (4). Ultimately, Rich argues that the influence of think tanks is mitigated by their propensity to deliver research information in the same polemic fashion that characterizes the policymaking process, and thus clearly aligns with the *political use* of information.

The research utilization line of inquiry from the "golden age" to present has conceptual implications for higher education policymaking. The types of research use—instrumental, conceptual, and political—and other classifications of research utilization could be extended by applying them to higher education policy episodes. For example, given the increasing migration of higher education policies across states, are policymakers more likely to make instrumental use of technical information regarding policies adopted by other states? If this use of research does occur, is the diffusion of ideas between states' policymakers (rather than researchers), as suggested by the two-communities perspective? Finally, given the wide array of information sources, are policymakers more likely now than in the past to utilize research evidence in shaping higher education policy?

The classic and emerging studies of research utilization also align well with an ascendant examination of theories of the policymaking process. Since 2000, for example, more than 30 articles the higher education policy process in peer-reviewed journals have examined, indicating significant growth in understanding the complex dynamics of public policymaking. These policy process theories seek to clarify, explain, and illuminate phenomena surrounding policy adoption; to varying degrees, they also capture the role of information in the policymaking process. The following section surveys the extent to which five conceptual frameworks incorporate research utilization and reviews their application to the higher education policymaking process.

Theories of the Public Policymaking Process

This second section of the chapter reviews the ways in which leading theories of the policy process conceptually account for the role of information. Through the application of increasingly sophisticated research designs and data sets (both quantitative

panel datasets and qualitative case studies), researchers have been able to examine with growing rigor the nuances of various conceptual approaches to the study of policy processes, each with information and research utilization playing either a central or secondary role. For example, Weible (2008) synthesizes recent studies of the policy process to compare how four leading policy theories—multiple streams, punctuated equilibrium, social construction, and advocacy coalition—process and use "expert-based information." Weible offers a series of falsifiable propositions related to policy subsystems and information use to guide future study. However, similar to the studies referenced in the previous section on research utilization, very few examine the higher education sector.

In part, this is surprising given how attuned higher education researchers have been to the recent developments surrounding policy theory in the social sciences, particularly political science. For example, Paul Sabatier's (1999a, 2007) *Theories of the Policy Process*, currently in its second edition, provides constructive summaries for seven policymaking process theories. Both editions of this book generated hundreds of studies considering policy issues related to the environment, health care, economic development, education, and many others. Joining this flurry of theory development, higher education scholars have responded to McLendon's (2003b, 2003c) recommendation of theories reviewed in Sabatier (1999a, 2007), including: multiple streams (Leslie & Berdahl, 2008; McLendon, 2003a; Ness, 2008; Ness & Mistretta, 2009, in press); punctuated equilibrium (Mills, 2007; Monear, 2008); diffusion of policy innovations (Doyle, 2006; McLendon et al., 2006; McLendon, Heller, & Young, 2005; McLendon, Deaton, & Hearn, 2007; Ness & Mistretta, in press); principal-agent (Lane, 2007; Lane & Kivisto, 2008); and advocacy coalition (Monear, 2008; Ness, 2008; Ness & Mistretta, 2009; Shakespeare, 2008).

This section examines the extent to which each of these recommended frameworks attends to research utilization in the policymaking process. To this end, I summarize the core elements of each framework, then briefly discuss how each conceptual lens might be applied to examine higher education policy adoption. After separately considering each framework, Table 1 provides an overview of how each framework captures research utilization by summarizing the central or secondary role of information, the possible types of information use, and the sources of information.

Advocacy Coalition Framework

Sabatier and Jenkins-Smith (1988, 1993) originally introduced the advocacy coalition framework (ACF) as an alternative conceptualization of the policymaking process emphasizing "policy change and learning." This framework was among the first to explicitly incorporate the role of technical information in the policy process. Sabatier and Jenkins-Smith (1993, 1999) specifically identify two factors, a professional forum for research dissemination and commonly agreed upon quantitative measures of a policy issue, as examples of the influence of scientific and technical

information on policy change. Similar to earlier conceptualizations of policy subsystems, such as the iron triangle of elected officials, government agencies, and interest groups, ACF attributes policy change (and stability) to the role of coalitions, which are stable over a decade or more, held together by common belief systems, and influenced by external perturbation. Before outlining specifically how ACF relates to research utilization, however, I provide a brief summary of the core conceptual components of this framework.

Sabatier and Jenkins-Smith (1993) define an advocacy coalition as, "people from a variety of positions (elected officials, agency officials, interest group leaders, researchers, etc.) who share a particular belief system—that is, set of basic values, causal assumptions, and public perceptions—and who show a non-trivial degree of coordinated activity over time" (p. 25). In addition to the three iron triangle primary actors, advocacy coalitions include other actors, such as journalists, researchers, policy analysts, and governmental actors at all levels. In further contrast to previous policy process theories, advocacy coalition suggests that multiple coalitions may exist within a policy subsystem. Sabatier and Jenkins-Smith identify a series of parameters that have a stabilizing influence on rival coalitions that relate specifically to the policy issues. In addition to these stable parameters, ACF identifies external (system) events that influence the policy process, such as changes in socioeconomic conditions, changes in public opinion, and policy decisions and impacts from other subsystems. Changes in these external events inevitably affect the stable parameters identified above and could affect the policy subsystem depending upon the constraints and resources of sub-system actor. As with all aspects of advocacy coalition, external events are most likely to influence policy change if they affect policy belief systems.

The crux of the advocacy coalition framework rests on three structural categories of policy belief systems. The *deep core* of fundamental beliefs, such as the nature of man as good or evil, is highly resistant to change. The *policy core* or policy position beliefs, such as the desired scope of governmental versus market activity, is difficult to change, but change can occur due to changes in the external events. Finally, *secondary aspects* of belief systems, such as administrative rules and budgetary allocations, are relatively easy to change (Sabatier, Jenkins-Smith 1993).

The advocacy coalition framework includes a set of nine hypotheses related to policy stability and change. The first three pertain to the stabilizing influence of belief systems on policy sub-systems. The next two hypotheses pertain to the conditions necessary for changes in the policy core belief system. For instance, Sabatier (1988) contends that policy change is not likely to occur in the absence of a power shift within a policy subsystem or significant changes external to the subsystem. The final four hypotheses pertain to policy-oriented learning across belief systems. Since each of these propositions deal directly with the role of scientific and technical information, I list them separately:

Hypothesis 6: Policy learning is most likely to occur when an intermediate level of conflict exists between coalitions and when two conditions exist: (a) both coalitions have technical resources to engage in the debate, (b) the conflict is between secondary aspects of both coalitions' belief systems or between the policy core of one and secondary aspects of the other.

Hypothesis 7: Policy learning is more likely for problems for which accepted quantitative indicators and data exist than for problems for which data and theory are subjective, qualitative, or altogether lacking.

Hypothesis 8: Policy learning is more likely in problems in natural systems, than in social or political systems, since controlled experimentation is more feasible in the former and critical variables are not themselves active strategists.

Hypothesis 9: Policy learning is most likely when there exists a forum that is: (a) prestigious enough to force professional from different coalitions to participate, and (b) dominated by professional norms (Sabatier & Weible, 2007, p. 220).

More recently, however, despite these four hypotheses related to policy learning and information utilization, ACF has been criticized for its limited conceptualization of technical and scientific information use and for its emphasis on the *conceptual use* of research that occurs within coalition (James & Jorgensen, 2009). This is ironic, according to James and Jorgensen (2009), given Sabatier and Jenkins-Smith's (1988) observation that, "one of the most surprising—and distressing—aspects of the literature on knowledge utilization is that it has developed largely independent of the literature in political science on the factors affecting the policy process" (p. 123). In addition to ACF's narrow consideration of the conceptual use of technical information, policy process researchers have criticized ACF for relying too heavily on individual belief systems and over-emphasizing the influence of external events. James and Jorgensen (2009), for instance, suggest a policy design approach that incorporates information utilization and focuses on the content of policy (i.e., the specific policy alternatives or recommendations) rather than simply whether or not policy change occurs. Higher education researchers may also benefit conceptually from such an approach and, in fact, recent studies have extended ACF is similar ways.

Based on two of the hypotheses regarding the conditions under which information utilization and policy change are most likely, policy-oriented learning seems unlikely to occur in higher education, which is not a natural system (hypothesis 8) and quantitative indicators and data are unavailable or insufficient for some problems (e.g., student learning outcomes). However, for other higher education problems, such as student financial aid policy, professional forums exist (hypothesis 9) and often multiple coalitions (e.g., merit-based versus need-based financial aid) have technical resources to engage in the debate (hypothesis 6). Two recent higher education studies offer further support for hypotheses 6 and 9.

The advocacy coalition framework has recently been applied to state-level higher education issues such as merit-based scholarship program adoption (Ness, 2008; Ness & Mistretta, 2009) and budget priorities for tuition assistance (Shakespeare, 2008). The merit scholarship case studies of program adoption provide evidence confirming the vital role of professional forums. Research utilization was most prevalent in the Tennessee policy episode based in large part on the professional forum, which included a task force discussion and invited presentations by merit aid proponents and critics (Ness, 2008). Although Shakespeare (2008) does not formally test ACF's hypotheses, her study on budget changes to the tuition assistance programs certainly finds that rival coalitions had sufficient technical resources

as outlined in hypothesis 6. For instance, the "shrink funding" coalition relied upon information and expertise from within the governor's office and upper house of the legislature and the "maintain funding" coalition relied upon the technical resources of the lower house of the legislature and the state financial aid commission. Moreover, as James and Jorgensen (2009) recommend, Shakespeare's study specifically considers the content of information related to policy alternatives and identifies dozens of internal and external sources of information upon which coalitions relied to inform or substantiate their policy preference. Indeed, these sources of information receive much more attention than the coalitions various belief systems.

Researchers might examine further the role of belief systems, which serve as the crux of ACF, on the sources of information preferences and the extent to which policy actors utilize information in the policy decision process. In many ways, this is a challenge for applying ACF to higher education: there are few higher education issues that lend themselves to long-standing stark differences of opinion at the deep or policy core set of beliefs. For example, legislators and state higher education leaders may be likely to favor decentralized governance arrangement for some time only to favor a more centralized system a few years later based on shifting political, social, and economic conditions.

On the other hand, ACF may provide a promising lens through which to examine policy decisions related to student admissions and financial aid. There does seem to be evidence of long-standing opposing coalitions: one favoring excellence and the other favoring access. These coalitions generally divide on partisan and ideological lines, so how do belief systems impact the likelihood for policy adoption or change? Financial aid coalitions might draw heavily from *deep* and *policy* beliefs, such as a preference for redistributive and entitlement financial aid programs, would be much less likely to change as opposed to *secondary aspects*, such as formulas for sliding scales to calculate award amounts based on financial need. However, studies of the political dynamics surrounding the adoption of merit scholarship programs suggest that lottery and merit scholarship advocates do not always follow predictable political and ideological patterns (Ness, 2008). Higher education researchers might test the strength of belief systems on policy decisions. How, for instance, does research evidence or other political information (such as media accounts and constituent preferences) influence policy decisions?

More than any of the following theories of the policymaking process, ACF manifestly accounts for how research evidence enters the policy arena and shaped policy outcomes. Higher education researchers might further examine ACF's hypotheses related to forum of debate. Is the forum for the merit-based versus need-based debate, for example, guided by professional or political norms? That is, does the debate occur in settings dominated by politicians (e.g., hearings, formal testimony), or does the policy debate seek out empirical evidence and encourage expert recommendations? As ACF hypothesizes, issue experts are more likely to participate in a professional forum. Through the examination of these questions and others, ACF may very well offer conceptual insights on the policy subsystem actors and phenomena that would extend our understanding of research utilization in the decision-making process.

Diffusion of Policy Innovations

The policy innovation and diffusion framework rests firmly on Everett Rogers' (1962, 2003) seminal text, *Diffusion of Innovations*, currently in its fifth edition. Essentially, the diffusion framework examines the migration of policies within organizations or governments. According to Rogers, innovations are adopted in an S-curve characterized first by "early adopters," then by policy adoption of the majority or organizations or governments until finally the innovation is common. Higher education researchers, however, are likely more familiar with Berry and Berry's (1999, 2007) application of the diffusion framework to policy adoption in the American states. Although this framework does not manifestly incorporate research utilization, diffusion of policy innovations implicitly incorporates information use as policymakers borrow ideas from other states. I return to possible implications for research utilization within the diffusion framework after briefly outlining its conceptual fundaments.

In addition to the "diffusion of innovations" framework as conceptualized by Rogers and Berry and Berry, three additional terms are related to studies relevant to policy diffusion. The first two terms, p*olicy entrepreneurs* and *policy networks*, are not unique to the diffusion framework and as such will also be discussed in the subsequent sections on multiple streams and punctuated equilibrium. Nevertheless, Michael Mintrom (1997) directly links policy diffusion to the presence of policy entrepreneurs, "policy actors who promote policy ideas," in the successful adoption of school choice policy in the U.S. states. Similarly, Mintrom and Vergari (1996) find that policy entrepreneurs are more likely to achieve their legislative goals as they are more involved with social and professional policy networks. The third overlapping term, *policy transfer*, is often used synonymously with diffusion of policy innovations. In fact, Dolowitz and Marsh (2000) provide thorough reviews of this literature "that directly and indirectly uses, discusses and analyzes the processes involved in lesson-drawing, policy convergence, policy diffusion, and policy transfer" (p. 5). The authors also present a continuum ranging from lesson-drawing, which is based on the rational decision-making process to "coercive transfer" adopted by direct imposition. In an earlier article, Dolowitz and Marsh (1996) critique extant policy diffusion and policy transfer models for their reliance on rational decision-making models. Instead, they argue that policy transfer should be examined through more nuanced lenses of decision-making, such as the garbage can theory (Cohen, March, & Olsen, 1972).

As Mintrom's studies above illustrate, Jack Walker's (1969) study popularized the application of policy diffusion with the American state as the unit-of-analysis. Walker (1969) finds that states were more likely to enact economic and governmental policies of their neighboring states both as a means of "satisficing" (Simon, 1957) and in response to competitive pressures. Rather than following national trends or peer states, Walker's (1969) study suggests that states are more likely influenced by states in their region. Berry and Berry (1990), for example, find similar evidence in their study of lottery adoption, which cites states, desires to reap the revenues of citizens who frequently cross the state line to purchase lottery tickets. However, unlike

Walker's study, Berry and Berry (1990) also account for certain so-called internal determinants, such as political, economic, and demographic characteristics of the state, in their examination of lottery adoption. Both the integrated model and event history analysis (EHA) of this integrated model have become the norm for recent diffusion studies, which according to Berry and Berry (2007) exceeds 50 interstate and international studies their initial study of lottery adoption (Berry & Berry, 1990).

Michael McLendon (2003b, 2003c) recommends that higher education researchers apply the integrated diffusion and internal determinants approach to examine postsecondary education policy adoption. Indeed, recent studies utilizing EHA methods find the integrated diffusion and internal determinants framework to be a stronger explanation for the rise of many policy adoptions in higher education, including finance strategies (McLendon et al., 2005), performance funding initiatives (McLendon et al., 2006), state-wide governance restructuring (McLendon et al., 2007), and state merit aid programs (Doyle, 2006). Not all of these studies find evidence of diffusion effects to explain policy innovation, however. For instance, Doyle's (2006) event history analysis of the adoption of state merit aid programs does not find evidence to support the diffusion hypothesis or political characteristics of states (such as ideology and partisanship), instead finding education and demographic characteristics of states as the most significant predictors of merit aid adoption.

As Berry and Berry (2007) note, the diffusion framework's scope is much narrower than many other theories of the policymaking process. One possible extension of the diffusion lens would be to specifically consider the use of information in the integrated framework. Since few diffusion studies have focused on the role of information, in-depth case studies may initially be more helpful than EHA in understanding the uses to which information is put in state policymaking research utilization. Once utilization patterns and information sources have been identified, quantitative studies could incorporate measures for research use in EHA models.

Greater attention to the diffusion comparison groups may also offer insights into how policy ideas and information might migrate. For example, diffusion influences among *neighboring states* might rely upon overlapping media markets and the formal and informal relationships and communication between policymakers and citizens. These same information sources might apply to diffusion influences within a *geographic region*, but would also likely include regional policy associations and compacts (Hearn & Griswold, 1994). Finally, a *national diffusion model* would rely almost entirely on policymaker connections through political and policy associations (e.g., National Governors Association, National Conference of State Legislatures, Education Commission of the States) and the connections between leaders of states with similar social, demographic, economic, or political characteristics. Yet, similar to ACF's emphasis on policy change, the EHA diffusion studies that focus solely on policy adoption are unlikely to capture the nuances associated with research utilization.

Recently, however, Lora Cohen-Vogel, Kyle Ingle, and colleagues have broken from the EHA convention in their study of diffusion effects through use of qualitative case studies. According to the authors, "qualitative approaches represent an

important tool for comparative state and innovation diffusion scholars" (p. 626). State policy adoption is a complex process, and context probably matters a great deal. Indeed, echoing Mooney (2001), Ingle, Cohen-Vogel, and Hughes (2007) argue that qualitative approaches hold great potential for unpacking the complexities that surround geographically based policy diffusion among the American states.

Based on evidence accumulated in interviews with policy actors in adopting states, Cohen-Vogel and Ingle (2007) suggest that three significant factors may play a role in the diffusion of merit aid programs among south-eastern states. First, policies are likely to migrate across borders when policymakers feel pressure to enact similar popular programs as neighboring states. Second, state legislators may be able to navigate the policymaking process more strategically if they can look to the experiences of a neighboring state to inform their decisions. Third, policy communities can serve as either formal or informal networks to advocate the adoption of particular programs in other states. Cohen-Vogel and Ingle (2007) also note that the influence of other states in the adoption of merit aid programs seems "particularly strong" during agenda-setting and policy development stages (p. 256).

Another benefit of the case study approach is the examination of states that *resist* regional diffusion. While there is growing interest in the phenomenon of policy diffusion, there is little research available on why some states failed to adopt merit aid programs. Two recent studies examine merit aid non-adoption. One study suggests that hold-out behavior occurs due to an absence of diffusion pressures and unfavorable internal conditions (Ingle et al., 2007). In their examination of merit aid policy adoption patterns, Ingle et al. (2007) find that in merit aid hold-out states, respondents reported less pressure to compete with neighboring states. Additionally, hold-out states did not report contact with merit aid policy experts or participation in regional associations. Similarly, Ness and Mistretta's (in press) case study considers the nonevent of merit aid diffusion in North Carolina which has three neighboring states with HOPE Scholarship programs (Georgia, South Carolina, and Tennessee). Indeed, North Carolina was the only southeastern state in the past 20 years to adopt a lottery and not fund merit scholarships with its proceeds. Archival and interview data suggest that organizational structures and technical information served as significant influences on the policy process. In particular, the financial aid community in North Carolina appears to have been successful in staving off merit aid support among individual legislators and regional policy organizations.

These case studies of policy innovation and diffusion theory suggest that research utilization occurs not only during policy adoption, but also in the earlier policy formulation and agenda-setting stages. Evidence also illustrates the *conceptual, instrumental*, and *political* uses of information. Policy trends and information from other states often serve as an enlightening (or conceptual) influence. Specific state-level data related to how closely the implemented policy met its desired effect (instrumental) can have a direct effect on whether other states adopt similar policies. And, policymakers tend to make tactical (or political) use of information to encourage the adoption of policy to compete economically or otherwise with a neighboring state.

Despite the swell of higher education studies applying the diffusion framework to policy adoptions, this framework holds further promise for understanding the higher education policymaking process. Most notably, as McLendon and Cohen-Vogel (2008) discuss, the policy innovation and diffusion lens might be applied to other phases of the policy process in addition to the current work focusing on dichotomous outcomes (adoption/non-adoption). In the agenda-setting and alternative specification stages, for instance, the diffusion framework might offer insights into the sources and flow of information. The role of policy networks within states, regions, and nationally seems to hold potential not only for understanding the migration patterns of ideas, but also for understanding the sources of information upon which these networks rely. Do the networks of policymakers rely on different sources than those of policy analysts? For instance, do the National Governors Association (NGA) and National Conference of State Legislatures (NCSL) provide information that influences policy decisions differently than information provided by State Higher Education Executive Officers (SHEEO) and the National Center for Higher Education Management Systems (NCHEMS)? These questions and others are addressed more fully in the final section of this chapter, which also offers a conceptual extension of the diffusion framework that seems appropriate to the higher education policymaking.

Multiple Streams

Unlike other theories of the policy process, the multiple streams (MS) framework emphasizes the dynamic, fluid, and serendipitous nature of policymaking. Indeed, Cohen, March, and Olsen's, (1972) garbage can model emerges from their examination of decision-making in colleges and universities, which they classify as "organized anarchies." John Kingdon's (1995) revised garbage can model, which emerged from his study of federal policymaking, has since been applied to policymaking in various contexts to explain the rise of issues to the agenda, the generation of policy alternatives, and the adoption of policy solutions. Despite the multiple streams framework's significant emphasis on randomness and political dynamics, research utilization is evident as a secondary aspect of the framework as captured by policy actors' efforts to connect problems, policies, and politics. As with the previous discussion of the diffusion framework, I first review the central aspects of MS in this section, then discuss possible extensions of MS to more fully account for research utilization in the final section of chapter.

Three fluid streams—problems, policies, and politics—represent the fundamental elements of the multiple streams framework. As Kingdon (1995) states, "People recognize problems, they generate solutions for public policy changes, and they engage in such political activities as election campaigns and pressure group lobbying" (p. 87). Not all problems, however, emerge in the *problem* stream. Kingdon maintains that there are three mechanisms by which conditions become problems: (1) through systematic indicators, (2) dramatic events, and (3) feedback based on programs, citizen input, and previous experience.

Kingdon (1995) identifies the *policy* stream as the process in which policy alternatives are considered in a sort of "policy primeval soup." These policies are generated from a variety of sources, including executive and legislative staff, interest group communities, researchers, and bureaucrats, which suggests that research utilization is evident. Kingdon also suggests that within the policy stream academic research, policy reports, and media accounts play a significant role in the alternative specification stage (more so than in agenda-setting). Moreover, 66% of Kingdon's respondents found academics, researchers, and consultants to be somewhat or very important.

The *politics* stream accounts for the many influences external to the specific problems and policies. The national mood, public opinion, political culture, electoral turnover, and interest group activity represent the most common elements. Kingdon maintains that this stream may exert the most influence, especially as policy decisions are made among the alternatives. Indeed, one of Kingdon's respondents suggests that regardless of the specific policy recommendations, decisions ultimately come from the preferences or proclivities of powerful committee chairmen. As Mooney (1991) suggests, constituents may serve as another source of influence and information within the politics stream given elected officials' inherent decision to link their preferred policies with their districts' interests.

As these separate streams flow through the policy process, phenomena affect each stream independently until for serendipitous reasons a policy actor is able to "couple" an issue across streams. This essential coupling aspect of the multiple streams framework can happen only during a brief period of time, or policy window. At such time, *policy entrepreneurs* seize the opportunity to advance their pet issues or solutions and gain political support. Kingdon notes that three qualities contribute to an entrepreneur's success: a claim to hearing (expertise or authority), political connections or negotiating skill, and persistence. These skills are often utilized in the policy stream as these policy actors "soften up" the system for policy change, then once the timing right, successful entrepreneurs pounce with their solutions or issues.

The multiple streams framework maintains that both *visible* and *hidden clusters* of policy actors influence the policymaking process. The *visible cluster* receives broad public recognition and media attention based on the high-profile participants such as executives and their cabinet members, legislative leaders, and, especially during election cycles, political party leaders and media. The *hidden cluster* includes researchers, staff members of elected officials, and career bureaucrats. Kingdon claims that the *visible cluster* is most effective in setting the agenda, while the *hidden cluster* more often generates alternative solutions. Similar to findings in the research utilization studies on the reliance upon insider and outsider sources (Mooney, 1991; Webber, 1987), the involvement patterns of these clusters suggest that various information sources enter the policy process at different points.

Having emerged from the garbage can model of campus-level decision-making, higher education researchers have since applied Kingdon's revised MS model to examine the policymaking process in the governmental context. At the federal-level, for instance, Hearn (1993) suggests that MS offers a compelling explanation for the paradox in the growth of federal student financial aid in the latter half of the

twentieth century despite substantial shifts in political control. Based on the internal and external forces attendent to federal student aid (i.e., broad political support for policies targeting the middle-class and heightened tension within Congress around hot-button issues, such as energy policy), Hearn argues that MS offers a conceptual explanation for an otherwise seemingly disjointed policy trend.

Higher education researchers have also found MS to offer compelling insights on state-level governance restructuring initiatives (Leslie & Berdahl, 2008; McLendon, 2003a; Mills, 2007) and on state merit scholarship adoption (Ness, 2008; Ness & Mistretta, 2009). Each of these studies illustrate MS's explanatory power based on the dynamic, often frenetic pace of policy developments, the non-linear connection of solutions to political developments rather than organizational functions, and the involvement of key individuals (policy entrepreneurs) to relentlessly advocate their preferred policies. Two studies also offer extensions of Kingdon's model. Based on his three-state comparative case study of statewide higher education governance reform, McLendon (2003a) recommends adding an outer layer to the MS model to account for intra-state economic, political, and demographic characteristics. The second extension (Ness, 2008), also based on a three-state comparative case study, incorporates an important element of ACF—the use of technical information—in a revised MS model to explain how states established merit aid eligibility criteria. In fact, by directly considering the role of information, researchers could find increased relevance of MS on higher education policy decisions.

Principal-Agent Theory

Concerned primarily with the relationship between two parties, principal-agent theory (PAT) essentially considers the tension between a formal authority (principal) and its designated, more specialized agency (agent). The theory suggests that such a relationship is characterized by goal conflict and by information asymmetries, which often lead to "shirking" behavior among agents and to "monitoring" efforts by principals. Having originally been applied by economists (e.g., Arrow, 1985; Jensen & Meckling, 1976; Ross, 1973) to individual relationships such as employer-employee, patient-doctor, and investor-broker, political scientists (e.g., McCubbins & Schwartz, 1984; Moe, 1984, 1985, 2005) have since applied PAT to relationships between government agencies and elected bodies. More recently, higher education researchers (e.g., Kivisto, 2005; Lane, 2007; Lane & Kivisto, 2008; McLendon et al., 2006) have applied PAT to relationships between state governments and higher education institutions and systems. These and other PAT studies offer conceptual insights on the complex relationships between governments and organizations and, more importantly for the purpose of this review, highlight the role of information (specifically the imbalance in favor of agents) in decision-making dynamics.

The core components of PAT relate to the fundamentally different perspectives and interest of principals and agents. Principals have formal authority and as a result a commitment to broader goals, but have limited time and expertise to effectuate that authority. Agents have specific expertise and as a result commitment to that field or sector often outweighing the commitment to principals' broader objectives. To

clarify PAT's central elements, consider the investor-broker relationship from economic PAT. In this relationship, the investor (principal) contracts with a broker (agent) to invest a sum of money based on the broker's expertise. Indeed, the information asymmetry between investor and broker is a defining characteristic of the contract, since investors with as much expertise as brokers would be highly unlikely to contract for these services. But, given this imbalance of information, how can investors be sure that brokers are acting in investors' best interest? The investor could regularly track the broker's activity through monthly reports. Similarly, the investor could annually evaluate the broker's performance. Or, the investor could simply trust that the broker is acting as a fiduciary. In the first two scenarios, the principal would be engaging in monitoring activities that are respectively "behavior-based" and "performance-based." The final option may most likely lead to the agent "shirking" based on the "moral hazard" of the principal not being able to directly observe the agent. As a result, brokers may act in their private interest either actively (i.e., investing strategies that best serve the broker) or passively (i.e., not making time to track the investor's account) (Kivisto, 2005). Although this example illustrates the essential elements of PAT, its application to government and politics (including the higher education sector) require modifications.[4]

As summarized by Lane and Kivisto (2008), political PAT emerged from the neo-institutionalism perspective that emphasizes the role of organizational structure and power in addition to the role of individuals (Moe, 1984; Powell & DiMaggio, 1991). Specifically, Moe (1984) suggests that contracts exist throughout government, such as constituents contracting with their elected representatives and elected officials with bureaucratic agencies. Similar to tensions in the investor-broker relationship above, political PAT includes elements of shirking by government agencies based on their relative autonomy from elected bodies and in response to conflicting goals. However, unlike an investor who can always find another broker, Moe (1984) notes the contract between elected officials and agencies is implied rather than explicit, since in governmental contexts the principals can rarely terminate their relationships with agents. Instead, McCubbins and Schwartz (1984) suggest two metaphors illustrating how Congress monitors agencies: police patrols or fire alarms. Police patrols include direct and centralized activities, such as reporting structures, approval procedures, and regular audits. Fire alarms, alternatively, are decentralized and less direct activities, such as standard operating procedures and informal practices that allow citizens, interest groups, and government officials to monitor agency behavior and to "sound an alarm" when problems arise.

In both cases, principals seek to minimize information asymmetries by directly requiring that agencies report on identified goals (police patrols) or by creating transparency of information and progress (fire alarms). Although studies of PAT do not manifestly address the use of research evidence and other information in the policy process, it seems that principals' monitoring activities could increase the likelihood of research utilization. Moreover, as Kivisto (2005) outlines, agents may engage in "signaling" activities, such as providing information and behaving in ways that might enhance the principals' perception of their competence. In essence, political PAT provides a lens that magnifies the strain between bureaucratic agencies

and their elected principals and offers insights into how agencies' organizational structure might impact their decision-making behavior.

Higher education researchers have recently identified the utility of PAT to examine the relationships between government and higher education campuses and systems (Kivisto, 2005; Lane & Kivisto, 2008; McLendon, 2003c). At the campus-level, Jason Lane (2007) examines governmental oversight of two large public research universities and illustrates the complex and varying web of oversight mechanisms that go beyond police patrols and fire alarms, in particular the importance of the press in providing latent oversight in a state without centralized, formal controls and high levels of campus autonomy. In fact, Lane specifically identifies the significant role of information gathering, including agency reports, legislative testimony, and communication with constituents, on external oversight of institutions. Other studies consider the system-level (or state-level) impact of governance structure on higher education policy (Lowry, 2001; McLendon et al., 2006; Nicholson-Crotty & Meier, 2003). For instance, studies find evidence that states with centralized higher education governance systems (i.e., consolidated governing boards) lead to lower costs for students (Lowry, 2001) and are likely to adopt less restrictive accountability programs (McLendon et al., 2006). These studies emphasize the state-level agencies' responsiveness to stakeholders and indicate that less centralized coordinating boards seem to be more strongly influenced by the principal (state government) than centralized governing boards with more formal authority thus autonomy from the state. PAT has clearly offered conceptual insights to higher education organizational behavior, yet it seems that further insights could be gained by examining more closely the precise role that information plays in principal-agent relationships.

Researchers, for instance, might specifically consider the information sources upon which principals and agents rely. Although informational asymmetry lies at the crux of PAT, few studies seek to examine the nebulous role of information. Similar to Lane's (2007) emphasis on information gathering, future research might explicate the sources of information (e.g., newspaper articles, agency reports, and constituent letters) upon which principals rely to oversee agents. Do these sources of information reduce information asymmetry between principals and agents? Or, do non-expert information sources serve to expand the imbalance of information and reinforce the two-communities perspective of policymakers (principals) and policy analysts (agents)? Additionally, given the goal conflict between principals and agents, researchers might examine the role of information sources in reinforcing this conflict. If, for instance, elected officials rely primarily on polling data and state agency officials rely primarily on empirical research, then these different information sources serve to re-enforce conflicting goals and may induce agents to shirk.

Another possible extension of PAT would be to examine the impact of elected officials and government agencies relying on the same sources of information. For example, organizations such as the National Center for Public Policy and Higher Education prepare policy briefs and reports (of varying scope and format) for both elected officials and higher education system and campus leaders. Do reports such as *Measuring Up* (NCPPHE, 2008) reduce information asymmetry? Do such reports

lead to less shirking by state higher education agencies? These questions, specific to the higher education context, offer potentially important insights on the relationship between principals and agents that would greatly inform the policymaking process.

Punctuated Equilibrium

Similar to ACF, the punctuated equilibrium theory (PET) focuses on policy subsystems and has recently been updated to account more broadly for how governments process information in the policymaking process. As originally advanced by Baumgartner and Jones (1993), PET holds that long periods of policy stability (i.e., little policy fluctuation) are interrupted by periodic "punctuations" of policy change. Borrowing the term from evolutionary biology, PET attributes policies' static nature to subsystem control which is highly resistant to change. Occasionally, however, issues reach the larger policy agenda, thus becoming more amenable to change. As initially proposed by Shattschneider (1960), PET also recognizes policy actors' tendency to "socialize the conflict," or propose a policy change in a larger forum. Baumgartner and Jones (1993) describe this strategy as "venue shopping" whereby policymakers attempt to alter the "policy image" of a particular issue in order to reframe its critical elements and thereby attract new participants to the debate. Based on more than a decade of accumulated evidence of PET's conceptual relevance (e.g., Baumgartner, Jones, & Wilkerson, 2002; Jones, Baumgartner, & True, 1998; True, 2000), Baumgartner and Jones have expanded the scope of this theory to a more extensive theory of government information processing.

Baumgartner and Jones' expanded theory emphasizes the centrality of information processing and the attendant policy dynamics associated with this governmental function. In *The Politics of Attention*, Jones and Baumgartner (2005) distinguish between the supply of information and the prioritization of information to argue that the federal policymaking arena is best characterized by an over-supply of information. As a result, the prioritization of information takes precedence. With regard to energy policy, for instance, there is no shortage of information on alternative fuel sources, efficiency strategies, and consumption patterns. Hence, policymakers' main challenge is determining what information is most relevant.

To guide the prioritization of information, Baumgartner and Jones rely on insights from Herbert Simon on the "bounded rationality" of decision-making (Simon, 1957) and on the parallel and serial processing of information by political institutions (Simon, 1983). Essentially, parallel processing entails an institution examining multiple policy issues at the same time. Regarding federal energy policy, for example, the Department of Energy and other federal agencies, both collectively and separately, simultaneously process information related to general trends, public opinion, and research findings on multiple energy-related issues. Given this level of expertise and attention, parallel processing generally lends stability to policy issues.

Serial processing, by contrast, consists of an institution or individual processing information related to a policy issue serially. So, whereas federal agencies and various committees of U.S. Congress process information simultaneously, individual elected officials often consider issues one-at-a-time, in seriatim. This is particularly

the case when an issue rises to the national spotlight and captures the *attention* of policymakers and the broader public. In fact, Jones and Baumgartner (2005) highlight the scarcity and fleeting nature of attention to explain the punctuations in policy change. As an example, Workman, Jones, and Jochim (2009) mention the fiscal crisis in the latter half of 2008, which demanded policymakers' attention and ultimately led to various economic stimulus policies. During this time, the once hot-button issues of health care reform, energy policy, and education shrunk from the policy agenda, then later re-emerged when re-framed to fit the spotlight issue (e.g., create "green jobs" by investing in alternative fuel source infrastructure such as wind turbines and clean coal technology).

Although manifestly concerned with the role of information in the policymaking process, PET does not align with conventional elements of the research utilization literature. For instance, Jones and Baumgartner (2005) define "information" much more broadly than earlier studies consideration of empirical "social science research" (Caplan et al., 1975; Rich, 1981; Weiss, 1977). Also, Jones and Baumgartner do not explicitly mention many of the traditional information sources identified in studies of state legislatures (Hird, 2005; Mooney, 1991; Webber, 1987). Research utilization studies relied primarily upon surveys or interviews with policymakers, which allow researchers to examine how policymakers use information. Instead, Jones and Baumgartner (2005) rely on longitudinal analysis of information from more easily quantifiable sources, such as newspaper articles, Congressional hearings and legislative actions, and Gallup polling data,[5] which tend to report on the status of a policy issue rather than provide specific evidence to guide policymakers' decisions.

These fundamental differences in units of analysis and research design blur the extent to which punctuated equilibrium accounts for the types of use of information. For example, Jones and Baumgartner (2005) advance a *disproportionate information processing* model, which holds that information is not proportionally allocated across policy issues, but rather is concentrated on issues that rise to the macropolitical arena. Thus, *instrumental use* consists of the role information plays in capturing policymakers' attention to a certain policy issue, as opposed to the traditional instrumental use of information by individual policymakers to decide between policy alternatives. The *conceptual use* of information, however, aligns more closely with earlier studies. Similar to the enlightenment function that research evidence can provide over the long-term (Weiss, 1979), PET includes long periods of stability for policy issues during which time information continues to accumulate and lead to incremental change. While research evidence is unlikely to lead to significant change during this static period, if research evidence become "ordinary knowledge" (Lindblom & Cohen, 1979) and external perturbations capture attention, then this information could influence the significant policy change. In fact, as with the multiple streams theory (Kingdon, 1995), according to PET, policymakers make *political use* of information by changing the policy image and through venue-shopping. For example, proponents of reducing energy consumption could change the policy image from "eco-friendly" to "reducing dependence of foreign oil" to "cost savings for consumers" and utilize information ranging from academic research to policy briefs to polling data in support of their preferred energy policy. Although PET

does not directly account for these tactical uses of information, they are indirectly captured through introduction of legislation and Congressional hearings.

The punctuated equilibrium theory offers a promising lens through which researchers might consider the use of information in the higher education policymaking process. First, researchers could examine federal higher education policy trends using data from the Policy Agendas Project led by Jones and Baumgartner. Anecdotal evidence suggests that PET may help explain recent passage, in 2008, of the Higher Education Reauthorization Act. Having been slated for consideration five years before HEA was finally reauthorized, Jones and Baumgartner's (2005) recent theory suggests that the scarcity of policymakers' attention may explain this protracted time frame. In 2003, when the Act was originally set to expire, the attention of Congress was fully attuned to the war in Iraq and to issues related to homeland security, which continued to command policymakers' attention. Moreover, given the limited scope of the ultimate reauthorization bill, Jones and Baumgartner would likely characterize this as incremental change to a stable policy issue. Nevertheless, as the impact of the 2008 HEA reauthorization becomes more discernable over time, higher education researchers might use PET to consider the extent to which it can be characterized as a punctuation in federal higher education policy.

Researchers might also consider applying PET at the state-level; however, this would require a substantial data collection project, especially if multiple states were considered. As McLendon and Cohen-Vogel (2008) suggest, researchers might identify a manageable project by focusing on a few carefully selected states with legislative bill information available online. Additionally, researchers might conduct single-state studies employing a mixed-methods research design that follow quantitative data collection and analysis strategies similar to Jones and Baumgartner (2005) and also include case study components relying on interview data and archival analysis to capture how policy dynamics might differ at the state-level and with respect to individual state contexts. As examples of the latter, Mills' (2007) single-case study suggests that PET offers conceptual relevance to higher education governance restructuring in Florida. From interviews with policy actors and an extensive review of archival data emerge three "stories of politics and policy" that emphasize the impact of executive control, a blue ribbon commission, and the press. While these narrative stories offer rich information from various viewpoints, they unfortunately blur the particular ways in which PET explains the Florida higher education governance restructuring. In another study of higher education governance restructuring, Monear's (2008) three-state study provides evidence of PET's conceptual relevance based on the strategic maneuvering of policy entrepreneurs to expand the issue in order to ultimately find support leading to enactment. These two case studies demonstrate both PET's promise for understanding higher education policymaking and, given the recent extension of PET to a broader government information processing framework, the need for extensive data collection that will allow for mixed-methods studies to examine research utilization with the punctuated equilibrium perspective.

In an effort to summarize the extent to which these five theories of the policymaking process account for research utilization, Table 1 provides a brief inventory

Table 1 Summary of research utilization in public policymaking theories

Theory	Central or secondary role of research utilization	Possible types of research use (Weiss, 1979)	Sources of information	Application to higher education
Advocacy coalition	Central. Since ACF is primarily a theory of "policy learning," the framework outlines conditions (e.g., quantifiable data, professional forum) under which research utilization is likely to influence the policy process	*Conceptual*, within coalitions shared belief systems information enlightens policy actors over time *Instrumental*, when quantitative information and a professional forum exist, information influences a particular issue *Political*, most likely for information related to the issues in the normative core (e.g., abortion) or policy core (e.g., corporate regulation) beliefs	Agencies, think tanks, academic research (preferably quantitative analysis)	Monear (2008), Ness (2008), Ness and Mistretta (2009), Shakespeare (2008)
Diffusion of policy innovations	Secondary. This framework is admittedly of a narrower scope than the others and does not aim to explain the overall policymaking process. Rather, the diffusion of policy innovations approach is limited to the adoption of certain policies	*Conceptual*, through learning from other states' policies and based on normative pressure to adopt "best practices" *Instrumental*, through reliance on policy data from other states to inform policy adoption *Political*, due to competition with neighboring states	Other states (neighboring, regional, national), regional compacts (e.g., SREB WICHE), national associations (e.g., NGA, NCSL, ECS), media	Cohen-Vogel et al. (2008), Cohen-Vogel and Ingle (2007), Doyle (2006), McLendon et al. (2007, 2006, 2005), Ness and Mistretta (in press)

Table 1 (continued)

Theory	Central or secondary role of research utilization	Possible types of research use (Weiss, 1979)	Sources of information	Application to higher education
Multiple streams	Secondary. Researchers may play role in "softening" the system within the policy stream, but politics plays much larger role in adoption	*Conceptual* and *Instrumental*, not likely due to: serendipitous nature of policy process, fleeting nature of policy opportunities, and fluid participation of policy actors. *Political*, most likely due to the role of policy entrepreneurs	Agencies, think tanks, academic research, constituents, fellow elected officials	Leslie and Berdahl (2008), McLendon (2003a), Ness (2008), Ness and Mistretta (2009, in press)
Principal-agent	Central. This theory is predicated on an asymmetrical distribution of information in which the principals (policymakers) rely on the agents (bureaucrats) for relevant information	*Conceptual*, through agents' "signaling" behavior (e.g., policy briefs) to gain principals' trust *Instrumental*, through principals' "monitoring" activities (e.g., annual reports), which provide systematic information on current policy issues *Political*, agents may tactically use information to justify their "shirking" behavior	Constituents (principals), academic research (agents), government agencies (agents), think tanks (agents)	Kivisto (2005, Lane (2007), Lane and Kivisto (2008), McLendon et al. (2006), Nicholson-Crotty and Meier (2003)

Table 1 (continued)

Theory	Central or secondary role of research utilization	Possible types of research use (Weiss, 1979)	Sources of information	Application to higher education
Punctuated equilibrium	Central. However, PET's emphasis is on governmental processing of general information (e.g., hearings, Gallup polls, media coverage) rather than research evidence	*Conceptual*, during periods of stability information informs incremental policy change and could accumulate to support punctuated change *Instrumental*, based on the "disproportionate information processing model," information on hot-button issues draws policymakers' attention to a certain issue *Political*, thought policy actors efforts to alter "policy images" and "shop venues"	Congressional hearings, government agencies, legislation, media, public opinion polls	Mills (2007), Monear (2008)

of each theory across four categories: whether research utilization serves a central or secondary role, the possible types of research use (instrumental, conceptual, and political), sources of information, and examples of higher education studies applying each theory. Three of the five theories incorporate research utilization as a central element of the framework: ACF emphasizes the role of information through policy learning; information asymmetry defines the relationship between principals and agents in PAT, and PET has been recently updated to account for how governments process information. For the other two theories (diffusion and MS), research utilization serves as a secondary element rather than a fundamental aspect of the framework. While several possibilities for research use exist in both frameworks, the primary emphasis for each theory lies elsewhere: internal determinants and regional or national influences (diffusion) and political dynamics (multiple streams). As the middle columns illustrate, all five theories of the policy process contain possible types of information use and rely on many sources of information. Although higher education researchers have applied each theory, this section identifies future research opportunities for each framework. The final section of this chapter extends this discussion by offering possible conceptual developments for the two frameworks in which research utilization serves a secondary role.

Application of Research Utilization and Theories of the Policymaking Process to the Study of Higher Education

This final section discusses how the conceptual insights from research utilization studies and theories of the policy process might guide future studies of the higher education policymaking process. In particular, two theoretical frameworks—diffusion of policy innovations and multiple streams—could be extended to capture better the role of information in the higher education policy process. While a growing number of studies in the field of higher education have deployed these two conceptual lenses, few have fully addressed the role of research utilization. After discussing the conceptual extensions, this section considers the role of "intermediary organizations"—statewide governing and coordinating bodies and regional compacts—on the state-level higher education policy process. I pay particular attention to the ways that future research might more deeply gauge the impact and influence of intermediary organizations on policy decisions. Indeed, both state agencies and regional compacts serve as significant sources of information during the policy process, yet little is known descriptively or conceptually about their roles and influence with respect to research utilization.

Diffusion of Policy Innovations: From Determinants to Delineation

While research utilization only plays a secondary role in the diffusion framework, this theory holds promise to explain more broadly the policy process through

greater attention paid to *how* policies diffuse. By more precisely delineating the ways in which policy innovations diffuse, the mounting empirical evidence of diffusion's relevance to higher education policy adoption may gain further clarity. Indeed, just as recent studies have greatly informed our understanding of the determinants of policy innovation, rich description of how these policies diffuse may reveal additional factors that could be measured empirically. Critically, researchers might consider what role policy information plays in the diffusion process. That is, does the type of information (e.g., policy brief, testimony, etc.), the informational agent or source, the timing of information, or its perceived credibility matter in terms of whether or not a policy diffuses? By examining questions such as this, researchers stand to better understand how research utilization is affected by internal determinants and how information affects policy diffusion.

Over the past decade, research on policy diffusion has generated distinctively new perspectives into what conditions influence policy adoption. A raft of longitudinal studies in the past five years have found certain political, economic, and social factors within states as significant influences on the adoption of state higher education policy. McLendon et al. (2005), for example, found Republican control of state legislatures to be a predictor of financing innovations. Doyle (2006) identified education and demographic attributes of the states as drivers of the adoption of broad-based, merit aid policies. McLendon, Hearn, & Deaton, et al. (2006) study of statewide governance changes found certain fluctuations in political leadership as key influences on adoption of state governance reforms. All of these studies empirically modeled diffusion, but their research designs and analytic procedures limited the manner in which diffusion could be studied.

Little research, for instance, has examined *how* policy ideas migrate across statelines or across policy communities within a given state. For example, could the impact of Republican control of state legislatures on policy adoption be related to the partisan networks of policy information that they share? Given the rising prevalence and prominence of conservative think tanks (Rich, 2004), might Republican legislators be better informed on policy alternatives for increased accountability initiatives, as an example, than their colleagues across the aisle? How do academic studies and policy reports affect policy diffusion? For instance does the research finding related to the "negative social consequences" of state merit scholarship programs (Heller & Marin, 2002) mitigate the diffusion of this policy innovation? Furthermore, what role do the information dissemination efforts of national policy organizations, such as the National Center for Higher Education Management's Information Center (www.higheredinfo.com), have on policy diffusion? As information on higher education policy trends becomes more broadly distributed, will the national model of diffusion become more prevalent than regional or neighboring state models?

Mixed-methods analyses of the diffusion of higher education policy would also extend diffusion's descriptive and conceptual relevance. In fact, to some extent, the mixed-method approach has already shown promise in a set of parallel, but unrelated studies on the diffusion of merit aid programs. Will Doyle's (2006) event history analysis of merit aid program adoption gauges the effects of a host of covariates

related to state characteristics and diffusion influences across all 50 states over a 12 year time span. As noted, Doyle finds that demographic and education variables drive merit aid policy adoption more so than diffusion influences. Two qualitative studies also find elements to offset regional diffusion pressures to adopt merit aid programs (Cohen-Vogel & Ingle, 2007; Ness & Mistretta, in press). As mentioned in the earlier diffusion section, these qualitative case studies find that although regional consortia could facilitate the diffusion of merit aid policy, certain internal state characteristics, such as college affordability, student migration patterns, and even constitutional language, trumped the diffusion impetus in some states. Notwithstanding the contributions of these case studies to delineate unique state context and characteristics from diffusion influences the case study approach is ill-equipped to measure merit aid diffusion across all 50 U.S. states or to identify the effect size of intra-state trends. Similarly, EHA studies are not well suited for understanding the nuance of how state context affects policy decisions. Future studies might integrate the qualitative and quantitative research designs to more fully apply the diffusion of policy innovations framework.[6]

Multiple Streams: Expanding the Policy Stream

Although most often applied to the agenda-setting phase of the policy process, the multiple streams framework also serves as a useful lens through which to conceptually understand the role of information in the legislative adoption of higher education policy. While this framework's explanatory power largely rests with its ability to elucidate political phenomena within the "black box" of the policy process, information often plays a large role in policy entrepreneurs' support for their preferred solutions. The multiple streams framework as outlined by Kingdon (1995), however, does not seem to fully account for research utilization. This framework's explanatory power could be extended by shifting its emphasis on policies (or solutions, according to the original garbage can theory) to a more central role in the framework.

In fact, in a recent comparative-case study of state merit aid policy adoption, I suggest this conceptual alteration in a revised multiple streams framework that also includes elements of advocacy coalition framework and electoral connection (Ness, 2008). According to this model, the *policy field* represents a substantive revision of MS by broadening the policy (or solution) stream from one of three streams to the field through which the *politics* and *problem* streams flow. This modification seems more consistent with Kingdon's (1995) conceptualization of the "alternative specification" process, during which policies are the principal consideration, as opposed to the "agenda setting" process when policies more directly compete with elements in the politics and problem streams. Moreover, this revised MS model reflects Kingdon's claim that during the alternative specification phase, instead of two of the three streams coupling, the politics and problem streams must connect in support of a preferred solution.

This conceptual extension of MS is also consistent with other theories of the policymaking process reviewed in this chapter. For example, the policy field incorporates elements ACF, such as the impact of policy information from sources within and outside the state. Rather than one of three factors that explain policy formulation, the policy field more accurately represents the landscape of potential policy ideas and related trend data and research evidence on which policy decisions are made. The policy field also provides conceptual space within the multiple streams framework for punctuated equilibrium's contention that "policy-oriented learning" occurs when subsystems learn from other policy decisions (Sabatier & Jenkins-Smith, 1999). Similarly, the policy field seems to better represent the regional and national migration of policy ideas as outlined by the diffusion of policy innovations framework (Berry & Berry, 2007).

Finally, the expanded policy stream conceptualization reflects the crucial role of information for policy entrepreneurs. As these policy actors garner support for their pet policies, they seek to align information about relevant policy trends and results with political phenomena and related problems. The research utilization studies examining policymakers' preferred sources of information seem to relate directly to the strategies that policy entrepreneurs might employ. For instance, although the universe of information on a given policy issue is constant across states, policy entrepreneurs in states with high capacity non-partisan research organizations (Hird, 2006) may rely more heavily on policy analysis vetted by issue experts, whereas policy entrepreneurs elsewhere may rely on ideologically-driven information from think tanks (Rich, 2004). The policy field allows researchers to conceptually account for these state-level differences by connecting policymakers' preferred policies to the information used to garner support. This prospect for future studies also responds to McLendon and Cohen-Vogel's (2008) recommendation that researchers examine how the content of policy entrepreneurs' proposed solutions might affect the ultimate policy decision. Indeed, by attending more closely to policy entrepreneurs' utilization of research evidence, future studies could demonstrate the extent to which information, as compared to political maneuvering, drives the policymaking process.

Intermediary Organizations

The diffusion of policy innovations and multiple streams frameworks would also benefit from greater attention paid to two intermediary organizations that often provide policy information and expertise: regional compacts and statewide higher education agencies. As the term suggests, intermediary organizations serve a translating function between two principals with different values and perspectives, which for higher education would be governments and colleges.[7] Studies in other related policy sectors have shown the important functions of intermediary organizations. In K-12 education, for instance, Honig (2004, 2008) illustrates the role that intermediary organizations at the district-level play in increasing evidence-based curriculum and pedagogical practices. Intermediary organizations, such as national research

councils and technology transfer offices, have also been shown to maximize research utilization (Bozeman, 2000; Braun, 1993; Guston, 2000, 1999; Slaughter & Leslie, 1997). This evidence suggests that similar influences could exist at the regional- and state-levels for higher education. State agencies and regional compacts most often fulfill these intermediary functions and, as such, the following sections outline how each might be conceptualized as an intermediary organization and how researchers might examine these organizations' impact on research utilization.

Regional compacts. For state-level higher education policymaking, regional compacts serve as valuable information sources and often as advocates for certain policy initiatives. All states, with three exceptions (New Jersey, New York, and Pennsylvania), belong to one of four regional compacts: Western Interstate Commission for Higher Education (WICHE), Midwest Higher Education Compact (MHEC), New England Board of Higher Education (NEBHE), and Southern Regional Education Board (SREB). Consistent with their original missions to share resources and advance education in their regions, these compacts facilitate articulation and tuition reciprocity agreements and lend expert analysis on higher education issues that individual states may not have the capacity to produce (Harcelroad & Eaton, 2005).

Regional compacts can be classified as intermediary organizations primarily based on structural and functional characteristics. Structurally, regional compacts serve both elected officials and higher education administrators. State participation in compacts, which requires membership fees, is approved by elected officials and compacts' boards of directors include governors and legislators from member-states. Compacts also work directly with state higher education officials to coordinate member-state efforts on policy goals and to systematically collect and distribute data. Functionally, compacts provide policy briefs targeted to elected officials and more detailed policy reports for higher education officials. Similarly, the professional staffs of compacts consult with policymakers individually, provide formal testimony, host meetings of state higher education leaders, and collaborate with higher education officials on state and regional policy initiatives. In many ways, regional compacts function as a combination of think tanks and state agencies. They produce reports and possess expertise similar to think tanks, but since states pay membership fees, policymakers may value this information as less biased than other partisan-aligned think tanks. However, without the formal reporting structure of state agencies and given their location outside of state capitals, regional compacts maintain an outsider status that can mitigate or accentuate their influence on the policy process. The conceptual understanding of regional compacts' structural and functional characteristics on state higher education policy could be enhanced by greater attention to this boundary function.

Similar to suggestions for the extension of public policy theories discussed earlier in the chapter, a deeper understanding of the role that regional compacts play on policy adoption would add clarity to the role of research utilization. For instance, to what extent do policymakers value or rely upon information provided by regional compacts? Does the type of information (i.e., original empirical research, descriptive data reports, policy briefs) influence the liklihood of utilization? Does the

frequency or mode of interaction (i.e., testimony, written formal reports, individual communication with legislators) matter? Also, do elected officials' participation on a compact's board of directors or various committees serve to moderate the two-communities divide? Studies addressing questions such as these would specifically inform the utilization of research and could more broadly inform theories of the policymaking process.

Based on their roles as intermediary organizations, I propose three possibilities for examining the role of regional compacts on higher education policy. First, in the vein of previous research utilization studies (e.g., Hird, 2006; Webber, 1987), researchers might survey policymakers within a given region or nationally in an effort to gauge their reliance on regional compact information. Such surveys may reveal patterns of preference that align by region or by various state-level characteristics. For instance, states with more professionalized legislatures may rely less on regional compacts given the greater legislative staff capacity. Or, on the other hand, states with citizen legislatures and more traditional political cultures may rely less on regional compacts based on their preference for information sources within the state.

Second, researchers might examine the influence of legislators' participation in regional compact activities. In a comparative case study of merit aid criteria determination (Ness, 2008), I find evidence from the West Virginia policy episode to support this influence. Multiple respondents indicated that legislators very often deferred to state Senator Lloyd Jackson, who also served as Chair of the Senate Education Committee, on education matters by virtue of his leadership role within SREB. This lends supports to Krehbeil's (1991) claim that the legislative committee structure facilitates issue experts and serves to mediate the need for every legislator to be deeply informed on every issue. Does this trend hold across regions and across states? Are certain regions more likely to value legislators' service to outside agencies? How does the absence of these opportunities affect the three states not participating in regional compacts (New Jersey, New York, and Pennsylvania)? This last question leads to the third suggestion for examining regional compacts' influence on research utilization.

Researchers might compare the role of information in policymaking process across member and non-member states of regional compacts. This might take the form of comparative case studies that include one or more of New Jersey, New York, and Pennsylvania in addition to comparable states selected from the region or other peer states outside the mid-Atlantic. Such a research design could provide in-depth analysis of the precise functions and influence of regional compacts that inform the extent to which these non-affiliated states have a greater or lesser reliance on research evidence. These influences could also be examined by incorporating a variable for regional compact membership in quantitative models. If EHA models of policy diffusion, for instance, could be extended to include measures of research use, then an additional regional compact variable (either a dummy variable in which New Jersey, New York, and Pennsylvania = 0 and all other states = 1; or a nominal variable that accounts for the particular compact) would provide empirical evidence on the effect of regional compacts.

State higher education agencies. Although the manner in which state agencies govern higher education varies widely, state-level higher education agencies serve crucial roles in providing information to and interceding between government and colleges. The conventional classifications for statewide governance structures include consolidated governing boards (all higher education institutions are governed by one board), coordinating boards (one board represents statewide interests, but single- or multi-institution governing boards retain varying degrees of authority), and planning agencies (state agency has very little formal authority, as with coordinating board structure, single- or multi-institution governing boards retain varying degrees of authority).[8] These three governance arrangements range in the level of formal authority, thereby influencing the dynamic of the state agencies relationship with the government and campuses. Early studies of statewide higher education governance suggest that coordinating and planning agencies are more likely advance state interests over campuses than are consolidated governing board arrangements (Berdahl, 1971; Millet, 1975). These differences have important implications for their role as intermediary organizations.

Regardless of the degree of centralization, the agencies largely emerged in the mid-twentieth century with the primary function to buffer state government from postsecondary education institutions. This buffering (or boundary) role of state agencies best represents their function as intermediary organizations. Prior to the creation of statewide governance systems, campus leaders directly represented their interests to state legislatures and governors. The resulting policy and appropriations decisions often reflected the strength of these individual relationships more so than wider interests of the state. Without an intermediary organization, for example, how could legislators determine which new campus buildings were of highest priority or how to equitably appropriate funds across varying institution types (e.g., flagship research universities, regional colleges and universities, community colleges)? These governance structures now have varying levels of influence on statewide master planning, budget allocations (or recommendations), and academic program approval. These general structural differences also suggest that higher education agencies may impact research utilization in the policy process.

As with the impact of regional compacts on information use, I propose two suggestions for studying state agencies' influence on research utilization. First, researchers might examine the impact of different governance structures on research utilization. Recent studies considering the effect of governance structure on state-level higher education policy might be extended to account for how effectively these agencies provide information during the policy process. For instance, McLendon et al. (2006) show that states with centralized agencies are more likely to adopt less restrictive accountability policies than states with coordinating structures. They attribute this difference largely to divergent loyalties: governing boards to their campuses and coordinating boards to the state. Do these loyalties also impact agencies' attempts to utilize research evidence? Are governing boards, for example, more likely to sense the two-communities divide, and thereby avoid advocating their preferred policies in the policymaking arena? If studies continue to show

that governance structure influences policy adoption, then an examination of *how* agencies do so seems appropriate.

The second suggestion for examining the role of information and state agencies concerns a recent development in the study of higher education governance: interest group activity. Specifically, some researchers contend that state agencies' efforts to represent campus or system interests to state governments is situated within a state's interest group landscape and therefore could be informed by interest group studies (Tandberg, Ness, & McLendon, 2009). In fact, Tandberg's (in press) recent study finds that states with increased levels of interest group activity receive more state funding. Moreover, an interaction variable between interest group activity and governance structure shows the significant effect on increased appropriations for states with the combination of high interest group activity and consolidated governing boards. Such conceptual developments could be complimented with studies that further examine how and why this effect occurs. For instance, as Wright's (2003) study of the increasing role of information in interest group behavior suggests, are state agencies using district-level data to lobby for appropriations increases? Are consolidated governing boards more effective due to their formal authority and system-wide data systems offering a rich information source from which to advocate preferred policies? These and many other questions informed by the interest group literature offer fresh conceptual perspectives through which to examine research utilization by state higher education agencies.

Conclusion

Connecting research and policy persists as one of higher education's most pressing challenges. ASHE presidents, think tank leaders, and government officials support strengthening this critical link. Currently, two growing streams of literature—research utilization and policymaking process theories—offer insights on how researchers might examine the role of information in the higher education policymaking process. The studies of research utilization present useful models for how research is used and examine the impact of several sources of information. The inventory of how five theories of the policy process incorporate the research utilization literature outlines possible conceptual extensions of these frameworks and holds promise for increasing our understanding of how research influences policy. Researchers might also consider the suggested directions for future study of the influence of intermediary organizations on research utilization. Indeed, recent studies of higher education policy adoption, political dynamics, and governance structure have led to important conceptual and practical insights, which might be complimented by more direct consideration of research use.

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Notes

1. Although this chapter's scope is limited to research-and-policy connections, I occasionally mention insights from relevant research-to-practice studies (e.g., Coburn, Honig, & Stein, 2009; Honig, 2004; Hood, 2002). Given the differences in policy and practice communities (elected officials versus trained professionals), it is important not to conflate research utilization in policy and practice. So, when I mention research-to-practice connections I make every effort to do so transparently.
2. In his address, Terenzini also mentions similar pleas of outgoing ASHE presidents, including Conrad (1989) and Nettles (1995), and offers suggestions for future policy-oriented higher education research. The Leslie and Beckham issue specifically addressed the state of higher education research and thus emphasized its influence on policy and practice.
3. Political scientists most often measure this variability on a scale of legislative professionalism that provides three categories (Squire, 2000). Citizen legislatures are characterized by part-time legislatures who often hold other full-time jobs, by fewer days in session usually 2 or 3 months, by low pay, and by few legislative aides or professional staff. Professional legislatures are more similar to U.S. Congress with well-paid, full-time legislators, longer legislative sessions usually 6–10 months, and more legislative staff. Hybrid legislatures represent the middle-range category of legislative professionalism.
4. See Lane and Kivisto (2008) for a comprehensive review of economic and political PAT (pp. 150–154). Indeed, I rely heavily on their work for this brief overview of PAT. Their *Handbook* chapter also offers compelling suggestions for how PAT might be applied to the study of higher education governance.
5. For more information about the data elements upon which Jones and Baumgartner (2005) rely, see the Policy Agendas Project website (www.policyagendas.org).
6. I am grateful for conversations with Will Doyle about the potential benefits of mixed-method designs to study policy diffusion.
7. Intermediary organizations are broadly similar to "boundary organizations" and "boundary-spanning organizations," yet each represents slightly different conceptual perspectives. See Guston (2001, pp. 400–402) for a summary of their distinctions.
8. Even within these three classifications of governance arrangements, however, variation abounds. For example, some states have one single consolidated governing board for the entire higher education system, while others have separate governing boards for 2- and 4-year institutions. See McGuinness (1997), McLendon (2003b), and the Postsecondary Governance Structures Database (http://www.ecs.org/html/educationIssues/Governance/GovPSDB_intro.asp) for more information.

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From Theory to Action: Exploring the Institutional Conditions for Student Retention

Vincent Tinto

Though significant strides have been made in constructing a theory of student departure, there is still a good deal of disagreement over the details of such a theory (e.g., Bean, 1980; Braxton, 2000; Braxton, Hirschy, & McClendon, 2004; Cabrera, Castaneda, Nora, & Hengstler, 1992; Nora, 2001; Seidman, 2005; Tierney, 1992, 2000). This is not to say that we have not made substantial progress in our efforts to better understand the process that leads students to leave higher education. As it pertains to the process of student institutional departure, namely that which leads individuals to depart from their institution of enrollment, it can be said that we now have a reasonable understanding of the broad dimensions of that process. The same can be said of our understanding of the process of student retention, the series of events which leads individuals to stay within the institution in which they first enrolled. Though the process of student retention is not the mirror image of student institutional departure, we now know more than ever about the forces shaping student retention and graduation. The same cannot be said, however, for our understanding of institutional practice to promote greater institutional retention and graduation. Though we are increasingly able to explain why some students leave and others persist within an institution and have been able to point out some types of action that institutions can take to improve student retention, we have not yet been able to develop a comprehensive model of institutional action that would help institutions make substantial progress in helping students continue and complete their degree programs within the institution.

Consider the data on national rates of college completion, in this case the proportion of students who complete their degrees from their initial institution of registration. Despite years of effort and a good deal of research on student retention, rates of college completion in the United States do not appear to have changed appreciably in the past 20 years, if not longer (Carey, 2004). Among those who first enrolled in a 4-year institution, for instance, rates of institutional completion within 6 years have held steady at slightly more than 50% (National Center for Education

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Statistics [NCES], 2005). Among those who first enrolled in a public 2-year college, only some 25% earn a degree or certificate from their initial institution within the same time. Of course some students never intended to earn a degree and others go onto complete their degrees or certificates elsewhere. They persist to completion but not in their initial institution of enrollment. But though we know that overall degree attainment anywhere in higher education (student persistence and system completion) is greater than the popular press would have us believe, it is still the case that roughly 6 of every 10 students who began in either a four or 2 year institution do not complete either a 2 or 4-year degree or certificate within 6 years of entry in the institution in which they first enroll (NCES, 2003). Though there are many reasons why this is the case, it is clear that gains in our understanding of the process of student retention have not been translated into gains in rates of institutional completion.[1]

This is particularly evident in our continuing failure to promote the success of low-income students. Though enrollment of low-income students in higher education has grown over the past 20 years and the gap in access to higher education between low and high-income students shrunk, gains in rates of 4-year college completion have not followed suit. Data from a recently completed 6-year national longitudinal study of students who began college in 1995–96 bears testimony to this fact (NCES, 2003). While 56% of all high-income students (dependent family incomes of greater than $70,000) persist to earn a 4-year degree within 6 years of beginning their studies, only 26% of low-income students of dependent family income of less than $25,000 do so (NCES, 2003, Table 2.0C).

Understandably, this reflects the fact that a greater proportion of low-income youth enter 2-year rather than 4-year colleges and, in doing so, reduce the likelihood of earning a 4-year degree (Dougherty, 1987; Grubb, 1991; Shaw, 1997). Whereas nearly 6 in 10 4-year college entrants earn a bachelor's degree within 6 years, only a little over 1 in 10 public 2-year college entrants do so (NCES, 2003, Table 2.1A). But even among those who began higher education in a 2-year college, income matters. While nearly 25% of high-income students persist to earn a 4-year degree within 6 years, only 8% of low-income students do so (NCES, 2003, Table 2.1C). In other words, the chances of a low-income student completing a bachelor's degree within 6 years when beginning college in a 2-year college is around one-third of that for a high-income student who also begins in a 2-year college.

Similar differences in likelihood of completion exist among 4-year college entrants. Of those who began higher education in a public 4-year college or university in 1995–1996, only 48% of low-income students persist to earn their 4-year degree within 6 years, while 67% of high-income students did so (NCES, 2003, Table 2.2C). More telling still is the fact that even among those who began at a 4-year college with the stated goal of obtaining at least a 4-year degree, only a little over half of low-income students earned a bachelor's degree (53%) as compared to over three-quarters of high-income students (77%) (NCES, 2003, Table 8.6).

Of course, some of these differences can be attributed to well-documented differences in levels of academic preparation of students entering 2- and 4-year institutions (Cabrera, Burkum, & La Nasa, 2005) and to the fact that low-income students are considerably less likely to attend elite institutions where graduation

rates are quite high. But even among students attending the top tier of institutions, presumably among the most talented and motivated students in higher education, it proves to be the case that students from the lowest socioeconomic quartile are less likely to graduate (76%) than students from the highest quartile (90%) (Carnevale & Rose, 2003, p. 14).

The facts are unavoidable. Though access to higher education has increased and gaps in access between groups decreased, rates of college completion generally and gaps in completion between high- and low-income students have not followed suit. Indeed, they appear to have widened somewhat over the past decade (NCES, 2005, Table 5B). Clearly there is still much to do to translate access to college into meaningful opportunity for success in college among low-income students. Just as clear is the need to move beyond our theories of student retention to a model of institutional action that provides institutions reasonable guidelines for the development of policies, programs, and practices to enhance student retention and completion, in particular among those from low-income backgrounds.

Moving to a Model of Institutional Action

We begin our pursuit of a model of institutional action by first considering the nature of theory and research on student retention and persistence. After doing so, we turn our attention to what is known about the nature of institutional environments that promote student retention and institutional completion. As we do so, we will note the types of actions institutions have taken to more effectively promote student retention and completion, in particular among those of low-income backgrounds. Finally, we will conclude with several thoughts about the types of additional research on institutional action we need to pursue in order to develop a more fully articulated model of institutional action. Our goal in doing so is rather modest. It is to continue a conversation about how such a model might constructed that has been begun by others (e.g., Astin, 1975; Beal & Noel, 1980; Berger, 2001; Braxton, 2001; Braxton et al., 2004; Braxton & McClendon, 2001; Clewell & Ficklen, 1986; Kuh, Kinzie, Schuh, Whitt, & Associates, 2005; Swail, Redd, & Perna, 2003; Tinto, 2005; Ziskin, Gross, & Hossler, 2006).

As we pursue this conversation we will distinguish between the terms retention and persistence that are often confused in the literature. For the purpose of this chapter, retention refers to the perspective of the institution. Institutions seek to retain students and increase their rates of institutional retention. By extension the term student retention refers to that process that leads students to remain within the institution in which they enroll and earn a certificate or degree. By contrast, persistence refers to the perspective of the student. Students seek to persist even if it may lead to transfer to another institution. By extension, the term student persistence refers to that process that leads students to remain in higher education and complete their certificate or degree regardless of the institution from which the certificate or degree is earned.

Finally it bears repeating that our focus here is entirely on institutional action. Though it is more than apparent that student retention is influenced by a range of events external to the institution, personal, state, and federal, we are concerned here solely with the actions institutions can take on their own to further the retention and graduation of their students.

Reflections on Current Theories of Student Retention

The research on student retention and persistence is voluminous. It is easily one of the most widely studied topics in higher education over the past 30 years. That this body of work has not yet resulted in a model of institutional action reflects a number of issues.

First, much of our work on student retention makes the implicit assumption that knowing why students leave is equivalent to knowing why student stay and succeed. This is not the case. The process of retention is not the mirror image of the process of leaving.

Second, too much of our research focuses on theoretically appealing concepts that do not easily translate into definable courses of action. Take, for instance, the concept of academic and social integration. While it may be useful for theorists to know that academic and social integration matter, that theoretical insight does not tell practitioners, at least not directly, what they would do to achieve academic and/or social integration in their particular setting. The same can be said of the related concepts of academic and social involvement or engagement.[2] Though the early work of Pace (1980), Pascarella and Terenzini (1980), Astin (1984, 1993), and, more recently, Kuh (2003), has done much to operationalize these concepts in ways that can be reasonably measured and in turn used for institutional assessment, that work does not yet tell us how institutions can enhance integration or what it now commonly referred to as engagement. And while it is true that recent studies, such as those by Tinto and Russo (1994), Tinto (1997), Engstrom and Tinto (2007, 2008) Zhao and Kuh (2004), and Kuh et al. (2005) have looked into practices that enhance engagement, there is a great deal more to do.

Third, too much of the research on student retention focuses on events, often external to the institution, that are not under the immediate ability of institutions to affect. Though informative, such research does not lead to reasonable policies and practices. For instance, though it is enlightening to know that student high school experiences and family context influence retention in college and persistence generally, such knowledge is less useful to institutional officials because they often have little immediate control over students' prior experiences or private lives. This is not to say that such information cannot be useful at least in an indirect way. In this case, knowing about the role of family context may help institutions more effectively configure their support programs for differing student situations (e.g., Torres, 2003a, 2003b). But it does not tell the institution either how to effectively tap into issues of family context or whether such actions are more likely to yield increased retention.

Fourth, there remains much confusion about what constitutes student retention and persistence. We continue to struggle with competing, if not conflicting, definitions and measures that on one hand see persistence as the completion of a college degree and, on the other, view it as students being able to fulfill the goal for which they began college. In other cases, some define persistence as continuous enrollment, while others measure persistence as success in one course at a time regardless of periodicity.

This confusion can also be seen in research on student leaving and on degree completion. Regarding the former, too many studies fail to distinguish between the type of leaving that may be said to be voluntary from that which is non-voluntary. For instance, leaving that results from a lack of personal contact is likely to be voluntary, whereas that arising from external events such as family obligations that pull a person away from college might be characterized as non-voluntary. Regarding the latter, some studies of student completion still do not distinguish between institutional completion that is the result of continuous enrollment in an institution from that occurring over time from intermittent enrollment at an institution (i.e., stopout) or between continuous or discontinuous enrollment in one institution (institutional completion) from that occurring through transfer to another institution (i.e., system completion). Such confusion matters, because the findings of different studies that employ different definitions and/or measures of student retention and persistence or success muddy the waters for institutions that seek guidance on the actions they should take to promote student retention and completion on their campuses.

Finally, much of the research and theoretical work on student success generally has been carried out in isolation, with one area of work separated from another. Regarding institutional action, some studies have focused on issues of financial aid, others on campus climate, and others still on programming such as freshman seminars. The result is that we have been unable to provide institutions with a comprehensive model of action that would allow them to weigh the outcomes of different forms of action and plan accordingly.

All this should not be taken to suggest that theory is not important or useful. It is, certainly as it pertains to understanding the process of student retention. Rather it is to argue that we have not yet been able to translate that understanding into forms of knowledge that faculty, staff, and administrators can readily use to form policies and practices to enhance student retention and completion on their campus, in particular for students from low-income backgrounds.

The Dimensions of a Model of Institutional Action

We will focus here on the conditions within institutions that are associated with student retention and completion rather than on the attributes of students themselves. We do so because it is too easy to see low rates of institutional retention as solely the responsibility of students. This is not to say that individual attributes do not matter. In some cases, they matter greatly. We all know of stories of students who by shear drive succeed against what are for most students seemingly insurmountable barriers.

At the same time, there are other students who do not succeed even when placed in settings that favor success. Nevertheless, though some might argue otherwise, student attributes such as personality, drive, and motivation are, for the great majority of institutions, largely beyond immediate institutional control.[3] This is not the case, however, for the conditions or environments within universities and colleges in which students are placed. Such environments are already within institutional control, reflecting as they do past decisions and actions. Those conditions and the decision that lead to them can be changed if institutions are serious in their pursuit of increased student retention. Since our focus is on institutional action, it makes sense then to begin our search for a model of action with those aspects of institutional environment that have been shown to shape student retention and are within the capacity of institutions to change.

In doing so, we take it as a given that there are limits to institutional action; limits to what institutions, acting on their own, can do to increase student retention and graduation. Other forces shape student retention over which institutions have little direct control. Understandably, limits to institutional action are greater in nonresidential institutions, such as urban 2-year colleges, that serve large numbers of working and part-time students whose time on campus is often very limited, than it is for smaller private residential institutions where a much larger proportion of student life is spent within the institution and therefore within the reach of institutional action. Among the former institutions, students may spend but a small fraction of their time on campus and live in circumstances whose influence dwarfs that of the institution. For many such students, going to college is only one of a number of tasks that occupy their day. This does not mean that improvement in student retention is not possible in these cases, only that it may be more difficult to come by and more limited in scope. Nor does it mean that there are not other actions that other actors, local, state, and national, can take to enhance the likelihood of student retention and completion. For this chapter at least these actions are beyond the scope of the current conversation.

Conditions for Student Retention

What then does research on student retention tell us about the conditions within colleges and universities that promote retention and graduation? Though the research on this question is understandably broad, findings converge on four institutional conditions that are associated with student retention. These are expectations, support, feedback, and involvement.

Expectations

What students expect of the environment in which they enter and of themselves as a result of their experiences within that environment determines in part what students do. Though many students begin higher education knowing what to expect, others

do not. Low-income students are typically the first in their families to attend college and as a result frequently do not have the sorts of shared knowledge, often referred to as cultural capital, that more affluent students commonly possess about the nature of the college experience and what it takes to succeed in college. They often do not know what to expect.

As a reflection of institutional action, student expectations are directly and indirectly shaped by a variety of actions not the least of which are the expectations the institution establishes for its students, as represented, for instance, by the statements and actions of its members, administrators, faculty, and staff. Those that most directly influence student retention that concern us here have to do with the clarity and consistency of expectations and their level, that is to say whether they expect much or little of the student. This is not to say that other actors do not also influence student expectations. It is well established that student peer groups also influence student expectations as do significant others beyond the campus. Nevertheless, for the purposes of the present discussion we treat those expectations as beyond the reasonable reach of institutions to directly influence.

Knowing What to Do to Succeed

Student retention and completion is, among other things, conditioned by the availability of clear and consistent expectations, specifically about what students need to do during college be successful. Roughly speaking, these fall into three broad areas of expectation; those for success in a course, in a program of study, and in the institution broadly defined. Expectations of these sorts are typically expressed in concrete ways through coursework and formal advising and in less concrete ways through informal advising and/or mentoring that arises through a variety of formal and informal networks on campus such as that within student peer groups and faculty-student contacts.

Expectations about success in the classroom are primarily influenced in formal and informal ways by faculty and to some degree by student peers. The information faculty provide in their syllabi, course materials, and conversations with students informs students of what is expected of them to succeed in the classroom (e.g., what is required to attain different grades). But so also do faculty behaviors in particular those pertaining to the assessment and grading of student work. Unfortunately, it is sometimes the case that faculty statements on formal documents such as syllabi and faculty assessment behaviors in classrooms do not always convey the same expectations about what is required for successful class performance. Here as in other cases, consistency matters and actions speak louder than words.

The same applies to program and degree completion. Knowing the rules, regulations, and requirements for course, program, and degree completion is part and parcel of student success. To paraphrase the famous New York Yankee philosopher, Yogi Berra, “If you don’t know where you’re going, you might not get there.” Student expectations about what they need to do to be successful in college, at least in the formal sense, is shaped not only by the prior knowledge students possess

at entry, but also by academic advising whether by faculty or staff (Frost, 1991; Elliott & Healy, 2001; Metzner, 1989; Ryan & Glenn, 2003; Young, Backer, & Rogers, 1989). Seidman (1991), for example, found that community college students who received post admission advising three times during the first semester to discuss issues such as course schedules, and academic and social involvement, persisted at a rate that was 20% higher than those who only participated in the college orientation program. Metzner's (1989) study of over one thousand freshmen at a public university found that student satisfaction with the quality of the advising they received was positively related to persistence to the second year in part because it was positively associated with higher grade point average during the first year. Unfortunately it remains the case that formal faculty advising remains a "hit and miss" affair on most campuses; some students are lucky to have an informed advisor and find the information they need, while others are not (Heverly, 1999).

Advising is particularly important to the success of the many students who either begin college undecided about their major and/or change their major during college (Lewallen, 1993).[4] The inability to obtain needed advice during the first year or at the point of changing majors can undermine motivation, increase the likelihood of departure, and for those who continue, may result in increased time to degree completion as they transfer to other programs (Lewallen, 1995). Though students may make credit progress, they do not make substantial degree-credit progress. Indeed it is sometimes the case that students will persist to the third year, even the fourth, yet not complete their degree because while they continue to earn credits they earn too few degree credits to graduate. They may have started in one major but transferred to one if not two other majors without become set on a course of study. In this case, the issue is not just advising the undecided student, or what is commonly referred to as developmental advising, but advising students who seek to change their programs of study.

Student expectations are also shaped by the sharing of accumulated knowledge, both formal and informal, that occurs on campus among and between faculty, staff, and students. But not all students are able to access that knowledge. Some students are able to locate that knowledge, often through informal networks of peers, while others, more commonly first-generation low-income students, are not. The acquiring of such knowledge may arise in mentoring relationships or more commonly in informal networks among faculty, staff, and students, and among peers as sometimes is the case for under-represented students who are able to make connection to other peers who are already on campus (Anderson & Ekstrom, 1996; Twomey, 1991). Attinasi's (1989) research is particularly instructive as it sheds light on how ethnic peers who are already on campus help new students develop what he calls "cognitive maps" of the physical, social, and academic geographies of the campus. These maps help new students cognitively manage and navigate what might otherwise be a foreign campus. For low-income students generally, the acquisition of that knowledge may occur through on-campus programs such as Student Support Services that are intentionally designed to help low-income students and first-generation college students safely navigate the sometimes turbulent waters of the institution.

Expectations for Effort

Student retention is also influenced by the expectations the institution establishes for the quality or level of effort required for successful performance (Pace, 1980). High expectations are a condition for student success, low expectations a receipt for failure. Simply put no one rises to low expectations. The literature on motivation and school performance noted by Schilling and Schilling (1999), for instance, argues that expectations have a powerful effect on student learning and performance. As they note "merely stating an expectation results in enhanced performance, that higher expectations result in higher performance, and that persons with high expectations perform at a higher level than those with low expectations, even though their measured ability is the same" (p. 5). The findings of the National Survey of Student Engagement [NSSE] are even clearer. Student perceptions of the level of effort expected of them by the institution are directly correlated with their level of effort, and in turn with their success in college (Kuh, Kinzie, Cruce, Shoup, & Gonyea, 2007).

It is regrettable therefore that students, especially during the critical first year of college, appear to expend less effort in their studies than faculty might expect or desire. Data from the National Survey of Student Engagement indicate that first-year students on average spend about half the time studying than faculty deem necessary for successful learning (Kuh, 2003; NSSE, 2006, p. 19, Fig. 7). Too frequently we hear of instances where faculty and staff claim to expect one set of behaviors or level of effort by their students, while students seem to expect something entirely different. What is striking is not merely that students report that they work less than they had expected when they first entered the institution (Schilling & Schilling, 1999; NSSE, 2006, p. 19, Fig. 7) but that their expectations for the amount of work or effort they have to expend to succeed tend to decline over the course of the first year. Tellingly, this appears to be the case regardless of the level of expectations with which students enter and the types of institutions they enter. Though more selective institutions enroll students who enter with higher expectations and in turn exhibit higher levels of effort, it remains the case that even among those institutions students report working less than they had expected when they entered or roughly 2–6 h less per week than they expected (NSSE, 2006, p. 20). Clearly student expectations are shaped not only by what we tell them, but also, and perhaps more importantly, by what we do or not do.

Though there are a variety of reasons why this may be the case, it is the view here that the relative lack of student effort, in this case hours spent studying in the first year, reflects in part the fact that faculty, as expressed by their actions, often do not expect enough of their students nor construct educational settings in which students are placed that require students to invest in greater effort. Though there are no doubt many exceptions, there is good reasons to believe that on average faculty do not consistently employ pedagogies, give assignments, provide feedback on assignments, and employ sufficient assessment tools (exams, classroom assessment methods, etc.) that lead students to spend more time on task. The net result is that

students are placed in settings whose characteristics do not reinforce, indeed may sometimes run counter, to what the institution or faculty may say about what they expect of students. Institutions and faculty may claim to hold high expectations, but may not act to establish conditions to make those expectations real.

At the same time, institutions will sometimes hold differing expectations for differing students. For example, these expectations may be expressed in the labels they use to describe groups of students, such as the term remedial or more subtly in the way individuals, in particular faculty, treat students of different social classes, genders or ethnicities. However expressed, students clearly pick up expectations and are influenced by the degree to which those expectations validate their presence on campus. Rendon (1994) was referring precisely to this idea in her research on validation and the success of nontraditional, first-generation, community college students, and what Solorzano, Ceja, and Yosso (2001) were referring to in their study of "microaggressions" that students of color often encounter on a predominantly white campus.

This point should not be taken to suggest that student expectations are not shaped by other forces in and beyond the campus. We know, for instance, that significant others beyond the campus, most notably family members, also play a role in shaping student expectations (e.g., Attinasi, 1989). We also know that student peer groups, especially among traditional aged college students, can also influence what students expect of themselves (Astin, 1993; Bank, Slavings, & Biddle, 1990; Pascarella & Terenzini, 1991, 2005). Nevertheless, the institution is responsible for directing its actions such that the expectational climate for individuals and the peers groups that arise from the interaction of individuals are such as to promote clear, consistent, and high expectations. As regards the impact of peer groups, for instance, it suggests that conditions that promote high expectations for student effort will have both direct and indirect effects, via the peer group, on individual expectations. This but one reason why many institutions establish programs such as honors programs and residential learning communities.

Support

Though expectations matter, so does support. Holding high expectations is one thing, but providing the support students need to achieve those expectations is another. Without support—academic, social, and in some cases financial—many students struggle to meet institutional expectations and succeed in college (Belcheir, 2001; Filkins & Doyle, 2002; Upcraft, Gardner, & Barefoot, 2004; Ward, Trautvetter, & Braskamp, 2005; Zhao & Kuh, 2004). For instance, a recent study of 6,700 first year students on 30 campuses nationwide found that students' perceptions of the degree to which the campus was supportive of their academic, personal, and social needs was the most powerful predictor, among a wide range of variables, of growth of student academic competence (Reason, Terenzini, & Domingo, 2006).

Academic Support

No support is more important to student retention than academic support. This is especially true during the critical first year of college when student retention is still so much in question and still malleable to institutional intervention. It is unfortunately the case that more than a few students begin college academically under-prepared. The U.S. Department of Education reported that at least 28% of all beginning college students in the 2000 academic year enrolled in at least one basic skills or "remedial" course in reading, writing, or mathematics, (NCES, 2004, p. 17). Not surprisingly, that percentage was higher in 2-year colleges than in 4-year institutions (42% in public 2-year and 20% in public 4-year) (NCES, 2004010, Table 4). But even these percentages may substantially underestimate the number of students in college who should take such courses since not all students who are referred to those courses actually take them (Attewell, Lavin, Domina, & Levey, 2006).

Regardless, for many students, the availability of academic support in the form of basic skills courses, or what is commonly referred to as developmental or remedial education courses, tutoring, study groups, and academic support programs such as supplemental instruction and summer bridge programs, is critical to their ability to succeed in college (Barefoot, 1993; Blanc, DeBuhr, & Martin, 1983; Blanc & Martin, 1994; Commander, Stratton, Callahan, & Smith, 1996; Congos, Langsam, & Schoeps, 1997; Peterfreund, Rath, Xenos, & Bayliss, 2008; Ryan & Glenn, 2003; Upcraft et al., 2004). In no subject is academic support more important than in reading. As demonstrated by Adelman (2004), students whose reading skills require remediation are less likely to graduate from college than are students with other "remedial" needs. Presumably inability to read well undermines performance in a range of courses in ways that mathematics, for instance, does not.[5]

In this regard it is noteworthy that a study of students in the City University of New York found that while placement in developmental or remedial courses per se did little to increase student success, successfully completing those courses did improve student success relative to comparably skilled non-remedial students (Lavin, Alba, & Silberstein, 1981). In other words, what matters is not just that students gain access to those courses, but that they are able to successfully complete them. A similar conclusion is reached in a more recent study of approximately 8,000 first-time freshman enrolled in non-selective public 4-year colleges in the state of Ohio by Bettinger and Long (2004a).

Among 2-year college students the findings are similar if not more striking. Attewell et al. (2006) for example found that, once one controls for prior academic preparation, "taking remedial courses was not associated at all with lower chances for academic success, even for students who took three or more remedial courses" (p. 915). The authors also found that 2-year college students who enrolled in basic skills courses were no less likely to graduate than non-remedial students with similar academic backgrounds. Those who successfully completed those courses were more likely to graduate than similar students who did not take basic skills courses.

Academic support is important not just to those who begin college academically under-prepared, but also for many other first year students who struggle to adjust

to the new demands of college work. Attewell et al. (2006) analysis of the high school class of 1992, for example, revealed that a substantial number of students with relatively strong academic skills take "remedial" courses in colleges. For these students, the availability of support typically in the form of freshman seminars or study skills courses also proves to be an important part of their success in that year (Barefoot, 1993; Davis, 1992). A recent statewide study by the Florida Department of Education, for instance, followed 36,123 full-time community college students who first enrolled in Fall 1999 for seventeen terms, or over 5 years (Windham, 2006). Approximately 42% or 10,716 of those students took a Study Life Skills course designed to give students the skills they need to succeed in college. Students who successfully completed that course completed their Associate's Degree or certificate at a rate of 58% as compared to 41% for those who did not enroll in the course. Though one usually associates such courses with students requiring developmental education, it proved to be the case that the course "was beneficial to all students regardless of their preparation for college" (Windham, 2006, p. 7).

Nowhere is academic support more critical for student retention than in the classrooms of the campus. This is the case because student retention ultimately hinges upon student learning and therefore on the ability of students to succeed in the classroom. Classroom support is also critical because for a majority of students, especially those who work and/or attend part-time, the classroom may be the only place on campus in which they spend any appreciable time. If students do not receive support in the classroom or as a result of connections established via the classroom, they will have more difficulty finding the support they need to succeed. For this reason, academic support is most effective when it is connected to, not isolated from, the settings in which students are asked to learn; that is, when support is aligned with the classroom and the task of classroom learning. Such alignment, for instance through the attachment of academic support to specific courses, not only enables students to more effectively utilize support in the places where they are asked to learn, but it also allows support to be contextualized to the specific learning task of the classroom to which it is connected. This is but one reason why actions such as Supplemental Instruction, basic skills learning communities, and the embedding of basic skills within courses proves to be so effective (Engstrom & Tinto, 2008; Kenney & Kallison, 1994). By aligning support to and in some cases embedding support within the classroom, students are better able to connect and apply the support they are receiving to the immediate task to learning within the classroom. Regrettably, too many support activities such as learning centers are disconnected from the actual demands of the classroom. Though they may provide generic support, students struggle to figure out how that support can be applied to the specific demands of the particular course in which they are enrolled.

At no time is academic support more important than in the first year, indeed the first semester and weeks of that semester. Most students, in particular low-income students, do not measure their success by the common metrics of the first year, second year and so on as do researchers. Success is typically measured one course at a time and in those courses, one class at a time, one leading to another over the course of the semester. Early successes, whether in beginning classes or in the first

courses of a program of study, impact the likelihood of future success. Conversely, early failure substantially undermines success. For this reason, academic support activities such as those noted above are most commonly applied to the key first semester courses that dot the curriculum.

Self-Efficacy and Student Success

One way of understanding the impact of early classroom successes on subsequent course success and retention is through Bandura's (1986) social cognitive theory. Social cognitive theory argues that individuals' interpretation of their performance affects and alters their sense of self-efficacy and in turn their future performance. These self-evaluations of one's ability are based in beliefs in ones capabilities to organize and execute the courses of action required to manage prospective situations (Bandura, 1986). These beliefs influence in turn the choices people make and the courses of action they pursue in the future (Pajares, 1996). Individuals who see themselves as more capable are more ready to engage in tasks in which they feel competent and confident and influences how much effort they will expend on those tasks and how long they will persevere when confronting obstacles.

One of the benefits of support programs that focus on the first year, in particular the first semester and the classes of that semester, is that to the degree they help students succeed in that semester, they also enhance students' sense of self-efficacy, reduce stress, and in turn increase the likelihood of subsequent success (Chemers, Hu, & Garcia, 2001; Coffman, 2002; Fenel & Scheel, 2005; Grant-Vallone, Reid, Umali, & Pohlert, 2003; Lent, Brown, & Lark, 1984; Multon, Brown, & Lent, 1991; Ostrow, Paul, Dark, & Berhman, 1986). For no students is this more important than for those who enter academically under-prepared. Given their histories of academic struggle, they often enter college doubting their capacity to succeed. Their success depends as much on their coming to see themselves as being able to succeed as it does the acquisition of basic skills (Hall & Ponton, 2005). This is, in large measure also true for many under-represented and first-generation college students, especially those from low-income backgrounds. For them, believing in their capacity to succeed is critical to their success as is acquiring a cognitive map on how to succeed in college (Filkins & Doyle, 2002; Hall & Ponton, 2005; Solberg & Villarreal, 1997; Torres, 2004). This in part is what Rendon (1994) meant by the importance of validation for success of under-served students and Torres (2006) meant when she spoke of the importance of affirmation.

Social Support

Though student retention is ultimately an academic matter, it is also shaped, directly and indirectly, by social forces internal and external to the campus. Many students, for instance younger students on residential campuses, have to make a series of

adjustments to existing social relationships (e.g., family and friends) and form new social affiliations with other members of the campus (Gloria, Kurpius, Hamilton, & Wilson, 1999; Gloria & Robinson Kurpuis, 2001; Skahill, 2002; Somera & Ellis, 1996). For these students, as well as others, making friends and knowing people is important in gaining a sense of belonging and acceptance as a member of a social community and an important part of developing social identity. The social networks of affiliations, which result, provide stability, predictability, and positive affect. By contrast, the absence of social support and the resulting sense of marginalization if not isolation often leads to problems of adjustment and to eventual withdrawal, especially among under-represented students who are a minority on campus (Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999). Fleming's (1984) study is particularly instructive as it documents how the absence of social support for students of color on a predominantly white campus undermines the emotional energies students have to devote to the task of enduring what is perceived to be a hostile climate.

Not all social adjustments come easily. Without support, some students leave because of the stress such adjustments entail (Gohn, Swartz, & Donnelly, 2000) and the social isolation that often occurs (Cacioppo et al., 2000; Jackson, Soderlind, & Weiss, 2000). For many students, social support in the form of counseling, mentoring, and faculty and peer advising, can spell the difference between staying and leaving. This is especially true for low-income, first-generation college students for whom college is an entirely new experience (Torres, 2004). It is also true for many students of color on predominantly white campuses who sometimes find the environment not supportive, indeed even hostile (Hurtado & Carter, 1997). For these students, mentoring programs and ethnic study centers can be especially important to success (Torres, 2004). In the latter instance, ethnic centers provide much needed social as well as emotional support for individual students and a safe haven for groups of students who might otherwise find themselves out of place in a setting where they are a distinct minority (e.g., Attinasi, 1989; Fleming, 1984). For new students, these centers can also serve as secure, knowable ports of entry that enable students to develop cognitive maps of the academic and social geography of the campus and safely navigate the unfamiliar terrain of the university (London, 1989; Terenzini et al., 1994; Torres, 2004). They also provide a place to "let one's hair down" and restore one's emotional energy (Fleming, 1984).

A number of studies have also documented the relationship between first-year students' perceptions of institutional support and a range of social and personal development outcomes (Belcheir, 2001; Filkins & Doyle, 2002; Zhao & Kuh, 2004). Filkins and Doyle's (2002) study of low-income and first-generation first year students at six urban institutions, for instance, found that students' evaluation of institutional support were positively associated with self-reported gains in social and personal development. More recently, Reason, Terenzini, and Domingo's (2007) study of 6,687 first-year students in thirty colleges and universities similarly found that students' self-reported social and personal competence were also related to students' perceptions of the supportiveness of their institution, as measured by the National Survey of Student Engagement. Those perceptions were in turn related to students' perceptions that the faculty and staff were supportive of their academic, personal, and social needs.

Financial Support

Financial support also influences student retention and persistence, especially for those from low-income backgrounds (Heller, 2003; Pascarella & Terenzini, 2005; Paulsen & St. John, 2002; St. John, 1991). Though the research evidence is somewhat mixed, the weight of the findings support the claim that greater amounts of financial aid are associated with higher rates of student retention (Hossler, Ziskin, Kim, Cekic, & Gross, 2008). This finding seems particularly true of grants as opposed to loans, whose impact for low-income students can be negative (Bettinger, 2004; Dowd & Coury, 2006; Dynarski, 2002, 2003).

The impact of financial support on retention is both direct and indirect. In the latter case, this reflects the way in which differing amounts of aid, loans and grants, influences where one goes to college (2 verses 4-year institutions) and the differing forms of participation (i.e., full verses part-time attendance and working while in college) in which one engages in while attending (Heller, 1996). For low-income students in particular, lower levels of aid are associated with attendance at 2-year institutions that is, in turn, associated with lower levels of retention and eventual completion (Bettinger, 2004). Similarly lower levels of financial support typically leads students to attend part-time and/or work while in college both of which have the net consequence, other things being equal, of lowering the likelihood of persistence and completion. Among students who began college in 2003–2004, for instance, approximately 70% who always attended part-time in a 2 or 4-year college left without a degree within 3 years of enrolling, whereas among students who always attended full-time, only 17% in 4-year institutions and 40% in 2-year colleges had done so (Berkner, He, Mason, Wheeless, & Hunt-White, 2007). It is therefore regrettable not only that the purchasing power of Pell Grants have, until just recently, declined over the past 30 years (Farrell, 2007; Fischer, 2007), but also that institutional aid has shifted away from need-based to more merit-based aid and away, by extension, from low-income students to students from more affluent backgrounds (St. John, Hu, & Weber, 2001). Little wonder then that there have been calls for the Federal government to substantially increase the level of Pell Grant awards and institutions to increase the amount of awards so that fewer students would have to attend part-time (e.g., Bettinger, 2004; Hossler, Gross, & Ziskin, 2006).[6]

Part of the impact of financial support on student retention may also result from the way in which varying amounts of aid influence the amount of time students have to be socially and academically engaged in college (Cabrera, Nora, & Castañeda, 1992; Herzog, 2005; Lichtenstein, 2005). Cabrera et al. (1992) analysis of the combined effects of student engagement and student financial aid, for example, indicted that though engagement variables had stronger direct impacts on retention, financial aid has an indirect effect on retention via its impact on levels of student engagement and thus on retention.

This may also help explain why work-study programs as a form of financial aid appear to enhance student retention and are, in turn, an increasingly popular part of financial aid packages (Astin, 1975; DesJardins, Ahlberg, & McCall, 2002; St. John, Hu, & Tuttle, 2000; St. John et al., 2001). All things being equal, students

who participate in work-study programs tend to be more socially and academically engaged and in turn more likely to continue in college.

All this is not to say that financial support cannot have a direct impact on retention. It can. This is most apparent when students, especially low-income students, experience financial difficulties while in college (McGrath & Braunstein, 1997). Though one typically thinks of issues such as family emergencies, it is the case that some low-income students are unable to purchase needed books and supplies until the financial aid packages from external sources such as Pell Grants clear the financial aid office. In this case, short-term institutional financial support is important to student success because it enables students to keep pace with the demands of classroom work. Unfortunately, not all institutions provide such support or do so in a timely fashion.

A cautionary note about the impact of financial support is warranted however. Like any other form of investment, a student's response to the cost of investing in higher education is necessarily conditioned by the perceived value of that investment. Though there are obvious limits to a person's ability to respond to cost, especially among low-income students, it is sometimes the case that the perception of value may lead students to persist even when costs dictate part-time attendance and/or require working while attending college. By contrast, students may choose to leave college even with little financial pressure when the value of college is seen as marginal. While colleges may have limited ability to influence the net cost of college attendance, they can influence the value of attendance by enhancing the quality of the education it offers to students.

Nevertheless there are limits to the ability of students, in particular those from low-income backgrounds, to bear the cost of college. That is but one reason why the documented shift in institutional aid from need-based to merit-based is worrisome. During the 2003–2004 academic year, it is estimated that of the roughly $10.2 billion financial aid provided by institutions in the United States to full-time students, approximately 54% was distributed in the form of merit-based aid of which nearly 60% went to students whose families earned $60,176 per year or more and only about 20% to students whose families earned $33,346 or less. But even in the distribution of need-based aid, only approximately 21% went to the latter families (Heller, 2008).

Assessment and Feedback

An environment rich in assessment of and feedback on information about student progress is another condition for student retention. Students are more likely to succeed in settings that provide faculty, staff, and students frequent feedback about their performance in ways that enable all parties to adjust their behaviors to better promote student success. Feedback is particularly helpful when it creates a slight cognitive dissonance between what one thinks of his or her performance and what one discovers from feedback because such dissonance is believed to cause the deepest kinds of change in behavior (Carroll, 1988). Students tend to do better in a variety

of ways, cognitive and developmental, when faculty consistently and frequently obtain feedback from students and share their own assessment of that feedback with them (Boud, 2001; Guskin, 1994). This is especially true during the first year when students are seeking to adjust their behaviors to the new academic and social demands of college life.

Assessment and feedback can take a variety of forms ranging from entry assessment of learning skills, monitoring of student progress, early warning systems, and a variety of classroom assessment strategies that gauge student learning within class. When applied in the form of entry assessment it enables the institution to ascertain the level of student academic skills and place students in the academic settings (e.g., programs and classrooms) best suited to their learning needs. Though such assessment still suffers from issues of accuracy, it helps institutions not only avoid placing students in classes unsuited to their learning needs, but also having faculty encounter classes in which the range of learning skills is so wide as to make it difficult for them to effectively help all students in the class learn the material of the course.

Assessment and feedback can also be employed to monitor student progress and alert institutions to students who need assistance and thereby trigger the provision of support when it is most needed. Again, this is especially important during the first year when persistence is still so much in question. Such "early warning" systems can take on a variety of forms from the assessment of student behaviors in residential settings to student academic performance in programs and in classrooms. In the former case, assessment may trigger the provision of social support such as counseling, while in the latter case it may result in academic support to students who are struggling in class. In either case, assessments must be shared with student support staff so as to enable them, as well as faculty, to intervene to help students succeed before it is too late. In this regard, an essential condition for effective feedback in the form of an early warning systems, academic or social, is that it is early; the earlier the better. This is the case because classroom failure and student withdrawal have its own dynamics such that early difficulties, if left unattended, can snowball over time. The longer one waits to intervene with support, the more difficult it is to reverse the momentum toward withdrawal that is established by earlier difficulties. This is especially true of classroom learning because early confusions tend to escalate over time. This is why classroom assessment techniques, when connected to support services, are particular important to those classes that are considered foundational to student academic skills generally or to programs in particular. Failure in those courses tends to undermine future success in the courses that follow that depend upon the skills and knowledge that the prior classes are intended to produce.

Given the effort early-warning systems entail—they typically require classroom faculty to initiate a "warning" and staff, as well as faculty, to reach out to students—it is understandable why many institutions first locate those systems in the several key gateway or foundational courses in the first year.[7] This is the case because success in those courses is critical to subsequent student success. If students do poorly in those courses, for instance reading, they are less likely to succeed in subsequent courses that depend on the skills acquired in the foundational course. Recall student success is about learning, not mere retention.

Assessment and feedback loops can also be constructed within classrooms. (Brookhart, 1999; Huba & Freed, 2000). If properly employed, classroom-based assessment improves both student learning and student success. Here an important caveat is called for. To be effective, classroom assessment must be frequent, early, and formative as well as summative in character. Myers and Myers (2006), for example, found that frequent (bi-weekly) exams produce significantly higher scores on a final examination than did a single mid-term exam employed in the same content and teaching format. This is true as well for those forms of classroom assessment such as those described by Angelo and Cross (1993) and those that involve the use of learning portfolios (Barton & Collins; 1997). In the latter case, such assessments also promote the development of critical reflection. Over two hundred institutions, such as Alverno College, Elon College, Evergreen State College, LaGuardia Community College, and Miami University of Ohio, have employed web-based portfolios that enable students and in some cases faculty to collect and reflect upon their experiences and accomplishments across their college years.[8] In some instances, graduating students employ their portfolios as part of an electronic resume when they apply for work and graduate education opportunities.

One of the purposes of classroom assessment is to create a classroom "feedback loop" that provides faculty and students with continuing information and insights that are needed to improve both faculty teaching and student learning (Yao & Grady, 2005). Faculty use feedback gleaned through classroom assessments not only to inform adjustments in their teaching, but when shared with students, also helps improve student learning strategies and study habits (Angelo, 1991, 1998). Both promote student learning and in turn student course success. But to be effective, classroom assessment techniques, such as the "muddiest point" or "one-minute paper," have to be used frequently and must provide immediate feedback to students, ideally no later than the next class. Frequent assessment and timely feedback helps establish a classroom environment in which students are not only more likely to adjust their behaviors over time but also think about what they are learning as they are learning. Such "critical" attention further promotes student learning. These techniques are not to be confused, however, with testing. Nor do they replace testing. They are forms of assessment that provide both students and faculty information on what is or is not being learned in the classroom so that students will do better on tests when they are administered.

A number of institutions are now using immediate feedback techniques often referred to as student response systems (Beatty, 2004; Kaleta & Joosten, 2007; Martyn, 2007). These allow the faculty to ascertain the degree of student comprehension during class and therefore enable them to correct any confusion before the end of class. Though such systems can be quite effective in improving student classroom learning, they do have a steep learning curve and can take up a good deal of classroom time (Kaleta & Joosten, 2007). Nevertheless they do add another tool that can be used to improve student learning within the classrooms in which they are employed.

Though research on the impact of feedback on student retention, as opposed to classroom success is generally limited—most studies are in the form of descriptive institutional reports—it is commonly accepted that a carefully constructed assessment program that entails feedback on student performance is critical to an institutional ability to improve student retention (Banta, 2001; Ewell, 1997; Wholey, Hatry, & Newcomer, 1994). Research on the use of classroom-based assessments, such as student portfolios (White, 2005), and classroom assessment techniques (CATs) (Angelo & Cross, 1993) is, however, quite extensive. The research documents, for instance, the fact that the use of CATs as a consistent part of classroom practice improves student learning and in turn student persistence (Cottell & Harwood, 1998; Cross, 1998; Light, 1990). It does so in part because of the way it promotes students' awareness of their own learning and the feedback it provides faculty about what is and is not being learned in the classroom (Corno & Mandinach, 1983).

Feedback can also influence student retention indirectly when it is provides faculty, staff, and program administrators information on the quality of student learning and the nature of their experiences within the college. Such feedback can arise through the use of student learning outcomes, student assessments of their educational experiences, for instance as captured in the National Survey of Student Engagement (NSSE) and the Community College Survey of Student Engagement (CCSSE), and/or student evaluations of specific courses or programs. To the degree that faculty, staff, and program administrators use that information to evaluate their own performance and improve, in turn, the education they provide students, students also benefit (Yao & Grady, 2005). This is but one reason why one speaks of the importance of building feedback loops that connect information on student experience and learning to faculty and support staff who have the capacity to act on behalf of student learning. Such information is particularly effective when it provides for a continuing feedback that it triggers action on the part of student, faculty, and staff alike.

One final note: given the importance of early warning, it is not reassuring to learn that the Project for Student Success study found that only a little over half of the 4-year institutions survey collected mid-term grades on first year students and slightly less than half flagged specific first-year courses with high percentages of Ds, Fs, or withdrawals (Hossler, Ziskin, & Orehovec, 2007).

Involvement

Another condition for student retention, perhaps the most important, is involvement or what is now commonly referred to as engagement (Astin, 1984; Kuh et al., 2005; Kuh, Schuh, Whitt, & Associates, 1991; Tinto, 1975, 1993). Simply put, the more students are academically and socially engaged, the more likely they are to

persist and graduate (Tinto, 1993). This finding is especially true during the first year of study because involvement during that year serves as the foundation upon which student and faculty affiliations are built and academic and social memberships established (Elkins, Braxton, & James, 2000; Fischer, 2007; Malaney & Shively, 1995; Nicpon et al., 2006; Polewchak, 2002; Sand, Robinson Kurpuis, & Dixon Rayle, 2004; Tinto, 1993; Upcraft, Gardner, & Associates, 1989). This appears to be true for all students, majority and minority, alike and applies even after controlling for background attributes (Greene, 2005; Kuh et al., 2007). Fischer's (2007) recent study, for example, employed data from approximately 4,000 students who participated in the National Longitudinal Survey of Freshmen to study the relationship between different forms of involvement in the first year of college and student satisfaction, academic achievement, and retention to the second year of college. She found that for all students, regardless of ethnicity and race, having more formal academic connections with faculty and formal and informal social connections with faculty, staff, and peers were all associated with satisfaction and persistence. Conversely the absence of such ties, that is academic and social isolation, proved to be a predictor of leaving.

Though involvement or engagement matters for all students, it may matter more for some students than others. A recent analysis of NSSE data of student performance within institutions suggest that the impact of engagement on first year grades and retention to the second year may be greatest for those of lower ability and students of color when compared to White students (Cruce, Wolniak, Seifert, & Pascarella, 2006; Kuh et al., 2007). For academically under-prepared students, in particular, engagement may have important compensatory effects that help offset the otherwise negative effects of lower academic skills (Kuh et al., 2007).

Involvement or engagement—academic and social—influences retention in a number of ways. In the former case, involvement influences retention through its direct and indirect impact on academic performance (e.g., Astin, 1984, 1993; Friedlander, 1980; Ory & Braskamp, 1988; Parker & Schmidt, 1982; Pascarella & Terenzini, 1991). This finding is particularly true of student contact with faculty. Student-faculty contact, both inside and outside the classroom has repeatedly been shown to promote student educational gains (e.g., Pascarella & Terenzini, 1980; Terenzini & Pascarella, 1980). More striking still is that finding that even among those who persist to graduation, students who report higher levels of contact with faculty as well as peers also demonstrate higher levels of learning gain and student development (Astin, 1993; Endo & Harpel, 1982; Pascarella & Terenzini, 1980; Wilson, Wood, & Gaff, 1974). This is the case because greater academic involvement inside and outside the classroom directly impacts the amount of time and effort students put into their studies. Greater effort and time spent on studies leads, other things being equal, to greater learning and heightened academic performance (Kuh, Carini, & Klein, 2004). Both lead, in turn, to retention and graduation.

Carini, Kuh, and Klein (2006) employed the National Survey of Student Engagement to survey 1,058 students at fourteen 4-year colleges and universities in order to assess the degree to which various forms of student engagement are

associated with different learning outcomes and measures of academic performance. Many measures of student engagement were positively linked with a variety of learning outcomes such as critical thinking and grades. As did Kuh, Cruce, Shoup, Kinzie, and Gonyea (2008), they also found that college students with the lowest SAT scores appeared to benefit more from student engagement than those with the highest SATs. The relationship between engagement and learning outcomes was not, however, uniform among institutions. Student engagement was more positively associated with student performance, in this case as measured by critical thinking, among some institutions than others. In other words the impact of engagement on student performance is conditioned or mediated by other aspects of the institution. This does not mean that greater involvement or engagement of students does not produce greater performance. We know it does. Rather it means that the extent of its impact upon performance in any institution reflects in part the institutional setting in which involvement occurs, not the least of which is the cultural context that gives meaning to student interactions with people on campus.

Involvement also shapes retention through its impact on student social membership and the social and emotional support that accrues from membership (Gloria & Robinson Kurpuis, 2001; Gloria et al., 1999; Mallinckrodt, 1988). By contrast, the lack of social involvement and the social isolation and loneliness that arises is can lead to withdrawal (Fleming, 1984; Rottenberg & Morrison, 1993). Understandably this appears to be particularly true in situations where students are a minority on campus or leave home to attend college in part because doing so makes it difficult to maintain prior friendships (Fleming, 1984; Nicpon et al, 2006). In this latter regard, it should be noted that research has consistently pointed up the fact that students living in residence halls on campus have higher retention rates than those who live off campus (Pike, 1999; Pike, Schroeder, & Berry, 1997).

Academic and social involvements, though conceptually distinct, overlap such that one form of involvement can promote the other. Academic involvement in class through the use, for instance, of group work has been shown to promote social involvements that may extend to peer relationships beyond the class (Tinto, 1997). In this instance, as well as others, institutional academic practices can and do impact student social relationships and in turn social memberships in the broader communities of the campus. Both promote retention and graduation.

Involvement, Meaning, and Sense of Belonging

Involvements, academic or social, do not occur in a vacuum. They take place within specific social and cultural settings and among individuals, faculty, staff, and students whose values give meaning to those involvement. The impact of involvement on student outcomes is not simply a reflection of the degree of involvement, but how those involvements or engagements lead to forms of valued social and academic membership and the "sense of belonging" they engender (Harris, 2006; Hoffman, Richmond, Morrow, & Salomone, 2003; Schlossberg, 1989; Tucker, 1999). Though this is the case for all students, it is particularly important to the retention of

under-represented students and low-income students on majority and more affluent campuses (Attinasi, 1989; Nora, 1987; Nora & Cabrera, 1996; Ostrove & Long, 2007; Pavel, 1991). In these situations, it is the meaning students attach to their involvement that seems to drive decisions to stay or leave, specifically that their involvement is valued and the community with which one interacts is supportive of their presence on campus (Fries-Britt & Turner, 2001; Gonzales, 2002; Hurtado & Carter, 1996, 1997; Hurtado, Carter, & Spuler, 1996; Nora, 1987; Nora & Cabrera, 1996; Suen, 1983). This is precisely what Hurtado (1994) and Hurtado and Carter (1997) argue in their analysis of "hostile climates" for minority students. Understandably, the same may also apply, but perhaps in a somewhat different manner, to any group of students who see themselves as a minority on campus as may be the case for older students who return to campuses whose students are mostly of "traditional" college-going age (Donaldson, 1999). Of course, it can also apply to any individual student regardless of their racial, ethnic, or other forms of identification. Nevertheless, as Fischer (2007) makes clear the absence of academic and social involvements and the isolation that results is clearly related to withdrawal for virtually all students.

What matters for student retention then is not simply whether students are involved, but how that involvement is understood and interpreted by students. This is not to say that involvement of any degree does not matter. We know it does and that the absence of involvement and the academic and social isolation that follows can and does lead to withdrawal. But we also know that the climate established on a campus informs those involvements and helps explain the ways they shape students "sense of belonging," the acquisition of social and academic support, and subsequent retention. This is why one speaks of the importance of building supportive climates on campus. In turn this is also why the expectational climate of a campus is so important to student retention for it serves to establish the broader context within which involvements occur and are interpreted.

Sense of belonging is a generalized sense of membership that stems from the student's perception of their involvement in a variety of settings and the support, academic and social, they experience from faculty, staff, and peers (Hoffman et al., 2003). It is entirely possible for students to feel a sense of belonging with one community of persons and/or one faculty or staff member, but not others or with the institution generally. It follows that when one asks about student involvement, one must also ask with whom, in what settings, and about what issues does involvement occur and how, in turn, how the student interprets those involvements.

Involvement or better yet the quality of involvement also depends on the degree to which individuals see their involvement at "relevant" or "meaningful." In a very real sense, individuals will become or at least are more likely to become involved or engaged in those forms of activity that are perceived to be relevant or at least meaningfully related to an individuals interests broadly understood. Like other people, students will allocate their involvements to those forms of activity that are perceived to be most relevant. Students go to college to be involved. The issue is not whether students want to be involved, but to which forms of involvement they will direct their energies and how those involvements will shape their success in college.

Conditions for Student Retention: An Observation

The preceding discussion about the conditions for student retention is not meant to imply that individuals have no say in their own success. Of course individuals matter; their actions as framed by their values, commitments, abilities, and prior academic preparation all come to play a part in individual success at least as measured here by retention and persistence. It is evident that there are some individuals who by sheer willpower, skill, and perseverance succeed even when conditions would appear to militate against success. Conversely there are individuals who do not succeed even when placed in settings that are conducive to success. The fact is that there is only so much institutions can do, and some would argue should do, to promote student success if individuals are themselves not inclined to invest in those activities that lead to success. Nevertheless, it is the view here that institutions have an obligation, having admitted students, to establish conditions on campus for students that have been demonstrated to be conducive to their success so that more students, who seek to succeed, are more likely to does so. This is not to understate the importance of individual behavior but to stress the obligations of the institution and the sorts of actions it should take to increase the likelihood that more students, once admitted, will be successful.

To sum up, students are more likely to succeed and continue within the institution when they find themselves in settings that hold high expectations for their success, provide needed academic and social support, and frequent feedback about their performance, and actively involve them, especially with other students and faculty, in learning. The key concept is that of educational community and the capacity of institutions to establish supportive social and academic communities, especially in the classroom, that actively involve all students as equal members.

It is important to recognize that student retention is most likely when all four conditions exist on campus. Though it may be the case that some conditions may be more important to some students than others, for instance academic support for academically under-prepared students, all matter. The absence of one undermines the efficacy of the others as for instance the absence of feedback undermines the ability of the institution to provide support when it is needed.

Moving to a Model of Institutional Action for Student Retention: What Next?

The preceding conversion has described the sorts of conditions that institutions need to establish to promote student retention and, where evidence warrants, indicated some of the actions institutions can take to establish those conditions. Research evidence is, however, spotty and still subject to a range of methodological limitations. There is still much we do not know and therefore still a good deal of research that has to be carried to more fully describe the range of actions that institutions should take to promote student retention. We conclude this chapter with several

thoughts about the sorts of studies that need to be carried out to move to a more fully articulated model of institutional action. In this case, our attention will focus on the classroom and those types of studies that would highlight the impact of institutional actions on the classroom and student success therein. We do so because for most institutions the classroom is the primary unit of institutional life and the one place where institutional action can have an immediate impact upon student retention. This is not to say that are not other domains of action such as financial aid, residential life, out-of-class activities including extra-curricular activities that warrant research. There are but these are beyond the scope of the present discussion.

Enhancing Student Success in the Classroom

At the outset, it is important to recognize that a number of researchers have already turned their attention to the role of the classroom and classroom practice in student success. John Braxton, in particular, has with a number of his colleagues, explored the ways in which faculty behaviors shape student success (see Braxton, 2008; Braxton, Bray, & Berger, 2000; Braxton, Jones, Hirschy, & Hartley, 2008; Braxton, Milem, & Sullivan, 2000). Their work and that of others (e.g., Eagan & Jaeger, 2008; Engstrom, 2008; Kinzie, Gonyea, Shoup, & Kuh, 2008; Laird, Chen, & Kuh, 2008; Pascarella, Seifert, & Whitt, 2008) has begun to document a number of ways in which classroom practices shape student persistence.

That being said, it remains the case that there is still much that we do not know and therefore much that we need to do to further delineate the various ways in which classroom practice shapes student retention and completion.

The impact of pedagogy. Though there is a good deal of research on the impact of differing pedagogies on student learning (e.g., Blumberg, 2000; Johnson, Johnson, & Smith, 1998; Major & Palmer, 2001; Smith, 2000; Springer, Stanne, & Donovan, 1999), there are but a few studies on the impact of active learning on student success (e.g., Braxton et al., 2008; Braxton, Milem et al., 2000; Laird et al., 2008). Though useful in a general way, they are limited by the nature of their measures of active learning to only a very general view of the impact of pedagogy on student success. What is needed are more detailed studies of the impact of different types of active learning strategies (e.g., cooperative learning, problem-based learning, and team learning) on the retention of students success generally and specific groups of students (e.g., low-income, academically under-prepared, minority, and international). Given the group nature of each of these pedagogies, we would also want to know if their impact on retention is in part due to their possible influence on patterns of student social and academic engagement in and beyond the classroom (Tinto, 1997). When utilized in diverse classroom settings, one would also want to know if such pedagogies also influence of the nature of inter-racial patterns of engagement and in turn the development of networks of affiliation that endure beyond the boundaries of the classroom. Similar questions need to be asked of effective lecturing and other ways of engaging students in learning within the classroom (e.g., service learning). Here the use of the term “effective” is meant to point what to many students is

obvious, namely that most faculty have not be trained to use any pedagogy effectively. This does not mean that there are not many faculty who are quite skilled in the use of pedagogy, be it lecture, cooperative, or problem-based. Rather it means that most faculty in higher education, unlike their elementary, middle, and high school counterparts, have not been trained to use those pedagogies effectively. As a result, research that has looked at the use of cooperative teaching, for instance, has typically compared its use to that of existing practice that is typically the result of the untrained application of other pedagogies, most often lecturing. What is needed are more finely tuned comparative studies of different pedagogies that in fact compare each not only to existing practice but to other pedagogies that are applied equally effectively.

The impact of assessment. That students do better in a variety of ways, cognitively and developmentally, when faculty consistently and frequently obtain feedback from students and share their own assessment of that feedback with them is well-established (Boud, 2001; Guskin, 1994). The impact of such assessment is especially pertinent during the first year when students are seeking to adjust their behaviors to the new academic and social demands of college life. The key to impact seems to be that assessment and feedback are offered early (Kinzie et al., 2008; Kuh et al., 2005). Early assessment and feedback enables both students and faculty to adjust their behaviors early enough to avoid academic problems. But though we have some evidence of the impact of early assessment and such in-class assessments techniques as the "one-minute" paper (Cottell & Harwood, 1998; Cross, 1998; Light, 1990), there is still much we do not know about the short and long-term effects of classroom assessment on student retention. What, for instance, is the impact of classroom assessment, such as the "one-minute" paper, on student learning behaviors and in turn success in subsequent courses? Do their impacts persist beyond the class in which they are employed? What of the comparative impact of different types of assessment (e.g., end of term examinations, frequent mini-exams) and feedback loops on different types of learning outcomes and in turn retention? Furthermore, since some forms of assessment are part of institutional early-warning systems that serve to activate the actions of other staff (e.g., student support services) on behalf of students, we also need to know more about the effectiveness of various early-warning systems on student retention. What forms of linkages between academic and student affairs staff are most effective in promoting student success and in what sorts of settings? Can such systems promote patterns of engagement with student affairs staff beyond the classroom that further promote student retention?

The impact of faculty development. A focus on the role of pedagogy and assessment necessarily leads to questions about the impact of faculty skills and in turn faculty development programs on student retention. In this case, however, the impact of faculty development programs is likely to be largely indirect in that their purpose is or ought to be the enhancement of faculty skills, in particular those that have to do with pedagogy (Bothell & Henderson, 2004; Braxton, Bray et al., 2000; McShannon, 2002). Several research questions follow: What are the impacts of faculty development programs on faculty pedagogical skills? How do those impacts vary among different types of faculty development programs? Do those impacts,

where they exist, translate to enhanced student success in the class and in turn student retention? Where programs are voluntary, which is most often the case, to what degree are their impacts on student success and retention largely a reflection of self-selection artifacts that reflect the motivation and commitments of those faculty who choose to participate? Where programs are not, such as required first-year faculty development programs, we need to know of their impact on faculty classroom skills and whether or not those skills endure over time. Similarly, as we would want to know for patterns of student affiliation, we would want to explore how faculty development programs, in particular those that adopt the faculty learning community model, shape patterns of faculty affiliation that cross the boundaries of field and department (Cox, 2001, 2002; Cox & Richlin, 2004; Fayne & Ortquist-Ahrens, 2005). Too often faculty are less connected to each other than are students.

The impact of learning communities. There is little question that learning communities enhance student engagement and subsequent retention (e.g., Bloom & Sommo, 2005; Castro-Cedeno, 2005; Engstrom & Tinto, 2007; Hotchkiss, Moore, & Pitts, 2005; Johnson, 2000; Scriverner et al., 2008; Smith, MacGregor, Matthews, & Gablenick, 2004; Tinto, Goodsell, & Russo,1993; Zhao & Kuh, 2004). There are, however, various types of learning communities that require differing degrees of faculty and staff action. These range from simple co-registration of two or more courses, groups of courses to which a seminar is attached (e.g., Freshman Interest Groups), to clusters of course that alter both pedagogy and assessment in significant ways. Some are entirely curricular based while others are housed in residential settings (e.g., living-learning communities). Some serve honors students, others are for first year students generally, while others focus on students who enter college academically under-prepared. What we do not yet have are comparative studies that gauge the impact as well as cost of these variants. Though we have reason to believe that models that alter pedagogy and assessment as well as residential patterns are most effective, these tend to be the most expensive to implement. As regards impact, our studies have tended to focus on short-term student gains such as retention into the following semester or year. What we need are longer-term studies that gauge, among other things, the ways in which different types of learning communities reshape the character of student academic and social engagements and patterns of peer affiliation over time (e.g., via the utilization of network analysis) and in turn subsequent student performance and retention. And we must know how these outcomes vary for different students (e.g., race, gender, social background) within the learning community in both 2 and 4-year institutions. For instance, we have seen that some students in first-year learning communities will, in following semester or year, continue to stay connected and participate in shared learning activities (e.g., study groups, course taking), but we have not yet empirically tested whether these effects endure over time. Finally, we have yet to shed light on the ways in which participation in learning communities, in particular those that require high degrees of faculty coordination as well as altered pedagogical and assessment practices, impact faculty behaviors. Though faculty will often report that participating in such learning communities is a very positive, if not transformative experience, we have not yet explored whether this is the case in any significant manner. Nor have we

explored how that experience alters faculty practices beyond the learning community and in turn impacts the students in their classes in subsequent semesters. The fact is that many institutional actions that impact faculty practice in the short term, such as learning communities, have spill over effects that endure and possibly expand over time.

Impact of part-time faculty. Though the use of part-time faculty is widespread, in particular in first-year gateway and basic skills courses, only recently have researchers turned their attention to the impact of part-time faculty on student retention (Bettinger & Long, 2004b, 2006; Boggs, 1984; Burgess & Samuels,1999; Eagan & Jaeger, 2008; Harrington & Schibik, 2001; Jacoby, 2006; Jaeger, Thornton, & Eagan, 2007). Thus far the results have been mixed. While most studies have found that the use of part-time faculty had a negative effect on student performance and retention (e.g., Bettinger & Long, 2004a, 2006; Eagan & Jaeger, 2008; Ehrenberg & Zhang, 2005; Jaeger et al., 2007), several others have found no or very little impact (Boggs, 1984; Burgess & Samuels, 1999). Though it seems to be the case that the use of part-time faculty, on average, negatively impacts retention, there appears to be significant variation of impact within an institution and among part-time faculty. Not all part-time faculty or indeed full-time faculty are equally effective in the classroom nor equally engaged with their students. As Evans (2008) points out in her study of a small residential public college in New York, some part-time faculty prove to be more effective in shaping student performance across a range of courses than some full-time faculty. The issue appears to be as much one of teaching practices than it is of being part or full-time. Furthermore, as Bettinger and Long's (2004b) study suggests, the impact of part-time instructors on student performance may vary by field. In community colleges in particular, technical and vocational courses are taught be part-time instructors who are actively employed in the fields in which they teach. Here then there are a range of questions that need answering. For instance, can institutions more effectively employ part-time faculty in some fields (e.g., technical and vocational) than others (e.g., basic skills and first-year gateway courses)? Are there areas of instruction where part-time faculty are as if not more effective than full-time faculty? The unavoidable fact is that colleges and universities will continue to use part-time faculty. The practical question we must answer is where the use of part-time faculty makes most sense and does not negatively impact student performance and retention.

Concluding Thoughts

There is still much to learn about how institutional actions can more effectively promote student retention generally and for particular groups of students (e.g., academically under-prepared, underserved). In an area of inquiry that has been typically focused on matters of financing and financial aid (e.g., Heller, 2003; Hossler et al., 2008; St. John et al., 2001), researchers have begun to shed light on the role of the classroom in student retention. But it is only a beginning. There are other domains

of institutional action that directly and indirectly impact the classroom that have yet to be sufficiently explored. What of the impact of technology in the classroom or the ways in which on-line instruction impacts student success? What of the impact upon faculty and in turn classrooms of institutional incentive, promotion, and tenure policies or the institutional accountability systems that hold departments accountable to some measure of student retention? A host of questions await our attention not only about institutional actions that impact the classroom, but also about a range of institutional policies and action that in many complex ways directly and indirectly impact student retention on campus.

Seen in this light, the present discussion should be understood as the continuation of a conversation that has been slowing emerging in the field that seeks to move us from a focus on theory and research about the nature of student retention to one of action that endeavors to translates what we know from our theories and research into guidelines for institutional action to promote greater retention and in turn graduation from institutions of higher education. In this case, the present conversation has been constructed by first focusing on what we already know about the conditions within institutions and classroom in which students are placed that promote their retention and graduation. It has argued that to be effective institutional action must address each of these conditions and do so, first and foremost, in the classrooms of the campus, the basic building blocks of institutional educational life. Least we forget for most students, in particular those who attend community colleges and those who attend part-time and/or work while attending college, the classroom may the only place where they encounter their peers and the faculty and engage in formal educational activities. For them, indeed for most students, the classroom is the one place where institutional action can most directly impact the learning, retention and in turn graduation. Retention is ultimately an educational matter. Without learning, student retention is, in this author's eyes, a hollow achievement.

Notes

1. It does not follow that overall rates of completion within the system of higher education have not changed. We know that they have in large measure because of the increased incidence of transfer between institutions.
2. The concepts of integration, involvement, and engagement are not identical. Whereas the latter refer to forms of behavioral interaction, such as being engaged in campus activities, the former includes as well forms of value interaction such as arises when one perceives oneself as a valued member of a community.
3. Not surprisingly, many institutions see this issue as one of recruitment, of attracting more able and motivated students who themselves are more likely to graduate. But there are only so many able and motivated students, and it seems as if every university is seeking to attract the same students. In any event, such efforts leave untouched the environments in which students are placed and do little to ensure that the experience of students will in any way be changed by attracting more able students.
4. It is estimated that among 4-year college students, nearly two-thirds either begin undecided or change their majors at least once during college.
5. This fact runs counter to what many faculty believe is the case, namely that mathematics is the major barrier to student success.

6. It is noteworthy that a number of elite universities have recently decided to fund the entire cost of attendance for students whose income fall below a certain level, typically set somewhat higher than that established by the Pell Grant program.
7. In residential campuses, early warning systems are also employ in residential halls to alert residential staff to student struggles.
8. The reader is encouraged to visit the ePortfolio Project at LaGuardia Community College at http://www.eportfolio.lagcc.cuny.edu

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Reform Efforts in STEM Doctoral Education: Strengthening Preparation for Scholarly Careers

Ann E. Austin

Doctoral education in the sciences, technology, engineering, and mathematics (STEM) disciplines is currently a major focus of interest, concern, and reform. Economic growth, national security, and the innovation and discoveries that enhance quality of life within the country and across the globe are closely related to the availability of a strong pool of well-educated individuals with excellent scientific talent and high-level preparation. As argued in a recent report issued by the National Science Board (2003), "Science and technology have been and will continue to be engines of US economic growth and national security" (p. 7). In a world context where complex challenges are numerous, including inadequate food supplies, global climate change, and daunting health issues, a system that ensures an effective pipeline for the preparation of individuals with scientific and technical talent is essential. A key stage of that pipeline involves doctoral education. At the doctoral stage, high-level talent is developed for conducting research in university and nonacademic settings and for teaching future generations. Government and private sector leaders, as well as academics, recognize the necessity and imperative to ensure the quality of doctoral study in the sciences, technology, engineering, and mathematics (Council of Graduate Schools, 2007; National Science Board, 2003, 2006; Walker, Golde, Jones, Bueschel, & Hutchings, 2008).

In recent years, contextual pressures and challenges, concerns about the quality of undergraduate education and the supply and talent of faculty who teach them, along with questions about the quality of students' experiences as they pursue advanced degrees, have motivated efforts to reform and strengthen doctoral education in STEM fields. The purpose of this chapter is to examine and discuss these efforts to improve STEM doctoral education. The chapter is organized in four parts. First, it begins with an exploration of the context in which STEM graduate education is situated and the recent events that have created a climate for reform. Second, it discusses in more detail particular issues toward which reform efforts in STEM doctoral education have been directed. Third, the chapter reviews the kinds of reform efforts being used to strengthen and improve STEM doctoral education, highlights

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several specific examples of initiatives and programs, and presents the available evidence concerning the impact and outcomes of those efforts. Fourth, the chapter concludes with an agenda for research and strategic action concerning reform in STEM doctoral education.

At the start, I note that post-doctoral work is also crucially important—to the individuals serving in post-doctoral roles, to the universities and research projects that employ them, and to the broader society benefiting from their research. The post-doctoral experience also has become the focus of concern and discussion in recent years, and a number of important issues and challenges pertaining to this aspect of STEM work deserve attention. However, the focus of this chapter includes only doctoral-level education in the STEM fields. A longer treatment would be required to consider the many issues relevant to post-doctoral work in STEM fields. I also note that a substantial part of the literature on doctoral work in STEM fields focuses specifically on its role in preparing future faculty. However, the critiques of STEM doctoral education, as discussed below, emphasize that STEM doctoral education can lead to a number of important careers, with academic work as one option. Thus, in this chapter, I focus on reform in STEM education with the recognition that STEM doctoral graduates may pursue academic as well as non-academic careers.

Context and Background

About 40,000 doctoral degrees are awarded each year in the United States. The number of Ph.D.s granted grew in the 1960s and early 1970s, leveled in the 1980s, and grew again from 1990 to 1998 to reach the level of 43,000 doctorates awarded annually. Much of the expansion occurred in the sciences and engineering. In particular, doctoral degrees granted in the life sciences increased from 18% of the doctorates awarded in 1973 to 48% in 2003. The increase in the proportion of doctoral degrees granted in engineering increased from 1% in 1973 to 17% in 2003, and in the physical sciences, during this period, the jump was from 7% to 27%. Of particular importance, however, is the fact that these increases were primarily due to expansions in international student enrollments, not from an increase in students from the United States (Nerad, 2008, p. 49).

By the mid-1990s, concerns were emerging in the United States about doctoral education overall, as well as specifically in STEM fields (Committee on Science, Engineering, and Public Policy, 1995; National Science Board, 1997; Rice, Sorcinelli, & Austin, 2000). In the tight labor market of the 1980s and 1990s, many doctoral graduates were not finding faculty positions, which fueled conversations about the state of graduate education. In the STEM fields, with the end of the Cold War, a shift occurred in federal funding, away from basic research toward more "strategic" research pertaining to such areas as the economy, education, and the environment (Carney, Chawla, Wiley, & Young, 2006, citing National Research Council, 1994). Many doctoral graduates were not finding employment in basic research, which contributed to concerns that graduates were insufficiently prepared for non-academic work or to address the many societal needs—including work in

applied research and development, consulting, and other areas—requiring advanced knowledge in science and engineering (Carney et al., 2006).

Various reports were released which outlined issues and problems. The Committee on Science, Engineering, and Public Policy (1995), a committee of the National Academies, released a report entitled *Reshaping Graduate Education of Scientists and Engineers* (widely known as the "COSEPUP" report) which generated much attention. The National Science Board also released a report concerning science and engineering graduate and post-graduate education (1997), and the Association of American Universities published the report of the Committee on Graduate Education (1998). These publications raised questions about whether graduate education in the United States was meeting national needs and preparing graduate students for the changing context in which they would work. The COSEPUP report, for example, recommended that graduate programs in sciences and engineering should give students more opportunities and options to develop a wider array of skills appropriate for diverse work options, that programs should offer more career guidance and information, that attention should be directed to time required to complete degrees, and that efforts should be made to increase the participation of women and minorities. At the same time, employers were expressing concerns about the readiness of new doctoral graduates for the workplace, state governments were calling for more accountability from higher education institutions in regard to the learning outcomes, skills, and abilities of their graduates, and students themselves were creating unions, at some universities, in response to their own concerns about the experiences they were having as teaching and research assistants during the doctoral experience (Austin & Wulff, 2004; Nerad, 2008).

During this same time period, an array of individuals and groups were talking about the state of graduate education, the importance of research on doctoral education and the preparation of future scholars, the need for reform, and the kinds of strategies that would enhance the quality of doctoral preparation. For example, graduate deans, faculty developers involved in teaching assistant preparation, and researchers interested in doctoral education as the initial step in faculty careers were initiating studies and programmatic efforts to strengthen the doctoral experience (Anderson, 1998; LaPidus, 1997; Nyquist, Abbott, & Wulff, 1989; Nyquist & Sprague, 1992; Nyquist & Wulff, 1992; Nyquist, Wulff, & Sprague, 1991). Key research and scholarly publications also added to the discussion in the late 1990s and early 2000s, including Nerad and Cerny's *PhDs: Ten Years Later Study* (1999), Golde and Dore's *At Cross Purposes* (2001), and Wulff and Austin's *Paths to the Professoriate* (2004). Foundations such as the Pew Charitable Trusts and the Spencer Foundation, government organizations such as the National Science Foundation, and higher education associations such as the American Association of Colleges and Universities (AACU) and the then-existing American Association for Higher Education (AAHE), were becoming involved, offering support in the form of funding or programmatic initiatives—or both (Association of American Universities, 1998; Austin, 2002b; Gaff, Pruitt-Logan, & Weibl, 2000; Rice et al., 2000; Nyquist et al., 1999).

One response to the array of concerns about the preparation of doctoral students for their careers was the establishment, in 1993, of the Preparing Future Faculty (PFF) program, supported by a grant from the Pew Charitable Trusts to the Association of American Colleges and Universities (AAC&U) in collaboration with the Council of Graduate Schools (CGS). PFF was designed to give doctoral students aspiring to the professoriate an expanded professional development experience that prepared them to be effective teachers, researchers, and active citizens. Participants benefitted from mentoring, opportunities to learn about faculty life, including teaching responsibilities, and exposure to the array of institutional types in which they might work in academe (Gaff, Pruitt-Logan, Sims, & Denecke, 2003; Gaff et al., 2000; Pruitt-Logan & Gaff, 2004; Pruitt-Logan, Gaff, & Jentoft, 2002).

Key stakeholders concerned about doctoral education came together at a national conference sponsored by the Pew Charitable Trusts and facilitated by Jody Nyquist of the University of Washington in 2000. At this meeting, entitled "Re-envisioning the Ph.D.," the stakeholders outlined the problems they saw in doctoral education from their particular perspectives, discussed the extent to which doctoral education was meeting the needs of society, and called for a renewal of quality and focus in doctoral education (Nyquist & Woodford, 2000; Nyquist, Woodford, & Rogers, 2004). This meeting launched an active and extensive website clearinghouse that, for some time, provided an up-to-date listing of resources and information on programs, research, and initiatives pertaining to doctoral education. The meeting also became the launching pad for further projects, dialogues, and institutional and national projects and initiatives to strengthen doctoral education across disciplines, including STEM fields.

Other responses developed also. The Carnegie Foundation for the Advancement of Teaching began a major initiative entitled the Carnegie Initiative on the Doctorate (Walker, 2004; Walker et al., 2008). I discuss this initiative in more detail later in the chapter. Another significant effort to further the discussion and reform movement was the "Responsive PhD Initiative," sponsored by the Woodrow Wilson National Fellowship Foundation for 5 years beginning in 2000. This project involved 20 universities and focused on developing new paradigms, establishing new practices, exploring new partnerships, and involving new people in doctoral education (Weisbuch, 2004). Another significant, funded initiative that emerged in response to the national interest in strengthening doctoral education is the Center for Innovation in Research and Graduate Education, led by Maresi Nerad and located at the University of Washington, which is conducting research to guide continuing reform efforts (Center for Innovation in Research and Graduate Education, 2003).

While the national conversation has included the wide range of fields in which doctoral education is offered, interest in reform in STEM doctoral education has been particularly strong. As noted, the COSEPUP report (Committee on Science, Engineering, and Public Policy, 1995) and the National Science Board's report on science and engineering graduate and postgraduate education (1997) had fueled the national dialogue about the quality of STEM doctoral education. Then, in 2003, the National Science Board, which serves as the policy-making body of the National Science Foundation and provides advice to the President and the Congress

concerning policy relevant to national science and engineering issues, published a report entitled *The Science and Engineering Workforce: Realizing America's Potential*. This report issued a warning and challenge: "The United States is in a long-distance race to retain its essential global advantage in science and engineering human resources and to sustain our world leadership in science and technology" (p. 41). The report continued its analysis by highlighting the importance of a coordinated effort to ensure the preparation of those with the needed skills in science and engineering: "The Federal Government has a primary responsibility to lead the Nation in developing and implementing a coordinated, effective response to our long-term needs for science and engineering skills. US global leadership and future national prosperity and security depend on meeting this challenge" (p. 42). The emphasis of the report was on the need for a well-educated workforce with high-level training to meet the needs of the country and the broader society for innovation and discovery in science and engineering.

The report provided an analysis of two major trends that affect the preparation of high-level talent in science and engineering. First, due to an increase in global competition for talent in science and engineering, the United States may not be able to fill gaps in its needs for scientific expertise with talent from the broader international labor market. Other industrialized countries are becoming more aggressive in their strategies to attract graduate students in science and engineering, thus competing with the efforts of American graduate schools to find excellent students. The competition for well-skilled professionals in science and engineering, both in the domestic and international markets, is keen, since such individuals have options for well-paying and interesting positions both in their fields and in other arenas. In considering graduate school choices, talented undergraduates in science and engineering consider such factors as their perceptions of career choices that are open to them, the opportunity costs of directions not taken, the quality of life they will experience in graduate school, and the debt they will accrue. Given these considerations, talented individuals from both the domestic and international settings may choose not to attend graduate school (National Science Board, 2003).

Second, the number of United States-born students interested in pursuing engineering, physical sciences, and mathematics is declining. More precisely, from 1999 to 2000, the enrollment of U.S. citizens and permanent residents in science, technology, and engineering declined by 3%. Between 1980 and 1999, the number of U.S.-born White males who received Ph.D.s in STEM fields declined from 9,362 to 8,138. Overall, the increase in enrollment in science and engineering fields can be accounted for by international students (National Science Board, 2003, p. 21). In fact, already from 1990 to 2000, the percentage of non-U.S. born scientists and engineers filling positions in the country increased from 14% to 22%. At the doctoral level, the percentage of international students enrolled increased from 24% in 1990 to 38% in 2000 (National Science Board, 2003, p. 9). In arguing for plans to attract more US-born individuals to study science and engineering at advanced levels, the report noted that the need for talented individuals in these areas cannot be met without finding ways to ensure that people from underrepresented groups succeed in their studies (National Science Board, 2003).

This downward trend in the involvement of US-born citizens (in particular, White males) is occurring at the same time that retirements in the science and engineering workforce are expected to increase rapidly in the next twenty or so years. Additionally, science and engineering occupations are increasing three times more quickly than positions in other areas of work. Furthermore, the challenges associated with the events of September 11, 2001 mean that the need for individuals with science and engineering skills is even greater than originally expected (National Science Board, 2003).

In response to the concern that the United States is lagging in its ability to produce a large enough, well-prepared pool of highly qualified scientists and engineers, the National Science Board (2003) called for action in several arenas. The recommendations focused on: (a) undergraduate education in science and engineering, (b) the knowledge base and research concerning the science and engineering workforce, and (c) initiatives to attract and retain excellent pre-college teachers in mathematics, science, and engineering. Of particular relevance to this chapter, the report emphasized reform in graduate and post-doctoral education in STEM fields. Recommendations focused on adjusting "advanced education of scientists and engineers to better align with national skills needs" (p. 25). Specific recommendations focused on: preparing students to work in disciplinary and cross-disciplinary areas in a range of careers in various sectors; developing research on the impacts of different approaches to supporting graduate education, including fellowships, research work, and traineeships; research on such topics as time-to-degree and the involvement of foreign students in US science, mathematics, and engineering endeavors; the role of the federal government in supporting science and mathematics graduate and postdoctoral education through recognizing programs that model good practice and encouraging collaboration between research and non-research institutions; promoting diversity and access to graduate programs, especially for those in underrepresented groups; addressing changes in grant procedures and encouraging adjustments in faculty reward systems to enable faculty members to have more time to mentor; and research on the science, engineering, and mathematics workforce.

The publication in 2007 of *Rising above the Gathering Storm: Energizing and Employing America for a Brighter Future,* produced by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, continued the call for urgent attention to the state of sciences and engineering in the United States. Recognizing that the country's prosperity relies heavily on research and development, the report reiterated concerns about global competition and challenges to U.S. leadership in scientific and technological innovation. Among its four key recommendations, the report called for "mak[ing] the United States the most attractive setting in which to study and perform research so that we can develop, recruit, and retain the best and brightest students, scientists, and engineers from within the United States and throughout the world" (p. 9).

As discussed in this section, a national dialogue about doctoral education gained momentum during the 1990s and into the new century through the efforts of foundations, researchers, and national organizations, such as the National Science Foundation, and through publications, conferences, and research. Doctoral students

themselves have contributed to the dialogue about the strengths, issues, dilemmas, and challenges in graduate education through their responses to surveys and interviews, their articulation of issues through the graduate teachers' unions in place at some institutions, and their contributions at scholarly and professional meetings. The next section discusses in more detail key issues that emerged in this dialogue that have fueled efforts to reform and improve doctoral education overall and STEM doctoral education in particular.

Major Concerns About Stem Doctoral Education

The liveliness of the discussions over the last 15 years have produced a number of suggestions for reform in doctoral education overall and STEM doctoral education in particular. The consensus around the challenges and the issues to be addressed is evident in the similarity of the conclusions and recommendations offered in the various reports and conferences. Here I discuss these recommendations for reform by organizing them into two primary areas of focus: (1) preparation for diverse employment options; and (2) the structure, quality, and nature of the doctoral experience.

Strengthening Preparation for Diverse Employment Options

A prevalent concern, appearing in national studies and reports as well as in student discussions, pertains to the extent to which doctoral education prepares students for the diverse career options available to them (Golde & Dore, 2001; National Science Board, 2003; Nerad, 2008; Nyquist, Austin, Sprague, & Wulff, 2001). Doctoral students in STEM fields may expect careers either within academe or in other sectors, so preparation must take into account both career routes. However, preparation has been criticized for not fully meeting expectations and needs. Golde and Dore (2001), based on their quantitative study of how graduate students in a number of fields perceived their experiences, asserted (in an oft-quoted comment) that the preparation of doctoral students does not match what they want to learn nor the needs and expectations in the positions they enter. Similarly, based on qualitative research, Nyquist et al. (2001) concluded: "Graduate education does not match the needs and demands of the changing academy and broader society" (p. 5). As discussed below, the discussions and recommendations have pertained to both preparation for academic careers as well as careers outside academe—and in fact, a major theme in recommendations for reform is that doctoral education, and particularly STEM doctoral education, should be sufficiently flexible to prepare students for a range of employment options.

Concerns About Preparation for Academic Work

In regard to the role of doctoral education in preparing students for academic work, a frequently mentioned conclusion has been that aspiring faculty members are not

fully prepared for the responsibilities of academic careers (Austin 2002a, 2002b; Carney et al., 2006; Golde & Dore, 2001; Nerad, Aanerud, & Cerny, 2004; Nyquist et al., 1999; Wulff, Austin, Nyquist, & Sprague, 2004). They often do not understand the full range of work that faculty members do, including what responsibilities they might have in regard to institutional governance, advising, and participating in outreach to the broader community. In a study reported in 1998 involving 187 doctoral students, Golde (1998) found that 90% felt prepared to conduct research and 63% felt they were ready to teach undergraduates; however, only 33% felt prepared to teach graduate students, 30% to advise undergraduates, 26% to advise graduate students, and 19% to participate in service and governance responsibilities. Doctoral students also often do not understand the various kinds of institutions that comprise the American higher education landscape and the missions and history characterizing each type (Austin & McDaniels, 2006a; Nerad, 2008). Thus, prospective faculty members may not understand the employment options open to them. More specifically, scientists and engineers may not perceive the ways in which they can contribute to the preparation of a citizenry informed about critically important scientific issues through work in teaching-oriented universities and colleges. In fact, in Golde and Dore's (2001) research involving more than 4,000 graduate students (in a number of fields), 54% had a "strong preference" to assume positions in large research-oriented universities, while only small percentages indicated preferences for liberal arts institutions, community colleges, or comprehensive institutions. Since available positions in research universities are far less than the doctoral students expressing preference to work in them, and since there is great need for preparing all future citizens to be knowledgeable about scientific issues relevant to their lives and the well-being of the planet and the society, greater attention in doctoral education to cultivating interest in and preparing future faculty for work in the range of institutional types in academe would be desirable.

Concerns About Preparation for Careers Outside Academe

Preparation for industry and non-academic workplaces is also essential and has been a central call in the reform discussions (Carney et al., 2006). The National Science Board report on *Realizing America's Potential* (2003) explained that, when higher education was expanding in earlier decades, graduates from science and engineering programs could anticipate the availability of positions in academe. Currently, however, industry is the largest employer of science and engineering graduates, and demand for individuals with Ph.D.s to fill academic positions has decreased. In 1999, for example, 48% of scientists and engineers with doctorates were employed in academic positions and more than half were employed outside academe (National Science Board, 2003). Thus, in making recommendations about meeting America's workforce needs, the National Science Board recommended more attention in STEM graduate education to new areas in science and engineering (such as nanoscale science and engineering), more preparation for future scientists and engineers in interdisciplinary skills, more attention to preparing talented

individuals for traditional fields that are currently related to infrastructure needs in the country (such as computer science), and more attention to preparing future professionals for areas of federal focus where a mismatch occurs between enrollments and need (such as nuclear physics and engineering) (National Science Board, 2003). Those who will enter the workforce also need to understand the global economy (Carney et al., 2006). Overall, the reform reports and the research on various stakeholders' concerns have raised questions and urged greater attention to explicit preparation of doctoral students for non-academic employment options.

Competencies to Develop in Doctoral Education

The publication of literature conceptualizing doctoral education as a period of socialization for academic work has paralleled the discussion of the adequacy of doctoral education for preparing students for future careers—academic and non-academic (Anderson & Seashore Louis, 1991; Austin, 2002a, 2002b; Austin & McDaniels, 2006a, 2006b; Bess, 1978; Golde & Dore, 2001; Tierney & Rhoads, 1994; Weidman, Twale, & Stein, 2001). Building on the literature on socialization, the research on the graduate experience and on faculty work, and the recommendations calling for reform in doctoral education, Austin and McDaniels (2006a) outlined key areas that doctoral education should address in order to prepare future faculty members for the work they will do. They recommended that doctoral students in all fields—including STEM fields—should develop competencies in four areas: (1) conceptual understandings of scholarly work; (2) knowledge and skills relevant to the major aspects of faculty members' work; (3) interpersonal skills; and (4) professional attitudes and habits. The work of a scholar is marked by certain characteristics, whether conducted within academe or in other settings. Thus, the recommendations that emerged from discussions in the national dialogue about the preparation of future faculty have considerable relevance for preparing students for a range of career options. Furthermore, doctoral students may not know in which arena they will ultimately work, and their career paths may, over time, weave across sectors.

In terms of the first area of competencies to be developed in doctoral education (conceptual understandings), Austin and McDaniels (2006a) suggested that future faculty should understand the "essential purposes and core values" of higher education (Levine, 2000), the responsibilities of institutions of higher education to the broader society, the history of American higher education, the types of institutions within the higher education landscape, and the traditions of teaching, research, and service that have shaped the roles of faculty members in American higher education institutions. The importance of preparing doctoral students to understand their responsibility to make contributions to the public good also was encouraged by Austin and Barnes (2005). Austin and McDaniels (2006a, 2006b) also asserted that adequate preparation for "conceptual understandings" must include thorough knowledge of one's discipline, which would involve understanding the culture of the discipline; the paradigms, theories, and philosophical traditions that guide its

work; the research methods and modes of scholarly communication commonly used; the major debates and cutting-edge questions challenging those working in the field; and the ways in which one's field intersects with others. Additionally, doctoral preparation should help students develop a sense of professional identity in which they come to see themselves as scholars, who understand the norms, values, and responsibilities associated with this role (Austin & McDaniels, 2006a, 2006b).

The second major competency area encompasses knowledge and skills in key areas of faculty work. Future faculty must understand teaching and learning processes, including the processes through which learning occurs, ways to respond to individuals' learning differences, and strategies to foster learning (Wulff & Austin, 2004). Future faculty also should have deep knowledge of how learning occurs and the challenges related to learning in their disciplines (Hutchings & Shulman, 1999), as well as ways to use technology to enhance learning. Well-honed research skills are at the heart of preparation for a faculty role—or for any other professional role as a scholar in a discipline. Austin and McDaniels (2006a) argued that all scholars should understand how to frame questions within their fields, how to design scholarly projects, how to collect and analyze data, how to present results for a variety of audiences, and how to give and receive feedback about their work. Appreciation and knowledge of the forms that service and engagement with the broader society takes within their fields is another key ability relevant to faculty work—and work in other sectors, as well. Specifically, how to link theory and research with application and practice and how to communicate with diverse audiences are essential skills for scholars and faculty members.

The third area of competency pertains to interpersonal skills (Austin & McDaniels, 2006b; Stark, Lowther, & Hagerty, 1986). Those who will serve as faculty members—or as scholars and professionals in other areas of work—should be able to communicate effectively in various forms and to a broad array of people (Austin, 2002a, 2002b; Austin & Barnes, 2005; Terenzini, 1996). They also should be able to work effectively with people within the academy and beyond, and, as many issues require an interdisciplinary approach, with colleagues across a range of disciplines. Understanding the dynamics of group process, knowing how to collaborate and work in teams, and having the skills to resolve conflicts become important attributes to develop in doctoral study (Austin, 2002b; Austin & Barnes, 2005; Austin & McDaniels, 2006a; Klomparens & Beck, 2004).

Fourth, doctoral education should prepare future faculty—and future scholars in all areas of work—to value and express various professional attitudes and habits. Of utmost importance is the internalization of the code of ethics that is prized by the profession (Austin & McDaniels, 2006b; Braxton & Baird, 2001; Pescosolido & Hess, 1996; Stark et al., 1986). A consistent concern through a number of the reports addressing reform in STEM doctoral education pertained to ethics and responsible conduct of research (Carney et al., 2006; National Science Board, 2003). Scholars learn how ethical guidelines should guide their research, the importance of confidentiality, the appropriate ways to treat human or animal subjects, how to recognize and manage conflicts of interest, and how to enlist ethical guidelines in the processes of

collaboration. They should know about laws and guidelines pertaining to intellectual property and how to balance the interests of all parties to research endeavors. Other professional attitudes to be cultivated include a sense of motivation to stay abreast of their fields and engage in continuous learning, the ability to cultivate and participate in professional networks, and a sense of how to find balance in regard to personal and professional responsibilities.

Lack of Attention to Developmental Career Preparation

The reports and studies analyzing doctoral education call for better preparation for both academic and non-academic careers, and more attention to preparing students with a full array of competencies. Additionally, extant literature questions the process through which graduate students learn. Whether doctoral students aspire to careers in academe or in other sectors, literature calling for reform expresses concern that doctoral education is not structured to develop the competencies graduates will need in a systematic, developmental way (Austin, 2002a, 2002b; Austin & McDaniels, 2006a; Nyquist et al., 1999; Wulff et al., 2004; Walker et al., 2008). Doctoral students typically have some opportunities to teach and conduct research under faculty guidance. However, these assignments are usually not designed to offer comprehensive preparation. For example, teaching assistants' assignments often address university needs for instructional coverage of undergraduate courses, not the needs of individual doctoral students to develop a set of teaching skills in a way that takes into account the doctoral students' development as teachers (Austin, 2002b; Nyquist et al., 2001). Assignments are not necessarily organized to ensure that any individual doctoral student has, across the graduate career, a range of different types of teaching opportunities. While teaching assistants usually have some training, STEM doctoral students often are discouraged by their advisors from spending much time on programs or training to deepen their knowledge of teaching (Austin, 2002b); time spent on developing as a teacher results in time away from the laboratory conducting research. While doctoral students in science and engineering often are working on research projects, they still may not have opportunities to develop, in a systematic way, the full array of research skills they may need in a career. Rather, they may get involved in projects that are in process, after grant proposals are written or before the final reports are prepared, thus enabling them to learn only about some stages of the full research process. In fact, in one study of doctoral students' perceptions of their experiences, interviewees reported a lack of competence in grant-seeking and proposal development (Austin, 2002b). Doctoral students also reported that they receive little preparation in other facets of scholarly work, including engaging in work in connection with the public, assessing ethical issues, and, for those interested in academic careers, participating in institutional governance or working on curriculum development (Austin, 2002a; Lovitts, 2004; Wulff et al., 2004).

In summary, the calls for reform coupled with the research and theoretical literature over the past decade and a half have focused considerable attention on shortcomings in the ways in which doctoral students—including those in STEM

fields—are prepared for their careers. Those voices critiquing doctoral education point to the need to prepare students more fully and explicitly for both academic and non-academic career options, to ensure that career preparation includes the array of abilities and understandings that graduates will need in employment contexts, and to offer educational experiences that provide developmentally progressive learning opportunities.

The Structure and Nature of the Doctoral Experience

Critiques of doctoral education not only pertain to whether graduates are prepared for academe and for assuming other employment options. Additionally, observers, researchers, and policy makers point with concern to the nature of the doctoral experience itself. As discussed below, the length of time to complete a degree coupled with the rate at which attrition occurs is frequently mentioned (Klomparens & Beck, 2004; Nettles & Millett, 2006). In studies that gather student views, key issues are also relationships with faculty members, mixed messages about what is valued in scholarly work, disappointments around shortcomings in regard to community, and concerns about the quality of life in academic careers.

Time to Degree and Completion Rates

Two major concerns that are mentioned as motivating factors for various studies and programmatic efforts to strengthen doctoral education are the time it takes for students to attain their degrees and the attrition rate from doctoral education. Overall, the time that students take to complete degrees in science and engineering fields is less than in the humanities and social sciences. About a decade and a half ago, Bowen and Rudenstine (1992) reported elapsed time to degree (time from entering a program to completion) was 6.2 years in engineering, and 5.9 in the physical sciences, compared with 9.2 years for humanities students and 8.13 for social sciences students. More recently, Nettles and Millett (2006) reported that their research indicated a somewhat shorter time to degree—a median time of 5.75 years for students in sciences, mathematics, and social sciences, 4.75 for those in engineering, and 6.75 for those in humanities. Nevertheless, while STEM fields may have shorter times to degree than other fields, and while the mean age for completing doctorates in science and engineering areas (31.8 years) is the lowest across fields, students in these fields often must follow their doctoral work with post-doctoral experiences. Thus, a considerable period of time passes until a new scholar is actually in a full-time faculty position. In addition to the implications for the individual in terms of becoming established in a stable position, a lengthy period of preparation also slows the availability of scientific talent available to the labor market. Thus, time to degree has become a major interest of graduate deans concerned with the smooth flow of students through the graduate school pipeline.

The impact of teaching and research assistantships on the students' experiences and time to degree varies depending on their fields (Nettles & Millett, 2006). Overall, assistantships provide students opportunities to make connections in the academic and social community, develop greater understanding of graduate education and what is necessary to succeed, and some experience as teachers or researchers (Lovitts, 2001, 2004; Nettles & Millett, 2006). In regard to the impact of various forms of doctoral funding, Nettles and Millett (2006) reported: "None of the three major forms of student support—fellowships, teaching assistantships, or research assistantships—predicted time to degree. Only in the social sciences was debt incurred as a doctoral student a factor in lengthening time to degree" (p. 175)

Attrition rates are also a concern that motivates efforts to improve doctoral education (Lovitts, 2001, 2004; Walker et al., 2008). Nettles and Millett (2006) explained that pinning down exact rates of attrition is difficult, partly because the interpretation of any figure varies depending on the time in the program a student decides to stop. When students leave early in their doctoral experience, they may be making reasonable decisions about their interests and futures. However, when several years of tuition (either from the institution, other funders, or the student directly) and time (on the part of the faculty and the student) have been invested, attrition represents investments lost. For some decades, the overall attrition rate in doctoral education has been about 45–50% (Bowen & Rudenstine, 1992; Lovitts, 2001), a daunting figure that is motivating reform efforts in doctoral education. Again, though, it is important to note that a specific figure must be viewed with caution. In her study of attrition in doctoral education, Lovitts (2001, 2004) concluded that students often do not have the appropriate information about standards of quality, how to choose advisors, and the "cognitive maps" of the environments they are entering that are needed to negotiate successfully through the doctoral experience.

Advising and Mentoring

Both qualitative and quantitative studies of doctoral education have raised alarm bells about the guidance that students receive. Students have reported that they lack clear information about the steps involved in progressing toward their degrees and the expectations they are to meet regarding requirements (such as examinations, meetings with guidance committees, and dissertation proposals). According to research data, students report that they do not have regular conversations with their faculty advisors about such important issues as their career goals, their areas of focus, and the connections between their professional aspirations and the opportunities available in the labor market (Austin, 2002a, 2002b; Austin & McDaniels, 2006a). Anderson and Swazey's (1998) study of doctoral students led them to conclude that "only half [of the doctoral participants responding] agreed—very few strongly—that faculty members were explicit in their expectations" (p. 6).

In addition to receiving insufficient information, doctoral students often report receiving "mixed messages" as they strive to make sense of their experiences and

decisions about their priorities and futures. Students learn a great deal by observing and working with faculty members in an apprenticeship fashion. They watch what faculty value and how they spend their time. They also observe that what is claimed to be important (such as teaching) is often not rewarded. In short, students report receiving conflicting signals about what work they should do and what work is valued (Austin, 2002b; Nyquist et al., 1999; Wulff et al., 2004).

Students typically report relatively few opportunities to talk in depth with faculty advisors about the life of a scholar, how they should prepare for their careers, and how they might make career decisions. They are sometimes surprised and even disillusioned to find that faculty members do not focus more time on their advisees, and, while cordial, may appear reluctant to forge personal connections with their doctoral students (Austin, 2002a, 2002b; Austin & McDaniels, 2006a; Nyquist et al., 1999; Wulff et al., 2004). Overall, a number of the studies of the doctoral experience point to short-comings in the nature and extent of mentoring and advising that students receive.

Insufficient Sense of Community

Closely related to issues about mentoring are concerns about the community within doctoral programs. Doctoral students tend to turn to peers for support and even guidance and information about the graduate experience (Austin, 2002b; Wulff et al., 2004). While peer relationships are useful, the limitations in relationships with advisors, mentioned above, are especially challenging for some students (Rice et al., 2000). In her research on doctoral attrition, Lovitts (2004) concluded that concerns about community are especially important to students who ultimately choose to drop out. For women and students of color, feelings of isolation, expectations to conform, and negative stereotyping can be strong factors undermining doctoral success (Antony & Taylor, 2001, 2004; Taylor & Antony, 2001; Lovitts, 2004). Lovitts (2004) has urged departments concerned with retaining students, especially those in under-represented groups, to be particularly attentive to the extent to which the culture is welcoming, creates a sense of community, and responds to students' needs.

Quality of Life

Research over the past decade also shows that doctoral students, across fields, are concerned about the quality of academic life. Watching their own advisors and faculty members, doctoral students express uncertainty about the pressures of the academic lifestyle and the extent to which a faculty career will enable them to live with a sense of "balance" in their personal and professional responsibilities, which many hope to have (Rice et al., 2000).

In their survey research, to which more than 8000 University of California doctoral students responded, Mason, Goulden, and Frasch (2009) found that many

graduate students, both male (74%) and female (84%), are concerned about family issues in relation to their career goals. In particular, many doctoral students do not want the hectic lifestyles that they observe their faculty members lead and do not perceive the research-intensive university as a "family-friendly" work environment. The survey also showed that a majority of doctoral students feel concerned about having children while working on the Ph.D., due to the time that doctoral work requires, the stress of managing both doctoral work and children, and the extent to which affordable child care, insurance, and housing are available.

In their earlier, well-publicized, "Do Babies Matter?" study, Mason and Goulden (2002, 2004) focused specifically on how academic careers impact family formation. The research showed that, for women faculty, postponing pregnancy and childbirth until after the years of doctoral study, the years of post-doctoral research (which typically are part of the experience of scholars in the STEM fields), the early faculty career, and the receipt of tenure often means that women have fewer children than they would prefer. This postponement of family formation also leads to considerable stress for women academics. The implications of such research for doctoral education, especially in STEM fields, is that students assess their own career decisions about whether, where, and in what positions to work in academe partly in light of what they observe and experience as doctoral students and what they perceive about the quality of academic life.

Those interested in attracting talented young people to STEM academic careers should take note of the concerns that both men and women have about the nature of academic life and the personal challenges that women in particular are likely to encounter in academic careers. Mason et al. (2009) pointed out that women doctoral students in departments where there are few female faculty (as is often the case in STEM fields) are less likely to perceive research-intensive universities as "family friendly." Thus, doctoral students' experiences and perceptions pertaining to academic life as it relates to their personal aspirations relates to the pipeline of a diverse pool of academics for future faculty positions.

Reports, research studies, and observations about doctoral education are quite consistent in the concerns and criticisms that they mention. Reports assert that STEM doctoral students are typically prepared rather narrowly, without sufficient attention to the full range of knowledge, abilities, and skills that they will need in academic careers. Furthermore, they often receive little encouragement to explore career options beyond academe, nor specific attention to considering ways in which their skills and abilities can be directed to a wide array of career options. In terms of the structure and nature of doctoral education, key concerns are time required to complete the Ph.D., high attrition rates, inadequate advising and mentoring, limitations to the sense of community characterizing the doctoral experience, and students' perceptions about the quality of life in academic careers. These various criticisms of doctoral education have been important considerations in the conceptualization of programmatic interventions designed to reform doctoral education in STEM fields.

Programmatic Interventions

The policy and research reports highlighting the shortcomings of doctoral education in the sciences, technology, engineering, and mathematics have led to an array of responses. Government bodies, foundations, graduate schools, departments, and individual faculty members have responded to the urgency of reforming doctoral education. In preparing this chapter, I faced the decision of how to discuss practical responses to the calls for reform. One choice was to offer short summaries of a number of programs. An alternative was to discuss several different types of programs in some depth, providing, where available, some evaluation data about impact. I chose to provide an overview of key characteristics on which programmatic responses to STEM doctoral education differ, and then to select several programs for discussion.

One key characteristic of programmatic efforts to reform and improve STEM doctoral education pertains to the sponsor, who is often also the funder. The nature of the sponsor has some influence on the degree to which a program has national attention. There are five types of sponsors: (1) national organizations and agencies, such as the National Science Foundation (NSF), the Council of Graduate Schools, and the Association of American Colleges and Universities; (2) private foundations and organizations, such as the Alfred Sloan Foundation, the Woodrow Wilson National Fellowship Foundation, and the Carnegie Foundation for the Advancement of Teaching; (3) disciplinary associations, such as the American Chemical Society; (4) individual universities; and (5) individual departments and faculty members. These various sponsors have supported an array of programs. For example, the National Science Foundation has funded a number of projects, including the GK12 Program to provide STEM doctoral students with opportunities to work with K-12 teachers and students. Another major NSF Program is the Alliances for Graduate Education and the Professoriate (AGEP), which has the purpose of encouraging more US citizens and permanent residents, especially from underrepresented groups, to enter STEM fields. NSF also funds various discipline-specific fellowship opportunities for graduate students.

A second characteristic around which initiatives might be characterized is the level of focus. Some initiatives, for example, are designed to provide opportunities for individual STEM students, while others focus on departmental or institutional interventions, and others create multi-institutional networks. Third, one might characterize programs on the basis of the topics or areas of graduate education that they target. For example, some programs are intended to develop doctoral students as teachers, while others focus on research development. Some programs provide opportunities for future scholars to learn about the array of higher education institutions in which they might work, and others link them with K-12 education. Some initiatives are designed to address a number of the concerns and criticisms that have been levied at doctoral education; others take a more focused, single-issue approach.

I have selected four programmatic initiatives which illustrate several of these characteristics, and discuss in detail the goals, programmatic elements, and change strategies of each. First, I discuss the National Science Foundation's Integrated Graduate Education and Research Traineeship (IGERT) Program, which is an

example of a major national program, supported with federal funding, and designed to provide a comprehensive graduate experience that addresses a number of the recommendations for enhancing preparation of future scholars. Second, I present the Carnegie Initiative on the Doctorate, funded by a major private national organization. This program has a very different change strategy; it involves gathering departments in various fields for dialogues about the challenges in doctoral education and supports these departments in developing discipline-specific, and institutionally responsive, plans for strengthening doctoral education. Third, I discuss the Center for the Integration of Research, Teaching, and Learning (CIRTL). While this is NSF-supported, it takes a different change strategy than IGERT. CIRTL encourages institution-level program development, while also creating a network of institutions that are sharing ideas about reform in STEM doctoral education. CIRTL prepares graduate students to approach their teaching responsibilities with the same analytical skills that they bring to their research. Embedded within the description of CIRTL is also a discussion of two participating universities and their individual efforts to make institutionally-specific reforms (which are supported by CIRTL). Fourth, I discuss the efforts of Dr. Brian Coppola and his colleagues in the Chemistry Department at the University of Michigan. Their work is an example of a reform effort at the department-level, encouraged by the commitment, creativity, and enthusiasm of a faculty member.

Taken together, these four discussions provide an overview of the kinds of reform efforts occurring in STEM doctoral education. Following these examples, I discuss key theoretical and practical questions that must still be addressed concerning STEM doctoral reform. Efforts are underway; but conclusions about the relative effectiveness of different models remain open questions.

Integrative Graduate Education and Research Program (IGERT)

In response to concerns about the quality of doctoral education and the recruitment and preparation of a diverse and talented cohort of advanced scholars in sciences and technology, the National Science Foundation started the IGERT Program in 1997 with a specific focus on promoting interdisciplinary STEM graduate education. Awards are made to institutions, not to individual students, which encourages institutional impact and innovations in graduate training. By 2005, NSF had provided 125 grants, totaling more than $300 million dollars. Individual institutions are awarded 5-year grants of about $3 million dollars, with most of the funds used to provide traineeships to doctoral students who participate in interdisciplinary or multidisciplinary programs (Carney et al., 2006).

The IGERT Program has been designed to help Ph.D. programs in science and engineering offer their students “the technical, professional, and personal skills needed for the changing career options of the twenty-first century” (Carney et al., p. 4; citing Integrative Graduate Education and Research Training Program, Program Solicitation, NSF 95–517, 2005). The program specifically focuses on developing U.S. students in response to the concern about a diminishing pool of

domestic talent in science and engineering. The solicitation highlighted the specific purposes of IGERT grants (cited in Carney et al., 2006, p. 4):

- Educating U.S. Ph.D. scientists and engineers who will pursue careers in research and education, with the interdisciplinary backgrounds, deep knowledge in chosen disciplines, and technical, professional, and personal skills to become, in their own careers, leaders and creative agents for change.
- Catalyzing a cultural change in graduate education, for students, faculty, and institutions, by establishing innovative models for graduate education and training in a fertile environment for collaborative research that transcends traditional disciplinary boundaries.
- Facilitating diversity in student participation and preparation, and contributing to the development of a diverse, globally-engaged, science and engineering workforce.

According to the Program Solicitation (IGERT, 2005), the NSF holds certain expectations for IGERT projects. The programs should, first, broaden the career possibilities for Ph.D. candidates by ensuring that they develop necessary personal and professional skills, including skills in teaching, mentoring, and leadership as well as communication and teamwork. Second, the institutional programs should encourage interdisciplinary work, which is expected to be the underlying theme of the traineeship activities. This goal is fostered through interactions among faculty and students across and within disciplines and the incorporation of interdisciplinary research into graduate education. Third, an IGERT grant is expected to ensure that students are exposed to a broad base of cutting-edge research and methodologies, opportunities to learn about ethics and responsible conduct of research, and encouragement to develop an international perspective. Fourth, expectations focus on the structure of doctoral programs. The award of an IGERT grant carries the expectation that a program will develop a strategy for recruitment, mentoring, and retention of U.S. students (including those from groups underrepresented in STEM fields), a strategy to assess the project both formatively and summatively, a strong plan for administering and managing the grant, and a commitment on the part of the university to provide an environment that supports integrative research and education. Overall, NSF seeks to encourage institutional innovation through the IGERT program.

While institutions have the leeway to organize their IGERT programs as appropriate for the specific context, the IGERT model emphasizes five components: (1) Each project is to have an interdisciplinary theme that involves a diverse array of faculty members. Project plans to integrate research and education and to encourage collaboration are organized around the theme; (2) Students are to develop a breadth of skills that will enable them to work in interdisciplinary environments, while at the same time gaining deep knowledge in their major area; (3) Students' experiences are to prepare them for both academic and nonacademic career options. Thus, they may have internships or mentoring experiences in academic, national laboratory, industrial, or other work settings; (4) Students are to gain an international perspective, which they may develop through institutional programs, fieldwork in international

contexts, or through collaborative research experiences; (5) The program should help students develop both professionally and personally, so they can understand the complexities of challenging problems, including the scientific, political, ethical, business, social, and policy dimensions of these issues (Carney et al., 2006, citing IGERT, 2005). IGERT permits universities to interpret "interdisciplinary" in their own way. Among the strategies used to achieve this goal are the funding of trainees who come from diverse disciplines, involving faculty from different disciplines in team teaching and developing courses relating to multiple disciplines, and involving trainees in research projects with faculty from various disciplines. Some programs strive to develop students as experts in more than one field, others emphasize developing mastery in one field along with an ability to work with colleagues in other fields, and others encourage students to learn research techniques from various fields.

From the early years of IGERT, the National Science Foundation has collected some evaluative data. The evaluation plan included third-year site visits to projects started in 1998, 1999, and 2000 (including extensive interviews with administrators, grant Principal Investigators, IGERT trainees, and key faculty involved in the project). Additionally, the NSF used a web-based system to collect annual data from each institution with an IGERT grant beginning in 1997. Then, in 2003, in order to get comparative data with institutions that did not have IGERT grants, NSF contracted with Abt Associates to conduct an extensive and carefully conceptualized evaluation of the initial impacts of the IGERT Program on students, faculty, and institutions that had received awards (Carney et al., 2006).

Evaluation Findings

Impact on students. The Abt evaluation (Carney et al., 2006) reported that IGERT participants develop more interdisciplinary expertise as compared to students who do not participate, while maintaining equal levels of development in depth of knowledge in their own fields. They have more opportunities to work with faculty from other universities and with scientists in public and government laboratories. They are more likely to have multiple formal advisors and an advisor from a department other than their own, and they are more likely to have worked on research projects with students from other departments. Overall, participants develop more extensive teamwork skills and the ability to communicate with those in other areas. The data also indicated that IGERT participants are more fully prepared for an array of career possibilities. A greater percentage than the non-IGERT comparison group conducted research, worked, or studied off-campus. Sixty-three percent of IGERT students, compared with 44% of the comparison group, agree that they are being prepared for various career options. Both groups are similar, however, in their career goals; about one-third aspire to faculty positions in research universities, and another one-third want to find either an industry or an academic position. While not all IGERT programs have developed specific ways to foster international experience, some have provided opportunities for IGERT students to work with scientists from abroad who come to the U.S., to engage in internships abroad, or to travel

to international conferences. In regard to the IGERT goal to ensure students have training for professional and personal development so that they can understand relevant issues in the world's complex problems, the data also show significant impact. IGERT participants are much more likely to have specific training in ethics and responsible conduct of research, as well as in research methods, statistics, and very current instrumentation. Furthermore, they are more likely to have had experience with multidisciplinary teams and to feel better prepared for such teamwork. The data also show they receive more training in communicating beyond their disciplines and feel more prepared in this area than their counterparts. Overall, based on their more extensive learning experiences, the doctoral students reported feeling more well-prepared for their careers than do those without IGERT training.

Impact on faculty involved in IGERT programs. The National Science Foundation also planned for the IGERT Program to impact the faculty involved as well as the doctoral students. Thus, the Abt evaluation also studied impact on faculty (with a matched comparison group) and concluded that the program has enriched the interdisciplinary experiences of the faculty members involved. The evaluation report noted that the faculty members studied (those working with IGERT and not) get involved to some degree in interdisciplinary work. However, the IGERT faculty have a heightened interdisciplinary dimension to their work. They team-teach more with others outside their discipline, and are more likely to mentor students in other disciplines. IGERT faculty report that their participation has helped them to develop a larger repertoire of teaching strategies and to bring a more expansive array of topics into their courses. They also collaborate on research and co-author with colleagues outside their disciplines at a greater rate, and are more likely to publish journal articles and present at conferences outside their own disciplines. Additionally, they indicate they are better positioned to win grants because of IGERT and have learned new research techniques. The evaluation study also noted that IGERT faculty members indicate enthusiasm for their involvement and willingness to give considerable time to IGERT work without special compensation.

Impact on institutions. Beyond the impact on the students who receive IGERT traineeships and the faculty who work with the program, IGERT has had a broader impact on the universities where the programs are offered in terms of promoting interdisciplinary graduate education. According to the Principal Investigators whom the Abt evaluation project interviewed, institutional impacts include new degrees, certificates, and degree requirements, policy changes in regard to interdisciplinary teaching, and more general institutional interest and support for interdisciplinarity. While assessment of faculty involvement in interdisciplinarity remains an issue at some institutions in relation to tenure decisions, the Abt evaluators concluded that the IGERT program has made a demonstrable impact on advancing support for interdisciplinarity at participating universities.

Impact on recruitment. The Abt evaluation study (Carney et al., 2006) also reported that faculty members involved in IGERT believe the program has enabled them to recruit "more and better academically qualified individuals," and that IGERT programs will help increase the number of U.S. citizens who pursue doctoral education in STEM fields (2006, p. 70). The recruitment of women and minority

individuals has equaled the national averages but the goal of showing increases in diversity has not yet been achieved.

Summary of impacts. Overall, the evaluation data show that IGERT has made a significant impact on supporting universities in developing innovative, interdisciplinary graduate programs. As compared with their counterparts, student participants are having more experiences working with faculty members and students across fields, learning teamwork and communication skills, participating in explicit training concerning ethics, and becoming aware and prepared for diverse career options. The evidence is solid that the IGERT program is addressing a number of the concerns and challenges outlined in the reports and studies calling for reform in STEM doctoral education.

Carnegie Initiative on the Doctorate

The Carnegie Initiative on the Doctorate (CID) is a recently completed 5-year program sponsored by the Carnegie Foundation for the Advancement of Teaching to address the challenges confronting doctoral education in the United States (Golde, Walker, & Associates, 2006; Walker, 2004; Walker et al., 2008). The project selected 84 Ph.D.-awarding departments in six fields: Chemistry, Mathematics, and Neuroscience in the STEM areas as well as Education, English, and History. Each department agreed to be part of an on-going process of examining the purposes of their doctoral programs and the extent to which they were effective or ineffective, developing and implementing changes in response to the findings, and monitoring the effects of the changes. The CID staff organized "convenings," which brought together teams from the participating departments, including graduate students themselves, for the purpose of discussing themes and issues emerging from the process of departmental self-examination. Additionally, the CID staff visited the departments periodically to interview departmental team members and institutional administrative leaders, and they conducted surveys of faculty and students which provided supplementary information to inform the discussions. The overall project plan was to help doctoral programs "hold a mirror up to themselves" to engage in "purposefulness, assessment, reflection, and transparency" (Walker et al., 2008, p. 13).

In essence, the CID project did not have a specific set of action strategies to encourage the participating departments to adopt or advance. Rather, it promoted change by encouraging those directly involved in doctoral education to engage with difficult questions and to identify the changes they believed appropriate within their disciplinary and institutional contexts. While they believed that no single model of change was appropriate, the leaders of the CID did believe that the project could set in motion some powerful processes. In their words:

> What *does* work in all settings, we argue, and what is distinctly absent from most doctoral programs, are processes, tools, and occasions through which both faculty and graduate students can apply their habits and skills as scholars—their commitment to hard questions and

> robust evidence—to their purposes and practices as educators and learners (Walker et al., 2008, pp. 5–6).

While they did not advocate specific areas for reform, the CID did have a set of underlying assumptions about how reform in doctoral education could be fostered most effectively. First, the Carnegie leaders chose to focus the project at the department level, believing that disciplines have unique norms and cultures that influence the doctoral experience and that, since departments provide the home base for faculty members, they are likely to be the most effective locus for reform efforts. Working with departments also enabled the project to "go deep" into the influences of the disciplinary traditions on the doctoral experience. Second, the project involved a set of institutions that were diverse in terms of prestige and the ways in which they went about doctoral education. Involving a range of institutional types made the project of wide interest across the American higher education landscape. A third assumption about change pertained to the importance of working from the local level, enabling each participating department to decide what reforms it would undertake in the context of its particular circumstances. Fourth, the CID highlighted the importance of making innovations and experiments public. Participants were encouraged to present their deliberations on challenges characterizing doctoral education in their fields as well as their efforts at innovation not only to the other participants, but also to colleagues nationally (these contributions were called "reports to the field"). Fifth, the change process explicitly involved doctoral students on the institutional teams, seeking their input and ideas at each step of the process. In reflecting on lessons learned, the CID staff asserted that graduate students are key ingredients in the change process (Walker et al., 2008).

Certain philosophical assumptions and values about doctoral education also formed the foundation for this effort to bring change to the participating departments and to raise questions that would be relevant to the disciplines. The Carnegie Foundation has a long history of shaping conversations and directions in American higher education. The philosophical perspective guiding the project was that doctoral education is a "formation process" through which students are developing a sense of professional identity as scholars that includes both intellectual and character dimensions. The project became known especially for creating "stewards of the discipline"—individuals who see their responsibilities both to their own careers and to their disciplines. A steward of the discipline is committed to generating new knowledge through research and scholarship, "preserving the best of the past for those who will follow," and preparing the next generation of disciplinary stewards (Walker, 2004; Walker et al., 2008, p. 11).

Another assumption about doctoral education grounding the project was a commitment to finding ways to create greater scholarly integration that would link the teaching and research aspects of a scholar's work. This interest led to discussions about how to thoughtfully develop doctoral students for their teaching responsibilities as well as how to create "pedagogies of research" that would provide more systematic preparation for scholarly careers. The project also highlighted a commitment to intellectual community, and framed conversations among participants about the conditions that foster greater creativity and risk-taking in doctoral education.

These two philosophical values—doctoral education as a "formation" process and the importance of scholarly integration—led to specific interest in ways to encourage greater collaboration for graduate students with peers and faculty members throughout the doctoral experience around the various aspects of scholarly work, including research, teaching, outreach, and institutional citizenship.

The description provided here of the Carnegie Initiative on the Doctorate has emphasized the philosophical perspectives because those are central elements in terms of the nature of this reform initiative. CID did not advocate specific innovations, but rather called for participating departments to make "a commitment to the ongoing process of improvement: deliberating about purpose, asking questions about effectiveness, gathering evidence to shape improvements over time, and taking action" (Walker et al., 2008, p. 142). This focus on encouraging deep questioning, data gathering, and dialogue within departments as well as across disciplines is what made this project unique in the reform landscape. Yet, many specific initiatives have emerged within departments—in STEM disciplines as well as in other areas—as a result of this initiative. Departments identified aspects of their doctoral programs that were not effective, developed new approaches, and implemented and began to gather data about the changes. Cross-disciplinary conversations highlighted practices in particular disciplines that could be adapted in others.

Examples of projects that CID departments designed illustrate the array of ideas and strategies that emerged from the project (Walker et al., 2008). In response to concerns that the doctoral experience should help students understand and create integration between the various aspects of scholarly work, including teaching and research, the Department of Anatomy and Neurobiology at the Boston University School of Medicine requires all Ph.D. students to serve as teaching assistants. These students take a required course about teaching, receive on-going mentoring as they teach, and are guided to develop both as researchers and teachers through systematic scaffolding that takes a progressive, developmental approach. The Interdisciplinary Program in Neuroscience at Georgetown University has taken specific steps to create an inclusive intellectual community that involves both students and faculty members and helps students understand their relationship to the larger disciplinary community. Journal clubs, simulated grant reviews, student involvement in panels on ethical conduct of research, and informal monthly "Tea-Time" gatherings to discuss controversial topics at the intersections of science and society are all part of the array of elements purposefully included in the doctoral experience. Another example of the kinds of ideas that have developed from coupling departmental analysis of doctoral practices with cross-disciplinary conversations involves experiments with research rotations (modeled after medical school rotations) (Walker et al., 2008). By giving first-year students opportunities to work with several different faculty members on various projects for relatively short periods of time, students gain broader knowledge of issues in their fields, connect with more faculty members, and begin to function as researchers early in their doctoral experience.

A major topic within the CID has been the concept of apprenticeship. The discussions led to interest in enlarging the traditional apprenticeship model, based on a student working with a single faculty member, toward more multi-generational,

coordinated, and multi-mentor learning communities. Each department grappled with the implications of a new concept of apprenticeship in the context of specific disciplines. Through the conversations, innovative ideas, grounded in respect for disciplinary traditions but seeded with ideas from cross-disciplinary dialogues, are emerging. While the CID has officially concluded, the ideas generated through the project are still informing departmental projects and influencing national discussions about reform in doctoral education in STEM and other fields.

Center for the Integration of Research, Teaching, and Learning (CIRTL)

The Center for the Integration of Research, Teaching, and Learning (CIRTL), one of the National Science Foundation centers, focuses on improving STEM education at the postsecondary level (http://www.cirtl.net/). CIRTL's mission is to contribute to the national pool of talent by developing STEM graduate students who have the knowledge and commitment to create successful careers that include effective teaching as well as excellent research (CIRTL, 2003). Since the majority of STEM doctoral students graduate from less than one hundred universities, CIRTL's mission includes contributing to the preparation of a well-qualified STEM faculty for the nation. The Center rests on the assumption that doctoral education heavily emphasizes research, typically providing little time and encouragement for graduate students to develop as teachers. The Center is also based on a recognition that teaching occurs through what is often called informal education (e.g., in such venues as museums and schools) as well as in formal higher education classrooms.

Funded by a large grant, CIRTL began in 2003 with three universities—the University of Wisconsin Madison, Michigan State University, and the Pennsylvania State University—which collaborated to develop and implement professional development strategies appropriate for STEM doctoral students. The University of Wisconsin Madison (UW) served as the incubator for the emerging strategies and, through the Delta Program (the UW version of CIRTL), became the prototype of the CIRTL approach. A second NSF grant, beginning in 2008, supported the creation and expansion of the national CIRTL Network to include six universities, adding Howard, Texas A&M, the University of Colorado-Boulder, and Vanderbilt to Michigan State University and the University of Wisconsin Madison (Penn State withdrew from the Network). The Network institutions are committed to collaborating to develop and share professional development strategies and models that provide professional growth opportunities for STEM graduate students (as well as for post-docs and faculty members). While the overall goals are consistent at each institution, the particular details of the professional development programs vary in response to institutional contexts, history, and background with professional development.

The signature of CIRTL is a set of three pillars whose principles guide program planning and which are reflected in each institution's CIRTL plan. The first pillar,

Teaching-as-Research (TAR), refers to "the deliberate, systematic, and reflective use of research methods by science, technology, engineering, and mathematics instructors to develop and implement teaching practices that advance the learning experiences and outcomes of both students and teachers" (CIRTL, 2005, p. 1). TAR is similar to what is widely called the Scholarship of Teaching and Learning (SoTL) or action research, but the TAR name resonated well with scientists early in the project development. Essentially, graduate students participating in CIRTL learn to use the skills of research they develop as scientists to identify challenges and problems in their teaching and their students' learning, frame specific questions, gather and analyze data to address those questions, and develop findings that can inform improvements in their teaching (Austin et al., 2009).

The second pillar concerns "Learning Communities," defined as a process that "bring[s] together groups of people for shared learning, discovery, and generation of knowledge" (CIRTL, 2005, p. 1). A key aspect of the definition of a learning community is that it has a functional purpose as individuals work together to achieve a goal and accomplish a task (Austin et al., 2009).

The third pillar, called "Learning-through-Diversity," recognizes the relationship between excellence and diversity. This pillar "capitalizes on the rich array of experiences, backgrounds, and skills among STEM undergraduates, [graduate students, post-doctoral scholars, and faculty that can]... enhance the learning experience of all" (CIRTL, 2005, p. 1). The pillar also draws attention to the importance of approaches to teaching that create inclusive environments. CIRTL participants learn to recognize, honor, and build on diversity as a means to deepen everyone's learning (Austin et al., 2009).

In its early years, CIRTL focused on creating prototypes of courses, internship experiences, workshops, resources to help teachers understand and build on diversity, and a teaching certificate. CIRTL course designs include "The College Classroom," "Effective Teaching with Technology," "Instructional Materials Development," and "Diversity in the College Classroom" (Pawley, Pfund, Miller Lauffer, & Handelsman, 2006). The diversity resources developed by CIRTL, including a review of inclusive teaching practices, a collection of syllabi from STEM courses that encourage diversity awareness, and a case book of diversity-related teaching situations relevant to STEM instructors, are available through its portal, which can be accessed via the CIRTL website (http://www.cirtl.net). The website includes an array of resources to strengthen the preparation of STEM graduate students for professional careers that may include both formal and informal teaching within an array of higher education institutions or outside academe. As the Network has expanded, various cross-Network activities have been developed. These include online courses available to graduate students from Network institutions and opportunities for doctoral students to visit other Network campuses to present their Teaching-as-Research projects and discuss disciplinary research projects. A description of activities at two of the CIRTL institutions shows the variations within CIRTL's work and also highlights how individual institutions are striving to strengthen STEM doctoral education.

Delta Program

The University of Wisconsin Madison was the original lead institution for CIRTL and created a prototype professional development program, called Delta, during the early years of the project (Austin et al., 2009; Brower, Carlson-Dakes, & Barger, 2007; Connolly, Bouwma-Gearhart, & Clifford, 2007; Gillian-Daniel, 2008). Delta is "a vibrant, interdisciplinary intergenerational learning community of current and future faculty" (Gillian-Daniel, 2008, p. 3), designed to prepare future educators who can help improve undergraduate STEM education. The Delta Program offers STEM graduate students (as well as post-docs) various high- and low-involvement opportunities, including six course options taught by teams of STEM and social science instructors, options to engage in internships with STEM educators to develop Teaching-as-Research projects designed to address teaching and learning issues in undergraduate courses, and monthly roundtable dinners involving discussions on topical issues. Delta also offers workshops on specific topics, such as approaches to the National Science Foundation's requirement that all grant proposals address broader impact, and "expeditions" in which graduate students and faculty visit offices and locations on campus to become more familiar with the learning processes that students experience (Carlson-Dakes & Pawley, 2005).

The three CIRTL pillars have been woven explicitly into all aspects of the Delta Program. Graduate students learn to identify learning or teaching problems, read relevant literature, develop hypotheses, design and implement interventions or possible solutions, gather and analyze data about the impact of the intervention, develop findings, and then use the findings to inform adjustments to their teaching. The concepts associated with the Learning-through-Diversity pillar are presented through a course, but also are embedded into each experience (for example, the expeditions into the university highlight resources that are available to support diverse student learning styles). The commitment to using learning communities (the third pillar) guides the structure of the Delta Learning Community. In all activities offered through Delta, instructors strive to model the underlying values and precepts of the CIRTL pillars (Austin et al., 2009; Gillian-Daniel, 2008).

Evaluation is embedded into all Delta activities and designed to assess participation, satisfaction, learning, application, and impact (Gillian-Daniel, 2008). Participation has been note-worthy, especially since STEM faculty sometimes express concern over any obligations that would take students away from research and laboratory responsibilities (Wulff et al., 2004). Gillian-Daniel (2008) reported that more than 1400 graduate students, post-docs, academic staff, and faculty members have participated at some level in Delta activities over the first four and a half years of the project. These figures represent about 100 graduate students participating in courses and programs each semester, with another 150–250 students, post-docs, faculty, and academic staff attending dinners and workshops. Of these participants, 36% have been in the biological sciences, 25% in the physical and mathematical sciences, 16% in engineering, and 13% in the social, behavioral, and economic sciences. In regard to satisfaction, 95% of participants have indicated that they are satisfied or very satisfied and 44% have participated in 15 or more hours

of program options. A longitudinal study was begun in 2005 to follow participants in Delta as they move into their careers. Interview data collected from this group in 2005–2006 showed that, through involvement in Delta programs, participants had gained new knowledge and skills regarding teaching, developed more positive attitudes about teaching responsibilities, and developed a broader sense of career options, including more awareness of and interest in the array of higher education institutions in which one might work (Gillian-Daniel, 2008). The small group who had completed their degrees and moved into teaching positions by 2007 reported their perception that the Delta experience had helped them with their teaching responsibilities (Bouwma-Gearhart, Millar, Barger, & Connolly, 2007). Delta participants also reported giving campus and national conference presentations about their research on teaching and learning, and incorporating the findings from TAR projects into courses where they or their faculty mentors were teaching.

Michigan State University's PREP and FAST Fellows Programs

As a member of the CIRTL Network, Michigan State University (MSU) has built on its already established professional development program for graduate students to provide additional focused opportunities for STEM doctoral students. MSU's approach to involvement in CIRTL illustrates the coupling of programming available to all graduate students with specific programming for STEM students. The overall professional development program offered through the Graduate School to students across disciplines is called PREP. The name itself calls attention to four professional skills that the program is designed to help doctoral students develop: planning throughout their graduate careers in order to identify and develop their career goals; resilience and tenacity to manage the personal and professional challenges that arise across the stages of the graduate experience; engagement in decision-making about one's professional development; and the professionalism to pursue high standards in research, teaching, and service (http://grad.msu.edu/prep/). The program is based on the assumption that doctoral students' needs and interests vary across the stages of the graduate school experience, including the early stage (involving course work, qualifying exams, and writing the dissertation prospectus), the middle stage (involving certifying exams, dissertation research, and the process of developing professional networks), and the late stage (dissertation writing and the job search). The program is represented by a matrix that crosses the three career stages with three levels of time commitment and engagement (low, medium, and high) required for participation in the professional development activities. At the intersection of career stages and levels of involvement, students can find descriptions of professional development options, including workshops and conferences, available to them (http://grad.msu.edu/lcpd.htm).

Recognizing that the literature on the doctoral experience has highlighted the shortcomings in American doctoral programs in regard to preparing students for the full array of higher education institutions in which they might work as faculty members, and the many employment options they might consider outside

of academe, the PREP Program includes opportunities for students to explore a wide array of career options, including, for example, opportunities to participate in simulated interviews for faculty work in different types of colleges and universities, and workshops with non-academic employers about the skills and abilities they seek. The Graduate School evaluates students' satisfaction and assessment of learning after each professional development experience by immediately surveying participants.

The university's Graduate School also offers doctoral students the opportunity to pursue a teaching certificate. Completion of the certificate requires participation in a number of professional development opportunities, a mentored teaching experience in the discipline, and the creation of a portfolio that involves reflection on one's development as a college-level teacher. A formal review process of the portfolio is required. While only a small number of students each year opt to complete all requirements for the certificate, it provides an option for doctoral students to delve deeply into preparation for the teaching components of their careers.

STEM doctoral students have the opportunity to participate in the PREP workshops and professional development opportunities, as well as to pursue the teaching certificate. Additionally, as part of MSU's involvement in CIRTL, STEM doctoral students can apply to be FAST Fellows, a year-long mentoring program designed to help doctoral students get a "fast" start to an academic career and develop the skills to teach and assess the impact of their teaching on students' learning. The FAST Fellows teach under the guidance of a faculty mentor, convene regularly for meetings and workshops, and interact in learning communities that meet regularly to explore resources about teaching, learning, and assessment, and the broader array of research on higher education. Each Fellow also works on a scholarly project concerning a teaching topic (known in the CIRTL community as a Teaching-as-Research project), which involves framing a teaching-related question, collecting and analyzing data, and disseminating the findings in campus conferences and, sometimes, at national conferences and in publications. The FAST program also provides some funding to support Fellows' projects and to enable them to travel to conferences relevant to their projects. While the second year of the program has just ended, the facilitators are already collecting data from participants in order, over time, to develop a comprehensive evaluation of the impact and outcomes of the program (Bouwma-Gearhart et al., 2007).

Other Evaluation of CIRTL Impact

A comprehensive evaluation program is underway to examine the impact of the CIRTL Program (CIRTL, 2007). The plan has three levels of assessment: (1) impact on student participants; (2) the process and factors contributing to and challenging institution-wide plans for STEM doctoral student development; and (3) the process of building an inter-institutional network around issues of STEM doctoral student professional development and the impact of participation in the CIRTL Network on the institutions participating. Evaluation processes include a range of qualitative and quantitative data collection strategies focusing on individuals, institutions, and the

network overall. A second National Science Foundation-funded project is supporting an on-going study of the long-term impacts of participation in CIRTL and other kinds of professional development opportunities on STEM doctoral students as they move into the first 5 years of their careers. Such studies on the long-term impact of doctoral student professional development are scarce, so the results, several years hence, will be important.

Departmental Reform Efforts

Departments and individual faculty members also are working to strengthen STEM doctoral education. One example is the work of Brian Coppola and his colleagues in the Chemistry Department at the University of Michigan. Scientific research has long been advanced through the use of research teams. Not only do research teams advance discovery of new knowledge; they also serve as the incubation site for young researchers, who learn how to be researchers by working in close proximity and under guidance from faculty members and senior colleagues. Coppola's approach models the research team strategy to prepare future scholars for responsibilities as teachers (Coppola, 2007; Coppola & Roush, 2004). The premise is that a department has the responsibility of preparing the next generation in all aspects of scholarly work. I quote Coppola's (2009) words here as they eloquently make a case for preparing future scholars in teaching as well as research:

> Research groups are the nuclear families of academia, and the obligation we have to replace ourselves in academia is profound. If academic scientists stopped doing research, discoveries would still be made. If academic scientists stopped filing patents, inventions would still be invented. But if academic scientists stopped educating the next generation of academics, the entire system of educating scientists comes to a swift and grinding halt.
>
> We owe it to the next generation to educate as well as possible, and my thesis is that integrating a scholarly development model in teaching and learning—for all of those who become the next generation of academics, based on what we know from research—is the necessary next step in the evolution of our profession (p. 35).

Modeling the research team approach, doctoral students join teaching groups to engage collaboratively with faculty members, post-doctoral fellows, and undergraduate students in working on teaching projects, such as curriculum or instructional development relevant to the department's mission (Gottfried, Sweeder, Bartolin, & Hessler, 2007; Varma-Nelson & Coppola, 2005). Sometimes colleagues from other fields may join the group to help, for example, with curriculum design projects, and to evaluate teaching materials produced by the group. The doctoral students involved receive financial support, as they would if they were participating as members of a research team. The University of Michigan Chemistry Department sometimes uses resources from the GANN Program (Graduate Assistantships in Areas of National Need, a program supported by the U.S. Department of Education) to support doctoral students who are including education-related projects as part of their graduate study (Coppola, 2009). Some of these students include chapters on the scholarship of teaching and learning as part of their dissertations. Another key ingredient for the

success of the teaching groups, as with research teams, is that a department must have a few faculty members willing to take the lead with the groups.

Coppola has written about the standards to which the work of the teaching teams is held. In collaborating to do what is called the scholarship of teaching and learning, they must do work that is "informed," "intentional," recognized to be "impermanent," and "inheritable" (Coppola, 2009, p. 36). To elaborate, the teaching projects must be informed by an understanding of the nature of the problem and how it relates to the broader context of teaching and learning, as well as an appreciation for the appropriate approaches to studying and addressing the problem. The work must be "intentional," in the sense of having clear goals, with explicit links that align the project goals, the plans and methods to address the problem, and the evaluation of the strategies used to address the problem. Coppola also argues that team members must recognize that their efforts to address the problem must be subject to further research and questioning, as are research results, and thus, the work must be recognized as "impermanent." The process and results of the teaching-related work must be documented so others can evaluate its value; that is, the work must be "inheritable," just as research findings must be presented in sufficient detail to enable others to replicate a study. A key element in framing the work of the teaching teams is that everyone involved is a scientist, engaging in an aspect of the scholarly work of a chemist—that is, the work is explicitly framed as central to the work of being a chemist, not marginalized or second-class work (Coppola, 2009).

The approach taken by the Department of Chemistry at the University of Michigan has been evaluated by a colleague whose expertise is in the study of higher education (Coppola, 2009). Results of the evaluation indicated that the graduate students participating in the teams working on teaching projects were better prepared as educators and understood the array of dimensions of faculty work more fully as compared to those without such team experience. The evaluation also revealed that the approach was becoming imbedded into the core mission and work of the department. According to Coppola (2009), faculty attention is captured, and resistance is at least neutralized, when funds come into the department to support students involved in this work. The evidence that the program is of interest to prospective students, apparently adding a competitive edge to the department in its efforts to recruit excellent graduate students and faculty, also helps win faculty support (Coppola, 2009).

Future Research: Next Steps in Research and Action

A number of innovative efforts to strengthen doctoral education in the sciences, technology, engineering, and mathematics have been developed and implemented over the past decade or so. While the body of research about the doctoral experience has grown considerably in this time period, the body of research about the change efforts themselves is still modest. Some programs have been evaluated to examine short-term impact and to gather insights that can be used for improvement. However, more comprehensive research needs to be undertaken. A more expansive body of

research on the nature and impact of change strategies to improve doctoral education would be very useful to institutions making programmatic decisions within environments of competing priorities and to funding agencies making decisions about the allocation of resources.

I suggest that a research agenda about reform in STEM doctoral education can be organized around a broad "theory of change" framework that seeks to learn more about the impact of various strategies in relationship to the change processes selected. There is little research at present that offers much guidance concerning which strategies are most likely to have what kinds of impact in terms of strengthening STEM doctoral education. A "theory of change" approach recognizes that different strategies to strengthen STEM doctoral education build on differing assumptions about such important issues as what the outcomes of a reform effort should be, what the target for change is, what factors contribute to the most impact on student learning, how much involvement in a reform initiative is necessary to produce certain kinds of outcomes, and how to maximize institutional investments in improving doctoral education. Here I suggest several categories of questions that deserve research, the answers to which would deepen understanding of change processes in STEM doctoral education:

- *Program Components and Organization*: What elements in professional development programs for STEM doctoral students (e.g., mentoring, internships, courses, short workshops) have what kinds of impacts and are most useful in preparing STEM doctoral students for their future careers? What is the relative benefit of different levels of "dosage?" That is, to what extent (how many hours) and in what kinds of ways do students need to be involved in professional development in order for significant impact to be gained? Are programs more effective in regard to student learning outcomes if they focus on single aspects of professional work (doing research or teaching) as compared to programs that strive to help students integrate the various dimensions of a scholar's work? What are the benefits of organizing programs around departmental strategies as compared to organizing institution-wide or network-wide strategies?
- *Impact on Participants*: What is the impact of various professional development programs on STEM doctoral students in regard to their attitudes and understandings about various facets of scholarly work? In what ways and to what extent do various programs have an impact on the career choices of developing scholars? What are the processes through which STEM doctoral students develop as teachers and researchers? Are there particularly important stages or experiences relevant to development in these areas of scholarly identity and ability? How do programs designed to better prepare doctoral students for their careers impact graduates as they assume their first professional positions? How do doctoral students who have been prepared systematically for teaching responsibilities handle first positions in departments whose cultures heavily value research over teaching? What is the long-term impact on career development of graduates who have participated extensively in programs such as IGERT or CIRTL?[1]

- *Role of Faculty/ Impact on Faculty and the Institution*: How does involvement in programs to strengthen doctoral students' preparation affect faculty members? For example, to what extent does working with doctoral students in a departmental "teaching team" affect faculty members' own teaching, research, or attitudes about their roles in doctoral preparation? What factors contribute to changes in faculty members' attitudes about the purposes of doctoral education or about the roles of faculty members in contributing to students' professional growth? In what ways and to what extent do departmental efforts to reform STEM doctoral education spill-over to have an impact on other departments within the institution?

In addition to organizing research studies to examine the change processes, design, and components of various reform efforts and their impact, I suggest several specific studies which would contribute important and useful insights to those working to improve STEM doctoral education. Some of the studies I mention have been included in recommendations offered in other reports. First, both the National Science Board (2003) and the leaders of the Carnegie Initiative on the Doctorate (Walker et al., 2008) call for more in-depth qualitative research concerning STEM doctoral education. Institutional leaders, including graduate deans trying to develop effective programs for STEM doctoral students, would benefit from well-designed and detailed case studies that highlight the characteristics and impact of specific programs (e.g., strategies for shortening time-to-degree or programs to deepen specific areas of professional knowledge, such as ethical behavior or awareness of employment options in diverse institutional types or outside academe). Understanding more about the specific experiences of students in particular disciplines, including, for example, the challenges they experience in learning about research and teaching in their disciplinary context and their processes of decision-making about career options, would be deepened by well-crafted, discipline-specific, ethnographic studies (Walker et al., 2008).

In a number of STEM fields, women and individuals of color are underrepresented. While there is some research concerning the experiences of these students as they progress through doctoral study, more research that focuses specifically on the STEM fields would be useful. The experiences and challenges confronted by part-time students also should be studied, with a focus on the kinds of strategies that would help students in non-traditional situations (e.g., women returning to graduate education after a period of child-raising) succeed in doctoral study.

Third, interdisciplinary scholarly work is increasing, and, as already discussed in this chapter, young scholars preparing for their careers should learn how to engage in this kind of scholarship. More needs to be known about how to help graduate students develop depth and breadth of knowledge (Walker et al., 2008). How can they best be supported in pursuing their disciplines in depth, while also learning how their fields intersect with other areas of study, the norms, values, and habits of thought in other disciplines, and the necessary skills for cross-disciplinary collaboration? One

suggestion is the development of "general education for doctoral education," recommended by Catharine Stimpson (2002), who served as Dean of the Graduate School at New York University. Important research questions could focus on the challenges STEM students experience as they engage in interdisciplinary work, the processes through which they grapple with the balance between breadth and depth in their studies, and the impact on their understandings and values of courses and other curricular and programmatic efforts to help them develop skills related to engaging in interdisciplinary work.

A fourth area focuses on the sustainability over time of initiatives to reform STEM doctoral education. Considerable investment is being made by funding agencies and institutional leaders in developing and implementing innovative approaches to preparing STEM doctoral students for their careers. With all externally funded projects, there is always the looming question of whether and how the programs will be sustained after external funding concludes. Typically institutions are encouraged to commit funds at progressively higher levels across the years of external funding, in order to encourage and prepare universities for assuming the full burden of financial support. Maintaining financial support is only part of the concern. Reform initiatives can also flounder in the face of other priorities. One strategy to address this concern is to embed reform efforts in multi-institutional networks. After funding concludes, the network may be a strong factor to encourage individual institutions to continue their reform efforts, since institutions of similar reputations often strive to stay at par with their counterparts. An important area of research concerns the factors that contribute to sustainability of reform initiatives over time. A related question pertains to how initiative leaders ensure that programs balance fidelity to their missions with appropriate responsiveness to pressures and reasons to adapt or change. These questions have practical implications that could be very useful to funding agencies and institutional leaders seeking ways to ensure that investments of time and resources have long-term and substantial impact.

Finally, in addition to offering suggestions for further research, I emphasize that ongoing, thoughtful conversations are needed about STEM doctoral education. These conversations should address the strengths and concerns associated with the doctoral experience, including the preparation doctoral education provides for young scholars' future career paths, as well as ideas for continuing efforts to strengthen STEM doctoral education. Faculty members, institutional administrators, and members of external groups, including disciplinary associations, funding agencies, and accrediting groups, should be involved. And, of course, STEM doctoral students themselves must be key participants in reflecting on the quality of their graduate experience and ideas for improvement. Efforts to strengthen the preparation of the future scholarly talent in the sciences, technology, engineering, and mathematics will impact the quality of undergraduate education, the country's economic competitiveness, the extent of high-quality research addressing major problems, and, ultimately, the well-being of people throughout the world.

Notes

1. The National Science Foundation has recently funded a study, now underway, whose goal is to address the question of the impact of various kinds of graduate school professional development experiences on the early career development of STEM scholars.

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Toward a More Complete Understanding of the Role of Financial Aid in Promoting College Enrollment: The Importance of Context

Laura W. Perna

Competing demands for public resources and demands for accountability of program effectiveness underscore the need to better understand the role of student financial aid in eliminating financial barriers to college enrollment. Although many researchers have examined the effects of student financial aid on student outcomes, gaps in knowledge persist. Based on their comprehensive review of research for the College Board's "rethinking student aid" project, Baum and McPherson (2008) concluded that more research is needed, as "many questions remain about how to develop the most effective student aid policies" (p. 6).

Through a review, synthesis, and critique of relevant prior research, this chapter argues that one reason knowledge about how student financial aid programs can best promote college enrollment is incomplete is that existing research does not devote sufficient attention to the "context" in which these programs operate or the ways that context mediates the effects of aid. Potentially relevant aspects of context include characteristics of other available financial aid programs, students and their families, the high school attended, available higher education options, and the broader economic, social, and policy environment. These aspects of context come together to define and delimit the ways financial aid may influence enrollment. Available research also provides insufficient attention to the indirect effects of aid, particularly the ways information and perceptions of financial aid may influence not only college enrollment but also college aspirations and academic preparation (Mundel, 2008). The chapter begins by explaining the need to increase educational attainment, the ways inadequate finances limit educational attainment, and the role of financial aid in addressing these financial barriers. Then the characteristics of student financial aid programs are described and what is known from existing research about the effects of financial aid on college-related behaviors is summarized. A conceptual model for understanding the ways "context" may influence the relationship between financial aid and college enrollment is proposed. Building on this

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framework, the chapter concludes by offering questions to guide future research, as well as recommendations for fruitful research strategies.

The Importance of Increasing Educational Attainment

Improving college enrollment and degree attainment is critical to ensuring the nation's continued economic and social prosperity as a growing share of jobs need workers with a college education. The United States Department of Labor's Bureau of Labor Statistics (BLS, 2003) projects that, on average, employment in occupations that generally require a bachelor's or associate's degree will increase faster than employment in other occupations. Jobs generally requiring a college degree comprised 29% of all jobs in 2000 and are expected to account for 42% of projected new job growth during the coming decade. BLS (2003) also predicts that 12 of the 20 fastest growing occupations typically require a bachelor's or associate's degree. Analyses of data from the Census Bureau and Current Population Survey show that 69% of white-collar office workers, the largest, fastest-growing, and among the highest-paying categories of employment, had at least some college education in 2001, up from 37% in 1973 (Carnevale & Desrochers, 2003). Moreover, although the number of frontline factory jobs declined by 21 million between 1959 and 2001, the remaining jobs in this sector are increasingly held by workers who have at least some college education (31% in 2001 versus 8% in 1973) (Carnevale & Desrochers, 2003).

Although increasingly important, educational attainment in the United States has fallen behind that of other developed nations (Baum & Ma, 2007; National Center for Public Policy and Higher Education, 2006). The educational attainment of the U.S. adult population has increased over time, as 28% of adults age 25 and older in the U.S. held at least a bachelor's degree in 2006, up from 26% in 2000 and 21% in 1990 (Baum & Ma, 2007). But, other nations are increasing the educational attainment of their populations at a faster rate (National Center for Public Policy and Higher Education, 2006). Although the quality and focus of available postsecondary education varies across nations, the rate of first-time enrollment into programs that lead to a traditional college degree (i.e., "tertiary-A programs") is now lower in the United States than in New Zealand, Sweden, Iceland, Finland, Poland, Australia, Norway, and Hungary (Organization for Economic Co-operation and Development [OECD], 2006). The OECD predicts that, because the United States is experiencing both slower enrollment and lower rates of college completion than some other nations, the share of college graduates in OECD nations produced by the United States will decline over the next decade.

Recognizing these trends, in a nationally-televised, prime-time address to a joint session of Congress on February 24, 2009, President Barack Obama presented an ambitious goal: "By 2020, America will once again have the highest proportion of college graduates in the world." Along the same lines, Lumina Foundation for Education (2009) has a goal of increasing the percentage of young adults in the

United States who have attained an associate's or bachelor's degree from the current 40% to 60% by 2025. The first goal in the State Higher Education Executive Officers' (SHEEO, 2008) "national agenda for higher education" is to increase the percentage of young adults who earn at least an associate's degree to 55% by 2025, which would require producing an additional three million degrees each year between now and 2025 (SHEEO, 2008). The College Board's Commission on Access, Admissions, and Success in Higher Education (2008) embraces this goal, promising to annually report progress toward achieving it.

One Approach to Increasing Attainment: Eliminate Financial Barriers to Enrollment

One area of opportunity for raising the nation's production of degree recipients is the population of students who are academically prepared for college but do not attend. The Advisory Committee on Student Financial Assistance (2006) estimates that between 2000 and 2010 1.4–2.4 million students from low- and middle-income families will be academically qualified for college but will not complete a bachelor's degree because of insufficient financial resources.

Although inadequate academic preparation and other forces also play a role (Adelman, 1999, 2006; Perna, 2005, 2006a), data and research consistently demonstrate that money is a primary deterrent for academically-qualified students who do not enroll in college (Hahn & Price, 2008; Perna, 2006a; St. John, 2003). The positive relationship between college enrollment and family income persists even though postsecondary educational participation rates have increased since the mid-1980s regardless of family income (Baum & Ma, 2007). The magnitude of the gap has fluctuated, but over this period college enrollment rates have been at least 25–30% points lower for high school graduates in the lowest family income quintile than for those in the highest quintile (Baum & Ma, 2007). College choices are also stratified by family income, as students from lower-income families who enroll in college are relatively concentrated in public 2-year and private for-profit institutions and underrepresented at public and private 4-year doctoral-granting universities (Baum & Ma, 2007). In 2003–2004, dependent undergraduates with family incomes below $20,000 represented 26% of all dependent undergraduates attending private for-profit institutions and 16% of those attending public 2-year colleges, but only 10% of dependent undergraduates attending public and private 4-year doctoral-granting institutions (Baum & Ma, 2007).

The positive relationship between family income and college enrollment persists even after controlling for differences in academic achievement. Only 29% of 1988 eighth graders in the highest quartile of math achievement and lowest quartile of socioeconomic status had attained at least a bachelor's degree within 8 years of their scheduled high school graduation, compared with 74% of those in the highest quartile of math achievement but highest quartile of socioeconomic status (Baum & Ma, 2007). Family income is also positively related to educational attainment among

students with the highest SAT scores. Among dependent undergraduates with SAT scores in the top quartile (i.e., 1,100 or higher) who first enrolled full-time in a 4-year college in 1995, only 71% of those with family incomes below $40,000, but 86% of those with family incomes above $70,000, had completed at least a bachelor's degree by 2001 (Baum & Ma, 2007).

The Role of Financial Aid in Eliminating Financial Barriers to Enrollment

Each year federal and state governments, as well as colleges and universities, foundations and other organizations, invest substantial resources in programs designed to eliminate financial barriers to college enrollment. In 2007–2008 alone, students nationwide received more than $96 billion in federally-supported financial aid, and more than $162.5 billion in aid from all sources, to offset postsecondary educational expenses (College Board, 2008a). In 2007–2008, two-thirds (66%) of all undergraduates received some type or amount of financial aid; for these recipients the average award was $9,100 (Wei et al., 2009).

The continued stratification of college opportunity even for academically qualified students despite the substantial annual investment of dollars into financial aid programs suggests that either: (1) existing financial aid resources are insufficient to meet students' entire financial need; and/or (2) existing financial aid programs are not constructed or implemented as effectively as possible.

Various indicators support the former explanation. About half of all 2003–2004 undergraduates had some amount of unmet financial need, where unmet need is defined as total price of attendance less expected family contribution and all types of financial aid; the average amount of unmet financial need for undergraduates in 2003–2004 was $5,300 (Berkner & Wei, 2006). Undergraduates with the lowest family incomes are most likely to have some amount of unmet financial need, as the share of dependent undergraduates in 2003–2004 with unmet financial need ranged from 85% for those with family incomes below $20,000 to 12% for those with family incomes of $100,000 or more (Berkner & Wei, 2006). Even at public 2-year colleges, 87% of dependent undergraduates with family incomes below $20,000 averaged $4,500 in unmet financial need (Berkner & Wei, 2006).

Despite the apparent need for additional financial aid resources, however, federal and state governments are challenged to increase their investment in student aid programs. These challenges are typically exacerbated during economic downturns. The National Bureau of Economic Research (2008) determined that the U.S. economy began a recession in December 2007, defining a recession as "a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in production, employment, real income and other indicators" (p. 1). One consequence of a recession is a decline in government revenues. A December 2008 report from the Center on Budget and Policy Priorities projected

that at least 41 states will have mid-year shortfalls in their FY2009 budgets (totaling $42 billion) and projected that nearly all states will have shortfalls in FY2010 (totaling $145 billion) and FY2011 (totaling $180 billion) (McNichol & Lay, 2008).

Most states are required to balance their budgets. As a result, when faced with revenue shortfalls states must utilize reserves, raise taxes, and/or reduce expenditures. Some (e.g., National Center for Public Policy and Higher Education, 2009) have urged states and higher education institutions to avoid responding to economic shortfalls through actions that increase the financial burden of college attendance on students and their families. Nonetheless, in response to shortfalls in their FY2009 budgets, at least 26 states have implemented or are considering reductions for higher education (McNichol & Lay, 2008). State budget shortfalls typically have a disproportionately negative effect on state appropriations for public higher education institutions, as higher education has historically served as a "balance wheel" in state budgets (Hovey, 1999). State appropriations for higher education are especially vulnerable in times of revenue shortfalls, as many legislators believe that colleges and universities have access to alternative sources of revenue, including tuition and fees, and may reduce personnel expenditures and realize other cost savings more easily than other state agencies (Lasher & Sullivan, 2004).

At the same time, federal and state governments are not only experiencing revenue shortfalls but also increasingly calling for accountability in the use of available resources. The federal government now requires that "effectiveness" be considered in decisions about the funding and management of federal programs. Reflecting the perspective that "federal programs should receive taxpayer dollars only when they prove they achieve results," the U. S. Office of Management of Budget (2003) now rates federal programs as effective, moderately effective, adequate, or ineffective using the Program Assessment Rating Tool (PART). The PART evaluation produces an overall rating of effectiveness based on program performance in four areas: purpose and design (20% of total score), strategic planning (10% of total score), management (20% of total), and results and accountability (50% of total). Results and accountability must be demonstrated by measures of outcomes, outputs, and efficiency. Use of the PART ratings has been phased in, beginning with 130 federal programs for the 2003 budget and 234 programs for 2004, and will include all programs by 2008 (U.S. Office of Management and Budget, 2003). For the FY2009 budget, the Office of Management and Budget (2008, September) designated several student financial aid programs as "adequate" (e.g., Federal Family Education Loans, Federal Pell Grants, William D. Ford Direct Student Loans), meaning that these programs must "set more ambitious goals, achieve better results, improve accountability or strengthen its management practices" (U.S. Office of Management and Budget, 2009). The Federal Perkins Loan program was designated "ineffective," meaning that the program has not demonstrated "results due to a lack of clarity regarding the program's purpose or goals, poor management, or some other significant weakness" (U.S. Office of Management and Budget, 2009). Still other federal student aid programs (e.g., Byrd Honors Scholarships, Federal Work Study, Leveraging Educational Assistance Partnerships) were categorized as "results not demonstrated," meaning that these programs do not have acceptable

performance goals or data to assess performance (U.S. Office of Management and Budget, 2008).

Characteristics of Student Financial Aid

A first step toward developing a more complete understanding of the effects of financial aid on students' college enrollment and how these effects may be mediated by context is to consider the complexities of available aid programs. Four relevant dimensions of student financial aid are: the source, the form of aid, goals, and eligibility criteria.

Source

Financial aid is available from many sources. In 2007–2008, about three-fourths of all student aid was awarded to undergraduates ($106.7 billion of $143.4 billion) rather than graduate or professional students; about two-thirds of this aid was awarded through federal programs (College Board, 2008a). Other providers of financial aid are colleges and universities (21% of all aid to undergraduates in 2007–2008), state governments (7%), and private organizations and employers (7%) (College Board, 2008a). In 2007–2008, 47% of all undergraduates received some type or amount of federal aid, 17.5% received some amount of state aid, and 21% received some amount of institutional aid (Wei et al., 2009).

With a few recent exceptions (e.g., Tebbs & Turner, 2006; Perna, 2008a), most research focuses on federal and state grants and federal loans with relatively little attention to understanding the effects on enrollment of scholarships from colleges and universities and other non-governmental sources (corporations, foundations, civic and community organizations and churches). Aid from these other sources may be substantial, as suggested by one electronic provider's claim of having a database of "1.3 million scholarships worth over $3 billion" (Fastweb, 2009).

Form of Aid

Student financial aid comes in many different forms, including loans, grants, work-study, and tax credits and deductions (Hearn, 2001). The annual growth rate in loans, including non-federal loans, to undergraduates has exceeded the annual growth rate in grants to undergraduates since 1991–1992 (College Board, 2008a). As a result, loans represented 49% of all aid (including non-federal loans) received by undergraduates in 2007–2008, up from about 32% in 1991–1992 (College Board, 2008a). Colleges and universities are the largest source of aid in the form of grants, as 42% of all grant aid in 2007–2008 was from colleges and universities, 31% was from federal grants (i.e., federal Pell grants and other federal grant programs), 15% was from private and employer grants, and 12% from state grants (College Board, 2008a).

About 6% of all aid to undergraduates in 2007–2008 was in the form of federal education tax credits (e.g., Hope and Lifetime Learning tax credits) and tax deductions, and 1% was in the form of federal work-study (College Board, 2008a). Looked at another way, in 2007–2008, 39% of all undergraduates received student aid in the form of loans, 52% in the form of grants, 7% in the form of work-study, and 2% in the form of veterans benefits (Wei et al., 2009). The average loan amount for those who received loans ($7,100) was higher than the average grant amount for those who received grants ($4,900) (Wei et al., 2009).

Goals of Aid Programs

Student financial aid programs are designed to achieve a range of goals (Hearn, 2001; Perna, Rowan-Kenyon, Bell, Li, & Thomas, 2008). Based on his examination of federally-sponsored financial aid programs, Hearn concluded that federal aid policies lack "philosophical coherence," as reflected by the wide array of distinct goals, including promoting access for low-income students, improving college affordability for middle-income students, rewarding achievement, advancing economic development, and encouraging human capital investment. Perhaps reflecting the absence of "well-considered patterns of policy development" for federal student aid programs, Hearn also observed that taken together, federal student aid policies lack "programmatic clarity and distinctiveness." In other words, based on his review of the literature, Hearn concluded that, "instead of an array of clearly discrete programmatic efforts addressing in distinctive fashion a set of overarching policy objectives, constituents for the programs. . . confront an array of overlapping efforts with rather vaguely differentiated objectives" (p. 270).

Similarly, based on a review of programs sponsored by the federal government and five states (California, Florida, Georgia, Maryland, and Pennsylvania), another study (Perna et al., 2008) identified distinctive state approaches to college-enrollment programs. Even for just these five states, the analyses showed variations in the extent to which college-enrollment programs include attention to addressing financial barriers and/or other barriers to college, recognize the role of schools in promoting students' college enrollment, limit eligibility for aid based on financial need and/or academic achievement, and attempt to influence students' decision to enroll in college versus their choice of institution to attend or some other outcome. Along the same lines, McDonough and colleagues (2007) concluded from their review of grant programs in 11 states that state approaches to financial aid vary in ways that reflect a state's policy goals and objectives and that these variations likely have differential effects on college access and attainment.

Eligibility Criteria

Differences in program goals are manifest in part by differences in eligibility criteria, particularly the relative importance of measures of financial need and/or academic achievement. Over the past decade, the share of state financial aid awarded

based on criteria other than financial need has increased substantially (College Board, 2008a). Between 1996–1997 and 2006–2007, the amount of non-need-based state grant aid awarded to undergraduates increased in constant dollars by 250%, while the amount of need-based state grant aid to undergraduates increased by only 59% (College Board, 2008a). Some states consider both financial need and academic achievement; 18% of all need-based state grant aid awarded in 2006–2007 also included academic criteria (College Board, 2008a). Although the majority of state grant aid is still need-based, and need-based state aid continues to increase annually, the faster rate of growth for merit- than need-based state aid raises concerns about the extent to which scarce public resources are being invested in ways that increase financial access for students from low-income families.

Summary of Current Knowledge Regarding the Effects of Financial Aid on College Enrollment

Others have provided outstanding reviews of research examining the effects of financial aid on college enrollment. Most notably, the Rethinking Student Financial Aid project sponsored by the College Board recently issued recommendations for reforming federal student aid along with a 220-page review entitled, "The Effectiveness of Student Aid Policies: What the Research Tells Us" (Baum, McPherson, & Steele, 2008). Several conclusions may be drawn from the Rethinking Student Aid literature reviews (Baum et al., 2008) and other relevant sources identified below.

First, the effects of student financial aid on college enrollment vary based on the type of aid. Based on their review of research examining the effectiveness of student financial aid, Baum and McPherson (2008) concluded that existing research devotes "strikingly uneven" attention to the effects on student outcomes of different types of aid programs (p. 5). Nonetheless, research consistently shows that grants promote college enrollment, especially for students from low-income students (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Mundel, 2008). In contrast, while some studies (e.g., Avery & Hoxby, 2004) suggest that an offer of loans is positively related to enrollment net of other variables, Heller (2008) concluded that prior research generally shows loans to have minimal effect on college access and success. Although some research has examined the effects of work-study on student persistence in college (e.g., Pascarella & Terenzini, 2005; St. John, 2003), little is known about the effects of work-study on students' college enrollment. In one of the few available studies, Avery and Hoxby (2004) found that, among high-ability high school seniors nationwide, the amount of work-study offered was positively related to the likelihood of enrolling after controlling for other student and institutional characteristics. The small number of available studies suggests that federal tax policies, including tax credits, deductions for higher education expenses and student loan interest, and tax-preferred savings programs, are unrelated to postsecondary access and choice (Long, 2004b; Reschovsky, 2008).

Second, research suggests that the effects of financial aid on college enrollment depend on a student's family income and race/ethnicity (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Mundel, 2008). Specifically, research consistently shows that changes in tuition and financial aid have a larger effect on college enrollment for students from lower-income families than higher-income families and for African Americans and Hispanics than for Whites (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Long, 2004a). Some evidence suggests that the effects of financial aid on students' choice of institution to attend also vary by race. Kim (2004) found that, net of other variables, receiving grants was associated with a higher probability of attending the first-choice institution for Whites, and receiving loans was positively related to attendance for Asians, while neither grants nor loans were related to the likelihood of attending the first choice institution for Blacks or Hispanics (Kim, 2004).

Nonetheless, although suggesting relationships between financial aid and college enrollment, existing research has several limitations. One limitation, as noted by others (e.g., Mundel, 2008; Heller, 2008), is that, because of methodological restrictions, existing research does not determine student outcomes in absence of the aid program.

A second limitation is that most research focuses on the relationship between a specific financial aid program and one college-related outcome, without considering how the broader context of student financial aid programs may mediate this relationship. This narrow focus is consistent with the goal of understanding whether a particular program "works." However, research that does not consider the broader financial aid context may generate misleading conclusions. For example, in his review of research on the effects of loans on student outcomes, Heller (2008) recognizes the importance of considering the financial aid context when interpreting the results of available research. Specifically, Heller concludes that, although research generally finds that loans have a limited effect on college enrollment, this finding must be interpreted in light of the availability of grant aid:

> This finding needs to be understood in the context of a financial aid landscape in which many students do not receive sufficient grant aid to pay for college. If grant aid were proportionally higher, then loans might provide more of a positive impact on college participation. But absent sufficient grant aid, simply piling on higher amounts of borrowing to students with large levels of unmet financial need may not be an effective vehicle for getting them to college (p. 49).

Similarly, Reschovsky (2008) concludes from his literature review that efforts to understand the effects of a specific federal tax policy on college outcomes are complicated by "the complex interactions among and between deductions, credits, subsidized savings plans, and direct higher education subsidy programs" (p. 76).

A third limitation is the absence of attention to the ways other aspects of context may mediate the relationship between student aid and college enrollment. Efforts to isolate the effects of a particular financial aid program on college enrollment should recognize the role of other policies aimed at promoting college enrollment. A few recent studies illustrate the ways multiple aspects of the state context come together to improve students' college enrollment. For example, in an exploration of the forces

that contributed to the substantial increase in college enrollment and other college-related outcomes in Indiana over the past two decades, Erisman and Del Rios (2008) concluded that Indiana's success was driven by a commitment to, and progress toward attaining, four goals: (1) improving high school students' academic readiness for college by making the college preparatory curriculum the "default" for all high school students; (2) increasing college affordability especially for low-income students; (3) increasing the diversification of the state higher education system by expanding the role of community colleges; and (4) promoting college success by rewarding institutions for student outcomes and developing policies to facilitate transfers across institutions in the state. Efforts to improve college affordability included attention to the cost of public higher education institutions, availability of need-based state grants (i.e., Frank O'Bannon Grants), dissemination of information about the availability of financial aid (e.g., Learn More Indiana website), early commitment of financial aid and academic and social supports through the Twenty-first Century Scholars Program, and establishment of the Part-Time Grant program to promote enrollment of non-traditional students (Erisman & Del Rios, 2008).

Other analyses, using different methods, also suggest the need to consider how the state policy environment and other state characteristics may mediate the effects of any particular aid program on enrollment. Using interrupted time-series analyses of data from the Integrated Postsecondary Education Data System (IPEDS), Orsuwan and Heck (2009) found that state merit aid was inversely related to the percentage of freshmen who attended out-of-state colleges and universities. But, the magnitude of the relationship depended on other characteristics of the state, including whether the state also adopted a prepaid tuition program and tuition rates at the state's public flagship university relative to tuition at public flagship universities nationwide (Orsuwan & Heck, 2009).

A fourth limitation of available research is the failure to consider how the effects of aid may be mediated by characteristics of individual students and their families, such as what students and their families know about student aid. Existing research tends to examine the effects of actual amounts of aid on student enrollment, with little consideration of students' knowledge or perceptions of the aid. Despite the availability of financial aid, many reports document the absence of accurate knowledge of financial aid among high school students and their families (e.g., Chan & Cochrane, 2008; Grodsky & Jones, 2004; Horn, Chen & Chapman, 2003; Ikenberry & Hartle, 1998). National surveys consistently show that most adults, parents, and students are uninformed or poorly informed about college prices and financial aid (Grodsky & Jones, 2004; Horn et al., 2003; Ikenberry & Hartle, 1998). Levels of awareness and understanding of college prices and financial aid are particularly low among Latino students and parents (Immerwahr, 2003; Tomás Rivera Policy Institute, 2004).

A related limitation is that available research typically considers only the direct effects of a financial aid award on enrollment, without examining how knowledge or perceptions of financial aid may indirectly promote college enrollment. As others (e.g., Fitzgerald, 2006; Paulsen & St. John, 2002) have argued, financial aid may

promote college access not only directly by reducing or eliminating financial barriers at the time of college entry but also indirectly by encouraging students to engage in other college-related behaviors, including other stages of the college-enrollment process, because they know aid will be available.

Based on their review and synthesis of prior research, Hossler and Gallagher (1987) concluded that the three stages of the college process are predisposition, search, and choice. In the first stage, students become predisposed toward or interested in attending college as they develop educational and occupational aspirations (Hossler & Gallagher, 1987; Terenzini, Cabrera, & Bernal, 2001). In the second stage, students search for information about colleges (Hossler & Gallagher, 1987; Terenzini et al., 2001). While still less frequently researched than the other two stages, researchers who have examined this stage typically operationalize "search" in terms of the sources of college-related information that students and parents use (e.g., Hossler, Schmit, & Vesper, 1999) and/or the number of colleges that students consider or to which they apply (e.g., Hossler et al., 1999; Hurtado, Inkelas, Briggs, & Rhee, 1997). In the third stage, students decide to enroll in a particular college or university. Little is known about the timing of these three stages for non-traditional enrollment. But, for "traditional" college enrollment (i.e., enrollment into college immediately after graduating from high school), predisposition typically occurs between the 7th and 10th grades, search during the 10th–2th grades, and choice during the 11th and 12th grades (Hossler et al., 1999; Terenzini et al., 2001).

Finally, existing research does not devote sufficient attention to the ways that student and family demographic and cultural characteristics may mediate the effects of aid on college enrollment. As an example, research demonstrates that responsiveness to aid varies across groups based on race/ethnicity and family income (Avery & Hoxby, 2004; Heller, 1997; Kane, 1999; Mundel, 2008), but does not explain why these differences occur. Potential explanations may include cultural differences in perceptions of aid, as well as differences across groups in access to resources that promote knowledge and understanding of financial aid.

In short, while providing a baseline of knowledge, existing research on the effects of student financial aid on college enrollment provides insufficient attention to the context in which the programs are implemented or the ways various dimensions of context may mediate the effects of aid on enrollment. Moreover, existing research does not consider the ways financial aid may indirectly promote college enrollment. Addressing the limitations of prior research requires the use of a conceptual model that explicitly considers the role of context. The following section offers a potential conceptual model.

Conceptual Framework for Understanding the Role of Context

In earlier work (Perna, 2006a), I drew on a review and synthesis of prior research to propose a multi-layered conceptual model of college enrollment. This prior work identified financial aid as one force that contributes to college enrollment but did

not focus specifically on the relationship between aid and enrollment. Drawing on this earlier work as well as St. John's (2003) balanced access model, this chapter argues that the relationship between financial aid and college enrollment is mediated by various dimensions of context. Like "the student choice construct" (Paulsen & St. John, 2002; St. John, Asker, & Hu, 2001), the conceptual model assumes that college enrollment decisions reflect an individual's "situated context" and that pathways to college enrollment differ in ways that reflect the diversity in individual circumstances, as well as the ways that individual circumstances serve to define and constrain students' college opportunities.

Drawing on the economic theory of human capital, the model assumes that students make decisions about college enrollment based on an assessment of the lifetime benefits and costs of enrollment relative to alternative choices (Perna, 2006a). Consistent with this economic approach, students are assumed to make choices that maximize their utility. Reflecting sociological theoretical perspectives, the model also assumes that students' college enrollment decisions occur within multiple layers of context. The four nested contextual layers proposed in the model are: students and their families; K-12 schools; higher education institutions; and the broader societal, economic, and policy context (Perna, 2006a).

The conceptual model is designed in part to illustrate the multiple ways policymakers may intervene to promote college enrollment (Perna, 2006a). By specifying linkages between policies and college-related outcomes, St. John's (2003) balanced access model provides additional insights into the ways public policy interventions such as student financial aid shape college enrollment behavior. In his framework

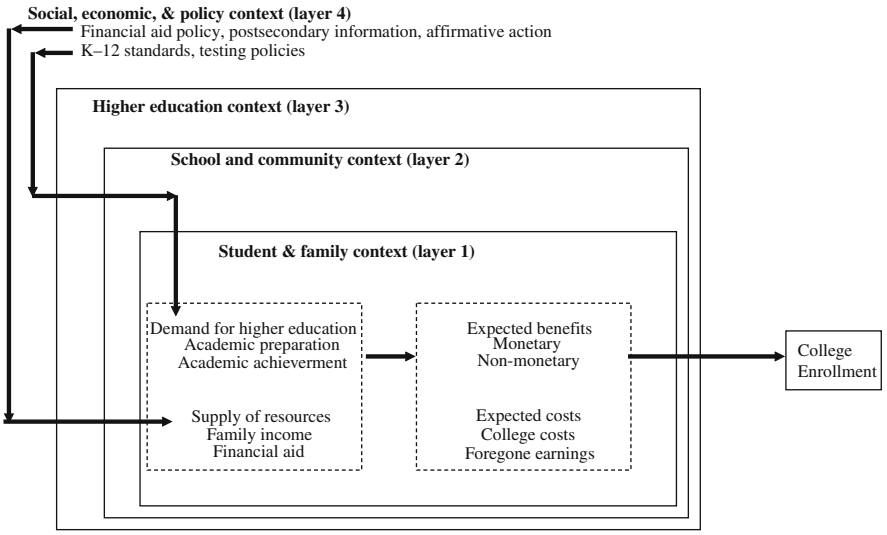


Fig. 1 Conceptual model of student college enrollment with policy linkages (Source: Perna et al., 2008)

for assessing the influence of policy on educational opportunity, St. John identifies several key steps in the educational attainment process: K-12 attainment and achievement, postsecondary transitions and access, undergraduate and graduate student outcomes, and individual development and educational attainment. St. John's framework posits that K-12 policies pertaining to schooling and school reform (e.g., standards and testing) shape K-12 attainment and achievement, policy interventions (e.g., financial aid policy, postsecondary information, and affirmative action) shape postsecondary transitions and access, and college and university policies (e.g., financial and academic strategies) shape undergraduate and graduate student outcomes. The relationship between financial aid and college enrollment may be understood from both a macro- and micro-economic perspective. Figure 1 shows how the two perspectives may be considered together.

Financial Aid as a Lever for Increasing Student Demand for Higher Education (Macro-Level)

At the macro-level (i.e., a public sector finance perspective), student financial aid is conceptualized as a "lever" that may be used to intervene in the "market" for higher education with the goal of promoting college-related outcomes (Paulsen, 2001a). More specifically, student financial aid policies are designed to increase students' demand for higher education, and thus their college enrollment, by increasing the supply of resources that students have available to invest in higher education (Paulsen, 2001a).

Economists argue that government intervention in the higher education market, including intervention in the form of student financial aid, is warranted for at least four reasons (Kane, 1999; Paulsen, 2001a). First, individual participants do not capture all of the benefits that higher education produces, as the benefits "spillover" to non-participants. Because individuals make enrollment decisions based on an assessment of only the individual benefits without considering the benefits that accrue to society, the level of investment in higher education that would occur without market intervention is less than optimal (Paulsen, 2001a; Steuerle, 2001). By providing student financial aid to reduce the costs of enrollment to individual participants, governments attempt to address this tendency to under-invest in higher education and maximize the societal benefits of higher education (Hansen & Weisbrod, 1969). The societal benefits of higher education are well-documented (Baum & Ma, 2007; Bowen, 1997; Institute for Higher Education Policy, 1998), and include increased economic productivity, tax revenues, and community and civic engagement, as well as reduced crime rates and dependence on public welfare.

Government-sponsored financial aid programs, particularly student loan programs, are also designed to correct for a second market failure: the inability of participants to use their post-higher education level of human capital as collateral against which to borrow funds needed to pay educational prices (Kane, 1999; Paulsen, 2001a). In the absence of market intervention, private capital markets fail to provide funds students need to pay college prices, again resulting in an

under-investment in higher education. Guaranteed student loan programs address this limitation by providing incentives for lenders to make funds available for students to borrow and allocating funds to students in the form of grants.

A third justification for government intervention is that individuals not only lack perfect information about college opportunities but also have differential access to such information (Kane, 1999). As with some other goods (e.g., restaurant meals, shoes), buyers of higher education are unable to obtain complete information about the "product" until they "experience" it (Winston, 1999). Potential first-generation college students, a disproportionate percentage of whom are from low-income families and are Black or Hispanic (National Center for Education Statistics, 2001), are likely to be particularly disadvantaged by this characteristic of higher education markets since they cannot rely on their parents for relevant information. Governments may address this market failure by disseminating information about the availability of financial aid programs.

Government intervention in the higher education market is also warranted when the public supports a reduction in inequities across groups (Paulsen, 2001a). Paulsen argues that public polices that increase higher education enrollment are a more efficient approach to equalizing incomes than other government interventions including direct transfers to low-income individuals or those from underrepresented racial/ethnic groups. By building human capital, student aid and other policies that promote college enrollment enable individuals to earn higher incomes throughout their lifetimes, thereby eliminating the need for the public sector to provide annual income subsidies to these individuals.

Government-sponsored student aid programs are typically designed to directly influence students' demand for college enrollment by increasing the supply of resources they have available to pay college prices (Paulsen, 2001a). One review revealed that, although the federal and state governments have distinct approaches to college-enrollment policy, 89% of all college-enrollment policies sponsored by the federal government and five selected states (California, Florida, Georgia, Maryland, and Pennsylvania) include only a financial component and are designed to impact students' college enrollment directly (Perna et al., 2008). For example, with Pell Grants the federal government aims to directly increase low-income students' college enrollment by providing need-based grants that reduce the price of attending college. Only a minority of programs include components to address other barriers to college enrollment (e.g., academic preparation and information), and relatively few programs explicitly recognize the role of high schools in implementing financial aid programs.

Financial Aid as a Mechanism for Increasing a Student's Supply of Resources (Micro-Level)

At the micro-economic level, human capital theory assumes that students decide to enroll in college by comparing the lifetime benefits and costs for all alternatives

and then selecting the alternative (e.g., college, work) that maximizes the student's utility (Becker, 1993; Paulsen, 2001b). This perspective predicts that the provision of financial aid directly to students will increase the supply of resources a student and his/her family have to pay for college and consequently increase the likelihood a student will conclude the benefits of attending college outweigh the costs.

Limitations of Human Capital Theory

Nonetheless, as others have noted (e.g., Long, 2009; Paulsen, 2001b; Perna, 2006a), although conceptually appealing human capital theory alone is insufficient for completely understanding how financial aid influences students' college enrollment decisions. First, human capital models do not explain several inconsistencies in students' responses to financial aid (Long, 2009). For example, human capital models do not explain why students "react differently to various forms of financial aid and tuition changes, even if the economic value of each is the same" (Heller, 1997, p. 632). Human capital theory also does not explain why college enrollment is influenced by non-pecuniary aspects of financial aid, including whether the aid is labeled "grant" or "scholarship" or whether the grant aid is frontloaded (Avery & Hoxby, 2004).

A second limitation is that, although acknowledging differences in students' preferences for different types of aid, human capital theory does not explore how or why preferences are formed (Manski, 2009). A rational human capital investment model assumes that, even when the expected benefits and costs are the same, two individuals may make different college choices because of differences in their preferences, tolerance for risk, and uncertainty (DesJardins & Toutkoushian, 2005). But, human capital theory does not explore why preferences, tastes, and expectations differ across groups (DesJardins & Toutkoushian, 2005).

Therefore, although useful for conceptualizing the effects of costs and benefits on students' college enrollment behaviors, traditional human capital approaches alone are insufficient for understanding inconsistencies in college-enrollment decision-making or how students develop perceptions or understandings of financial aid. Drawing on other frameworks provides additional insights.

Other Theories

Both behavioral economics and psychological approaches to decision making assume that, because of informational and computational constraints on information processing capacities, individuals adopt such strategies as satisficing or bounded rationality (Hogarth, 1987; Long, 2009). Thus, because of cognitive limitations, individuals make decisions that are bounded by time and resource constraints.

Drawing on a sociological perspective, McDonough (1997) uses Bourdieu's notion of habitus to illustrate the ways that bounded rationality influences college-related decision making. This perspective assumes that college-related decisions reflect an individual's habitus, or the internalized system of thoughts, beliefs, and perceptions that is acquired from the immediate environment. Rather than consider all possible alternatives, habitus defines and limits the alternatives that are considered, how different alternatives are perceived and valued, and the choices that are made (McDonough, 1997; Paulsen & St. John, 2002). These alternatives are defined and delimited by the social, organizational, and cultural contexts in which individuals are embedded, including class-based values and the organizational habitus of high school attended (McDonough, 1997). According to McDonough, the notion of organizational habitus considers both the availability of resources and structures within a high school to promote college enrollment, as well as the underlying norms and expectations for college enrollment at a school, norms and expectations that reflect class-based values about college-going.

Other sociological theories, such as cultural and social capital, may also be useful for understanding differences in students' perceptions and use of financial aid. Consideration of cultural and social capital provides a more complete assessment of the resources that students have available from their social contexts to inform college-related decisions (McDonough, 1997). Cultural capital refers to the system of attributes, such as language skills, cultural knowledge, and mannerisms, that is derived, in part, from one's parents and that defines an individual's class status (Bourdieu, 1986; Bourdieu & Passeron, 1977). Members of the dominant class possess the most economically and symbolically valued kinds of cultural capital (Bourdieu & Passeron, 1977; McDonough, 1997). McDonough uses the notion of "entitlement" to further understand the role of cultural capital in college-going decisions. For example, students attending elite private high schools feel "entitled" to highly-selective colleges while students attending urban high schools in working-class neighborhoods feel "entitled" to community colleges (McDonough, 1997).

Social capital focuses on social networks and the ways social networks and connections are sustained (Morrow, 1999). In his comprehensive assessment of the origins and uses of social capital, Portes (1998) noted that social capital is acquired through an individual's relationships with other individuals, particularly through membership in social networks and other social structures. Coleman's (1988) approach stresses the role of social capital in communicating the norms, trust, authority, and social controls that an individual must understand and adopt in order to succeed. Whereas Coleman's perspective suggests that parents play a primary role in promoting the status attainment of their children, Bourdieu's approach describes the restrictions that structural barriers to institutional resources, in the form of differential access across racial/ethnic, gender, and other groups, impose (Dika & Singh, 2002). According to Bourdieu (1986), the amount of social capital to which an individual may gain access through social networks and relationships depends on the size of the networks as well as the amounts of economic, cultural, and social capital that individuals in the network possess.

The Importance of Context in Understanding the Effects of Aid on Enrollment

Among other conclusions, these theories and the research that tests them illustrate the ways that various aspects of "context" influence postsecondary access and choice. Students make postsecondary access and choice decisions largely determined by the norms and values embedded within a student's family and high school, as well as a broader economic, social, and policy context (Perna, 2006a). Greater attention to context may help identify the structures and processes that define and delimit students' perceptions and use of financial aid in college-enrollment decisions. These understandings, in turn, may suggest ways to improve the construction, implementation, and/or marketing of student financial aid programs to more effectively promote enrollment of all students.

Other researchers assert the benefits of considering context when examining students' college-related behaviors (e.g., Orsuwan & Heck, 2009; Tierney & Colyar, 2006). McDonough, Calderone, and Purdy (2007) argue that attention to context may be especially useful for understanding inconsistencies in students' financial aid-related decisions:

> Reinterpreting affordability as a localized, highly contextualized, deliberative process sheds potential light on why low-income students fail to claim state and federal aid even when they qualify, as well as why large-scale attempts to disseminate financial aid information, streamline the FAFSA process, and improve practitioner knowledge related to financial aid have resulted in minimal improvements to the college-financing perceptions of those most in need (pp. 5–6).

With this conceptual model as a guide, the following section suggests the ways that the student and family, school, higher education, and broader economic, social, and policy contexts may mediate the relationship between student financial aid and college enrollment.

Applying the Conceptual Model to Understanding the Ways the Effects of Aid on College Enrollment are Mediated by Context

The Student and Family Context

An emerging body of research suggests that perceptions of aid vary by race/ethnicity and family income (Cunningham & Santiago, 2008; Hahn & Price, 2008; Heller, 2008; Linsenmeier, Rosen, & Rouse, 2006; Perna, 2008b). Differences across groups in willingness to borrow are typically inferred based on students' actual use of loans. For example, using regression discontinuity and difference-in-difference analyses, Linsenmeier et al. (2006) found that an institution's decision to eliminate loans from financial aid packages for low-income students increased the likelihood of enrollment for low-income, minority students but was unrelated to the likelihood

of enrollment for low-income students overall. The authors speculated that replacing loans with grants had a greater effect on enrollment for minority than non-minority applicants because minority students are more averse to debt than non-minority students.

Research also suggests that willingness to borrow varies by family income, although the nature of the relationship is ambiguous. Some descriptive (e.g., Baum & O'Malley, 2003; Perna, 2008b) and multivariate (e.g., Callender & Jackson, 2005; Linsenmeier et al., 2006) analyses find that students from low-income families are less willing than other students to borrow, while multivariate analyses (e.g., Christou & Haliassos, 2006; Eckel, Johnson, Montmarquette, & Rojas, 2007) show that students from low-income families are more likely than other students to borrow.

Several aspects of the student and family context may help explain differences across racial/ethnic and family income groups in perceptions of aid, as well as differences in the effects of aid on enrollment. One potentially relevant dimension of the student and family context pertains to social values and cultural norms about loans (Cunningham & Santiago, 2008; Heller, 2008). For example, using data from the 2004 National Postsecondary Student Aid Survey and BPS:04/06, Cunningham and Santiago (2008) found that minority students, especially Asian and Hispanic students, were more likely than other students to have at least $2,000 in unmet financial need but low loan amounts. Using focus groups to probe this finding, Cunningham and Santiago concluded that Asian and Hispanic students may be less willing to borrow, at least in part, because of cultural norms against borrowing.

A second potentially relevant dimension for understanding differences in the use and perceptions of aid may pertain to a family's prior experience with financial aid, including the experiences of parents and older children (Long, 2009; McDonough, 1997; Perna, 2008b). Consistent with cultural and social capital theories, data from one exploratory study show that students' perceptions of loans are closely related to their parents' views (Perna, 2008b).

A related dimension of the student and family context pertains to the relative roles of students and their families in paying college prices (Long, 2009; Manski, 2009; Perna, 2006b). An exploratory study suggests that some students do not apply for available scholarships (Perna, 2008a) or learn the specifics of student financial aid programs (Perna & Steele, in press) when they believe that their parents will fund the costs of their postsecondary education.

Over the past decade, the share of college costs paid by parents has declined, while the share paid by students has increased (Hearn, 2001; Stringer, Cunningham, O'Brien, & Merisotis, 1998). Although many factors (e.g., increased consumer debt, inadequate savings, slow personal growth) may contribute, one source of the decline in the share of costs covered by parents may be parents' reduced willingness to pay (Stringer et al., 1998).

Some research suggests variations across racial/ethnic and socioeconomic groups in terms of the expected distribution of college costs between parents and students. In her case study analyses of college-related decisions of students attending four high schools, McDonough (1997) found that students in high-SES families typically

defer college financing decisions to their parents but that students in low-SES families generally assume responsibility for identifying ways to pay college prices and more explicitly consider college prices and financial aid in college application and enrollment decisions. Using national data and multinomial logit analyses, Steelman and Powell (1993) found that, even after controlling for parents' education, parents' marital status, number of children, and family income, African American, Hispanic, and Asian parents were more likely than White parents to perceive college costs to be the responsibility of parents rather than students. Based on their analyses, Ellwood and Kane (2000) concluded that college enrollment rates may be positively related to family income at least in part because parental willingness to pay college prices increases with family income.

Although most families want to promote their child's educational attainment, the ability of low-income and minority families to do so is often constrained by economic, social, and psychological barriers (Perna, 2004). Barriers to parental involvement may be associated with mother's employment, parents' education, family composition, child care responsibilities, language and culture, and discrimination, as well as a lack of prior experience with college-related processes (Ceja, 2001; Kerbow & Bernhardt, 1993; López, Scribner, & Mahitivanichcha, 2001; Tierney & Auerbach, 2005). In the face of these barriers, some families rely on their children to obtain college-related information (Ceja, 2001; Tomás Rivera Policy Institute, 2004; Tornatzky, Cutler, & Lee, 2002). Children are then responsible not only for acquiring and understanding information about college prices and financial aid, but also for educating their families about this information (Ceja, 2001).

School Context

A central aspect of school context that may mediate the effects of aid on enrollment is the availability of financial aid and other college-related counseling from school staff. Qualitative research illustrates that school counselors play an important role in structuring students' aspirations, plans, and readiness for college (McDonough, 1997, 2004, 2005a, 2005b). Using case study analyses of four high schools in California, McDonough (1997) identified variations across schools not only in the availability of college counseling but also in counselors' assumptions about students' other sources of college-related knowledge, "appropriate" college destinations for students attending the school, and ways to best disseminate college-related information to students.

Research also suggests the role of school counselors in shaping students' perceptions of financial aid (McDonough & Calderone, 2006; Perna, Rowan-Kenyon, Thomas, et al., 2008). Based on her review of available research, McDonough (2004) concluded that students and parents rely on school counselors as a source of information about financial aid (when counselors are available), and that students who talk with "available and trained" school counselors are more knowledgeable about college prices than other students.

Support from high school counselors may be especially important when parents do not have the knowledge, information, prior direct experience, or other resources required to adequately guide their children through college-related processes (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999; Kerbow & Bernhardt, 1993; McDonough, 1997; Tierney & Auerbach, 2005). Compared to White students and parents, African American, Hispanic, and low-income students and parents appear to be more dependent on high school personnel for information about college (Cabrera & La Nasa, 2001; Ceja, 2001; Freeman, 1997; Horn et al., 2003; Terenzini et al., 2001; Tomás Rivera Policy Institute, 2004; Tornatzky et al., 2002; U. S. GAO, 1990). However, the high schools these students typically attend are generally not equipped to provide support for college admissions-related activities to all students (McDonough, 1997; Rosenbaum, 2001). The availability of college counseling varies across schools not only in terms of actual student-to-counselor ratios, but also in terms of time devoted to college counseling, relationships between school counselors and college admissions staff, and types of counseling services offered, as well as the availability of other school structures to support college counseling, such as a school's mission and norms regarding college-going and degree of college-preparatory curricular focus (McDonough, 1997). The ability of school counselors to engage in college counseling is further limited by the need for counselors to engage in other activities including crisis intervention counseling, developmental counseling, scheduling, test administration, and discipline (Ballard & Murgatroyd, 1999; McDonough, 2005a, 2005b; NACAC, 2006; Venezia & Kirst, 2005). One exploratory study suggests that these resource constraints reduce the availability of counselors for one-on-one meetings, shift the focus of counseling to the needs of the school's "typical" or most "needy" students, and require students and their families to initiate contact with school counselors (Perna, Rowan-Kenyon, Thomas, et al., 2008).

School counselors appear to be especially unavailable and ill-equipped to talk with students about financial aid (McDonough, 2004, 2005a, 2005b). Financial aid training is typically not part of a school counselor's formal education, as college counseling has traditionally been viewed as inconsistent with a counselor's focus on students' mental health (McDonough, 2005a, 2005b). Although counselors typically provide information about financial aid as part of their duties, only one in four counselors responding to a NACAC (2006) survey felt "very prepared" to guide students' borrowing decisions. Counselors are particularly unsure about advising students about the amount to borrow, the optimal type of loan, or the consequences of failing to repay loans (NACAC, 2006).

Other research raises questions about the quality or comprehensiveness of financial aid information school counselors provide. Few counselors appear to systematically disseminate information to students about financial aid (McDonough & Calderone, 2006; Perna, 2008a, 2008b). Drawing on interviews and focus groups with 63 college counselors at urban high schools in southern California, McDonough and Calderone (2006) found that, with a few exceptions, most counselors provided no more than minimal information or assistance to students

regarding college financing, most encouraged students to attend low-price institutions (e.g., community colleges) based on their assumptions about students' ability to pay, and some counselors advised students based on the assumption that African American and Latino parents are reluctant to use loans to finance college prices. Similarly, an exploratory study of the forces that contribute to college-going among students attending 15 high schools revealed that high school counselors and teachers provide a range of messages to students about loans, with some discouraging and others encouraging their use (Perna, 2008b).

Higher Education Context

Variations in both the prevalence of institutional grant aid and the criteria for awarding institutional grant aid suggest that colleges and universities may also mediate the effects of financial aid on college enrollment. The share of undergraduates receiving financial aid varies by institutional type. In 2007–2008, 48% of undergraduates attending public 2-year institutions received some type or amount of financial aid, compared with 70% of undergraduates at public 4-year colleges and universities, 87% of undergraduates at private, not-for-profit non-doctorate-granting institutions, and 98% at private for-profit, 2-year or 4-year institutions (Wei et al., 2009). Average amounts of financial aid for recipients also vary by institutional type, ranging from $3,400 at public 2-year institutions, to $10,100 at public 4-year doctorate-granting institutions, to $19,000 at private 4-year doctorate granting institutions (Wei et al., 2009). On average, private 4-year institutions award a higher share of aid to students based on financial need than public 4-year institutions. In 2006–2007, 70% of all institutional grants at private 4-year institutions were awarded based on financial need, compared with only 44% at public 4-year institutions (College Board, 2008a). Public 4-year colleges and universities also tend to devote a larger share of institutional aid to athletic awards than private 4-year colleges and universities (18% versus 6%, on average, in 2006–2007, College Board, 2008a).

Private 4-year colleges and universities charging higher tuition also tend to allocate a higher percentage of institutional grant aid based on financial need than those charging lower tuition, regardless of Carnegie classification (College Board, 2008a). For example, high-tuition private doctoral-granting institutions allocated 80% of their institutional aid based on financial need, while their low-tuition counterparts devoted just 61% (College Board, 2008a). Institutional grants tended to cover a higher percentage of published tuition and fees at lower-priced than higher-priced private institutions (e.g., 34% versus 18% at higher- and lower-priced private baccalaureate colleges) (College Board, 2008a).

Even among highly selective private colleges and universities financial aid and pricing polices vary. In an examination of financial aid records of students attending 28 highly-selective private colleges and universities, Hill, Winston, and Boyd (2005) found that, on average, net prices increased with family income; net-price as a share of median family income ranged from 49% for students in the lowest family

income quintile to 21% for students in the 95th percentile of family income. But, the ratio of net price to family income varied substantially, ranging, for the lowest-income students, from 5 to 74% (Hill et al., 2005). At seven of the 28 institutions, net price represented a larger percentage of income for low-income students than for high-income students (Hill et al., 2005).

Social, Economic, and Policy Context

Many aspects of the broader social, economic, and policy context may mediate students' perceptions of aid and the effects of financial aid on enrollment. Two particularly relevant aspects of this broader context are state variations in student financial aid and changes in the characteristics of available financial aid. Variations in student financial aid across states suggest the importance of considering the characteristics of aid programs, as well as other state characteristics, when examining the effects of aid on student outcomes (Perna & Titus, 2004; Orsuwan & Heck, 2009). Changes in the characteristics of financial aid programs over time suggest limitations on the generalizability of findings from prior research (Heller, 2008; Hossler Hossler, Ziskin, Sooyeon, Osman, & Gross, 2008).

Variations in State Financial Aid. Research shows that state grant aid is positively related to college enrollment, regardless of whether the aid is awarded based on need or merit. For example, the likelihood of enrolling in any type of postsecondary education within 2 years of graduating from high school and the likelihood of attending an in-state private 4-year or in-state public 4-year college or university increase with the availability of state need-based financial aid (Kane, 1999; Perna & Titus, 2004). Using fixed-effect regression analyses of state-level data from 1992 to 2000, St. John, Musoba, and Chung (2004) found that, after controlling for state demographic and other characteristics, both need-based and non-need-based grants were positive predictors of college enrollment among high school graduates; a $1,000 increase in need-based grants was associated with an 11.5% point increase in college enrollment rates, while a $1,000 increase in non-need-based grant aid was associated with an 8.9% point increase.

Research also suggests that the effects of state merit-aid programs on enrollment vary in ways that reflect the characteristics of the aid program. For example, studies show increases in college enrollment associated with the state merit-aid program in Georgia (Cornwell, Mustard, & Sridhar, 2004; Dynarski, 2000, 2002, 2004) but not in New Mexico (Binder, Ganderton, & Hutchens, 2002). Dynarski (2004) also found that the Georgia HOPE Scholarship has a greater effect on enrollment at public 4-year institutions than at other types of institutions. In a comparison of seven state merit-aid programs, Dynarski (2004) found the largest enrollment effects in Georgia, Kentucky, Louisiana, and Mississippi and the smallest in South Carolina (where the relationship was not statistically significant). The effects of merit-aid programs on racial/ethnic gaps in enrollment also varied across states (Dynarski, 2004). Merit-aid programs in three states had larger effects on enrollment for Blacks and Hispanics than for Whites, thereby reducing racial/ethnic gaps

in enrollment. In contrast, the Georgia HOPE Scholarship program had larger effects for Whites than for Blacks and Hispanics, suggesting that the program contributes to the racial/ethnic stratification of enrollment in the state (Dynarski, 2004).

Other research suggests that the effects of state aid on college enrollment may be mediated by other state characteristics. For instance, using interrupted time-series analysis of data from IPEDS, Orsuwan and Heck (2009) concluded that measures of a state's economic and political characteristics mediated the positive effects of a state merit-aid program on the out-migration of college freshmen. Out-migration was positively related to per-capita income and negatively related to the percentage of state education expenditures allocated to higher education. The reduction in out-migration associated with having a state merit-aid program was even larger in states that also had prepaid tuition programs and relatively higher rates of tuition at the state's public flagship institutions than in other states (Orsuwan & Heck, 2009).

Changes in Financial Aid Over Time. The availability and purchasing power of financial aid also likely influence the relationship between aid and enrollment. These types of changes over time stem from several sources. Some occur with the periodic reauthorization of the Higher Education Act of 1965, the authorizing legislation for federal student aid programs. For example, the 2008 reauthorization of the Higher Education Act (aka the Higher Education Opportunity Act) broadened eligibility for the federal Academic Competitiveness and Smart Grants to include students enrolled part-time and in certificate programs (Field, 2008). The 1992 reauthorization included changes that increased the amounts students could borrow and relaxed some aspects of the needs-analysis criteria. These changes led to substantial increases in borrowing and thus limit the generalizability of findings from research examining the use of loans prior to 1992 (Heller, 2008).

Changes in the purchasing power of student financial aid programs have occurred in response to changes in government resources. For example, although the Higher Education Act of 1965 authorizes the Federal Pell Grant program, the federal government must annually appropriate resources for the awards. As result, maximum and average Pell grant awards have fluctuated over the past three decades. In the past decade alone, the maximum Pell grant (in 2007 dollars) rose and fell from $3,504 in 1997–1998, to $4,626 in 2002–2003, to $4,146 in 2006–2007, and $4,310 in 2007–2008 (College Board, 2008a). As another example, in response to funding concerns, Georgia legislators tightened academic eligibility requirements for the Georgia HOPE Scholarship in 2004, effective for students entering college on or after May 1, 2007 (Fisher, 2007). Because of this change, the number of 2007 high school seniors eligible for HOPE declined by about 18,000 (Fisher, 2007).

Changes in economic conditions may restrict the availability of student aid. For example, one implication of the current credit crisis is that 130 fewer lenders offered federal student loans and 31 fewer lenders offered private loans at the start of 2008–2009 than at the start of 2007–2008 (Thomson, 2008). A second implication of the current economic recession and subsequent budget constraints is that some states are seeking to reduce expenditures by restricting the availability of state student aid programs. For example, in December 2008, New Jersey state legislators voted to

reduce expenditures for two merit-based state aid programs by making eligibility requirements more restrictive (Giordano, 2008). The changes require high school students to graduate in the top 15% rather than the top 20% of their class in order to receive the NJ STARS scholarship, a program established in 2004 to cover tuition and fees at any New Jersey community college. With the revisions, the scholarship will no longer cover tuition and fees for remedial coursework. The changes also require STARS recipients to graduate from a community college with at least a 3.25 grade point average rather than a 3.0 grade point average to receive NJ STARS II, a scholarship to attend a 4-year public college or university, restrict eligibility for NJ STARS II to students with family incomes below $250,000, and limit the scholarship award from full-tuition to $6,000 per year for students with grade point averages between 3.25 and 3.49 and $7,000 for students with grade point averages above 3.49 (Giordano, 2008).

The purchasing power of financial aid also changes over time due to changes in the price of attendance. Over the past two decades, the sticker price of attending all types of colleges and universities has increased dramatically (College Board, 2008b). Between 1998–1999 and 2008–2009, average tuition and fees increased by 27% at private 4-year colleges and universities, 50% at public 4-year colleges and universities, and 15% at public 2-year colleges and universities after controlling for inflation (College Board, 2008b). The extent to which increases in financial aid have kept pace with increases in tuition has also varied over time. For example, the share of average tuition and fees at public 4-year colleges and universities that is covered by the maximum Pell grant was 50% in 1987–1988, declined to 35% in 1996–1997, rose again in the early 2000s, and fell again to 32% in 2007–2008 (College Board, 2008a).

Questions for Future Research

The proposed conceptual model suggests the ways various aspects of context mediate the relationship between financial aid and students' college-related behaviors. Considering the limitations of prior research described earlier in this chapter, the proposed conceptual model suggests at least five broad questions for future research. Addressing these questions with a conceptual model that explicitly considers the role of context will likely generate insights into how to maximize the effectiveness of available financial aid resources.

How Do Different Types of Aid Separately and Together Influence College Enrollment?

One area for future research is to better understand how different types of aid separately and together influence college enrollment. As described in the

review of existing research above, one limitation of most research is the tendency to focus on isolating the effects of only grants or loans, with relatively little attention to the effects on college enrollment of other forms of aid (Baum & McPherson, 2008) or how different forms of aid interact to influence students' college-related behaviors (Orsuwan & Heck, 2009). The "purest" forms of financial aid are grants and scholarships, i.e., funds that may be used to pay postsecondary educational expenses and do not have to be repaid. About half (50%) of all undergraduates enrolled in 2003–2004 received financial aid in the form of grants; the average amount of grant aid received was $4,000 (Berkner & Wei, 2006).

Other forms of aid, including loans, work-study, and tax credits, have "strings" attached. Unlike grants, loans need to be repaid. Moreover, even within "loans," program terms vary. In 2007–2008, 34% of all loans were federal subsidized Stafford Loans, 31% federal unsubsidized Stafford Loans, 13% federal PLUS loans (for parents of dependent undergraduates), and 23% non-federal loans (College Board, 2008a). The College Board notes that federal loans are a form of aid but non-federal loans are not, as non-federal loans include no interest subsidy and "generally have less favorable terms than federal loans" (p. 9). Unlike non-federal loans, federal Subsidized and Unsubsidized Stafford Loans include a fixed-rate of interest and allow for deferment of repayment until 6 months after graduation. Unlike Unsubsidized Stafford Loans, Subsidized Stafford Loans are awarded based on a student's financial need and include an interest "subsidy," i.e., the federal government, not the student, pays the interest while a student is enrolled at least half-time.

Federal work-study also has "strings," as students must work in designated positions in order to realize the award. A form of campus-based federal aid, eligible colleges and universities may award federal work-study to financially needy students. About 1% of all aid to undergraduates in 2007–2008 was in the form of federal work-study (College Board, 2008a). Other forms of financial aid have increased substantially over the past decade. For example, between 1997–1998 and 2007–2008, total federal grants increased in constant dollars by 79% and total federal loans increased by 70%. In contrast, over this period the total amount of federal work-study dollars awarded to undergraduates has remained virtually unchanged after controlling for inflation (College Board, 2008a).

Federal education tax credits and tuition deductions have characteristics that differentiate them from other forms of aid. Whereas other federal student aid programs (e.g., Pell grants, Stafford Loans, Federal Work-Study) are authorized and periodically reauthorized under the Higher Education Act of 1965, the federal Hope and Lifetime Learning tax credits were established as part of the federal tax code (i.e., the Taxpayer Relief Act of 1997). In 2007–2008, 6% of all aid to undergraduates was in the form of federal education tax credits and tuition deductions (College Board, 2008a). Observers point to several reasons for the absence of an enrollment effect for federal tax policies, including the delay in receiving the award (i.e., in the year after tuition expenses were paid), the failure of tax credits to cover costs of attendance other than tuition and fees (e.g., room, board, books, other educational

supplies), the limitation of the credits based on tax liability (i.e., tax credits are not refundable), and the complexity of the programs and tax forms (Long, 2004b; Reschovsky, 2008).

States also offer a range of programs that are designed to increase the resources that students have to pay for college. These programs include not only state-sponsored financial aid programs, but also prepaid tuition and college savings plans, tuition reciprocity agreements with other states, and loan forgiveness programs, among others (Orsuwan & Heck, 2009). Prepaid tuition and college savings plans are tax-advantaged vehicles that encourage families to save for their children's post-secondary educational expenses, but by definition require families to have sufficient disposable income from which to save.

Given the complexity of financial aid, it is not surprising that most research tends to consider only broad categories of particular forms of aid (e.g., "grants" or "loans"). Nonetheless, in order to understand how to structure financial aid so as to maximize its impact on enrollment, future research should give greater attention to the complexities of aid, including variations in the effects of aid based on the sources, types, goals, and eligibility criteria. Future research should also consider the ways the effects of any particular financial aid program are mediated by the context for aid, including the availability and characteristics of other financial aid programs (Orsuwan & Heck, 2009). Because of the tendency to examine particular financial aid programs in isolation, little is known about how the effects of a particular financial aid program vary based on the availability of other types of financial aid (Heller, 2008; Reschovsky, 2008).

How Do Perceptions of Aid Influence Students' College-Related Decisions?

Future research should also consider how the effects of financial aid are mediated by student and family characteristics, particularly their knowledge and perceptions of aid. Rational human capital models do not assume that individuals have perfect and complete information about all alternatives, only that individuals use available information to make "reasoned" choices (DesJardins & Toutkoushian, 2005, p. 218). Despite this acknowledgement, and as described in the review of prior research above, human capital models typically consider actual amounts of grants and loans rather than students' knowledge or perceptions of financial aid (Long, 2009; Manski, 2009). Considering only actual amounts of financial aid is especially problematic since, with the exception of some state merit-aid programs (e.g., Georgia HOPE), students and their families only learn the amounts and types of financial aid they will receive after they have applied for admission and financial aid (Kane, 1999; Perna & Steele, in press).

Some evidence suggests that perceptions of loans vary across groups and that these perceptions are related to college-related behaviors. For example, although the growth of student loans suggests that the use of loans to finance postsecondary

educational expenses is commonplace (College Board, 2008a), the emphasis of the U.S. financial aid system on loans may limit college opportunity for individuals who are unwilling or unable to incur this type of debt (Perna, 2008b). Although some research suggests that students' perceptions of loans vary across groups (e.g., Christie & Munro, 2003; Christou & Haliassos, 2006; ECMC Group Foundation, 2003; Linsenmeier et al., 2006), only a few studies have explored the forces that contribute to these differences (e.g., Christie & Munro, 2003; Perna, 2008b).

Some research suggests that willingness to borrow is positively related to college enrollment (Callender & Jackson, 2005; Ekstrom, 1991). Using data from the High School and Beyond longitudinal survey of 1980 high school sophomores and seniors, Ekstrom found that students who reported they would be willing to borrow to pay $1,500 in college prices that could not be covered by family or other sources of financial aid were more likely than other students to enroll in college within 4 years of graduating from high school, enroll in a 4-year than a 2-year institution, and enroll full-time than part-time even after controlling for background characteristics, educational aspirations, academic achievement, encouragement from significant others, and knowledge of college costs and financial aid. Using data from surveys of 2,000 prospective higher education students in Britain, Callendar and Jackson found that the likelihood of applying to a university increased with students' tolerance for debt even after controlling for educational achievement, social class, ethnicity, age, and mother's educational attainment. Moreover, debt aversion had a greater negative relationship to the probability of applying for admission for students from low- than high-income families (Callender & Jackson, 2005).

Although these studies suggest the importance of students' perceptions of aid, additional research is required to understand the ways these perceptions influence students' college-related behaviors. Future research should further explore students' perceptions of financial aid, the forces that influence these perceptions, and the implications of these perceptions for student outcomes. Future research should also examine how perceptions of financial aid are informed by various aspects of the context in which students are embedded, including their family background, support from school staff, the characteristics of available aid programs, and other forces including the media.

What Types of Information About Financial Aid, at What Points in Time, from What Sources, and for What Groups of Students Promote College Enrollment?

Little is known from prior research about how financial aid indirectly promotes enrollment, including how knowledge of financial aid may raise students' college-aspirations or encourage students to become academically prepared for college. Therefore, a third area for future research is to consider how financial aid—and particularly information about financial aid-influences these college-related behaviors and how the relationship between financial aid

information and college-related behaviors is mediated by various aspects of context.

Various policies and practices are aimed at increasing students' and families' college-related knowledge. Among the most recent is the public service advertising campaign, KnowHow2Go campaign that was launched in January 2007 by the American Council on Education, Lumina Foundation for Education, and the Ad Council. This campaign is designed to disseminate information about the steps required to enroll in college, including how to "put your hands on some cash."

Nonetheless, as indicated in the discussion of the limitations of existing research above, despite the availability of information dissemination efforts reports consistently demonstrate that most students and parents are poorly informed (Perna, 2004). One benefit of improving knowledge of financial aid may be to reduce the number of students who enroll in college and are eligible for financial aid but do not apply. Using descriptive analyses of data from the National Postsecondary Student Aid Survey, King (2004) found that about 1.7 million low- and moderate-income undergraduates enrolled in colleges and universities nationwide in 1999–2000 had not completed the FAFSA; about half of these students were likely eligible for Pell grants. A substantial number of other undergraduates completed the FAFSA but submitted it after April 1, the preferred deadline for most state and institutional grant aid (King, 2004). Additional descriptive analyses of data from the Beginning Postsecondary Student survey suggest that many eligible students do not submit a FAFSA because of incomplete or inaccurate understandings of their eligibility for aid and submission deadlines (King, 2004).

Despite the belief that "information" about financial aid promotes college enrollment, little is known about the necessary content, timing, and/or modes of delivering messages about financial aid (Mundel & Coles, 2004; Perna, 2004). Therefore, future research should identify what types of knowledge "matter" (i.e., promote various college-enrollment behaviors), at what points in time, from which sources, for which groups of students. If "information" is to serve as an effective policy lever for increasing college access and choice, then we need to know more about whether information *can* promote changes in student behavior and what kind of information different groups of students need to have at different points in the pathway to college.

Types of Information. While descriptive data consistently illustrate gaps in knowledge about college prices and financial aid (Perna, 2004), future research should identify the types of knowledge that are important. For example, do students need to have accurate and complete knowledge of college prices and financial aid, or do they more simply need to be confident that, when it comes time to enroll, they'll be able to secure the necessary resources? One exploratory study Perna & Steele (in press) suggests that knowledge of financial aid per se may be less important in encouraging college-enrollment behaviors than the presence of family, school, and other supports and structures that engender confidence in students that they will be able to pay.

Timing of Information. Future research should also examine when students and their families need to have information about financial aid. Several recent reports

call for "early" information about financial aid, asserting that students and research now tend to learn about financial aid only during the later years of high school, i.e., too late to influence other college-related behaviors (Advisory Committee on Student Financial Assistance, 2008; Perna, 2004).

Nonetheless, little is known about how the timing of information, including an early promise of aid, shapes college-related behaviors. Based on a review of available research, Schwartz (2008) concluded that little is known about the effects of early commitments of aid, due to limitations of available research. Schwartz identifies four types of financial aid programs that make an "early commitment" to students about the future availability of aid: (1) state merit-aid grant programs that award aid based on high levels of academic achievement; (2) I Have a Dream, Indiana's Twenty-first Century Scholars Program, and other programs in which students self-select to participate; (3) stakeholder grants such as the Child Trust Fund in the United Kingdom; and (4) other programs, including individual development accounts (IDAs). Research examining the effects of early commitment programs is limited by methodological issues (e.g., self-selection of students and families into these programs) and programmatic issues (e.g., limited participation in most programs of students from low-income families, limited dollar amounts of most awards).

Knowledge of financial aid is believed to be related to students' college-enrollment decisions (Perna, 2004), as research shows that students' and parents' understanding of college prices and financial aid is positively related to college expectations (Flint, 1993; Horn et al., 2003), application (Cabrera & LaNasa, 2000), enrollment (Plank & Jordan, 2001), and choice (Ekstrom, 1991), as well as such college financing strategies as students' willingness to borrow, students' use of financial aid, parental saving for college (Ekstrom, 1991; Flint, 1997), and student application for financial aid (U. S. Government Accounting Office, 1990).

Available research does not, however, establish the direction of causality between knowledge of financial aid and students' college-related behaviors (Perna, 2004). In other words, existing research does not establish whether having knowledge of financial aid causes students to engage in college-related behaviors, or whether those who engage in these behaviors acquire information and knowledge. Available research also does not establish the relationship between knowledge of aid and other college-related behaviors, including aspirations for college prior to the 11th grade, curricular choices, college search processes, or students' choice among institutions (Mundel, 2008).

Sources of Information. Future research should also consider how, and with what consequence, the effects of information about financial aid are mediated by various aspects of context—particularly the sources providing financial aid information. The proposed conceptual framework suggests that potential sources of information may include other family members (e.g., older siblings and extended family members), high school staff, peers attending the same high school, pre-college outreach programs (e.g., Upward Bound), colleges and universities, and federal and state sponsors of student financial aid. Available research includes limited attention to only some of these potential sources.

School staff. Perhaps in response to what is known from available research, some have begun to advocate for improving the quantity and quality of college counseling by high school counselors. For example, one of the ten recommendations made by the College Board's Commission on Access, Admissions and Success in Higher Education (2008) is to increase the availability of college counseling during middle and high school by reducing student-to-counselor ratios, improving preparation and training for college and financial aid counseling, and maximizing the use of other resources to provide counseling, including local colleges and universities and community-based non-profit organizations.

As others have noted (e.g., McDonough, 2004; Mundel, 2008), although existing research suggests the importance of counselors as a source of financial aid information, more research is required to understand the ways they influence students' and families' knowledge of financial aid. As McDonough (2004) notes, although research suggests the benefits to college enrollment of timely and educated discussions between students and school counselors, little is known about school counselors' knowledge of aid.

Additional research is also required to understand how and with what consequences other school staff may be providing financial aid counseling to students. The ability of teachers to serve as a source of information about college costs and financial aid is often limited because teachers are often focused on other priorities, including reducing high school dropout rates and teen pregnancies (Immerwahr, 2003), and/or lack knowledge about college-related requirements beyond their own direct experience (Venezia, Kirst, & Antonio, 2003). Teachers also often have low educational expectations for African Americans and Hispanics (Freeman, 1997; Immerwahr, 2003). Nonetheless, in the absence of sufficient financial aid counseling from school counselors, at least some students may be relying on information from teachers (Perna, Rowan-Kenyon, Thomas, et al., 2008).

Future research should also examine how the provision of financial aid information varies based on the complexity and other characteristics of student aid programs (Mundel, 2008; Perna, 2004). One exploratory analysis suggests that, although state merit-aid programs in Florida and Georgia may have negative consequences for equity, the relative simplicity of eligibility may enable counselors and teachers to more confidently communicate with students about the availability of and criteria for receiving financial aid (Perna, Rowan-Kenyon, Thomas, et al., 2008). In three other study states (i.e., California, Maryland, and Pennsylvania), school staff did not provide extensive financial aid assistance to students at least in part because of the complexity of need-based aid application processes (Perna et al., 2008).

Higher education institutions. More research is needed to understand how colleges and universities affect students' understanding and use of financial aid. Variations across institutions in the presence of Pell-grant recipients suggest that the effects of aid on college enrollment depend on institutional characteristics. Using regression analyses of IPEDS data to explore this variation, Steinberg, Piraino, and Haveman (2009) found that the representation of Pell-grant recipients among undergraduates was inversely related to the institution's median SAT score at both public and private institutions. The magnitude of the relationship was substantially greater

at public than private institutions. At private institutions, the percentage of Pell-grant recipients was also inversely related to the total cost of attendance.

More research is needed to understand the effects of higher education institutions' efforts to "market" financial aid on students' perceptions and use of financial aid (Mundel, 2008; Perna, 2004). Merely by their presence and geographic proximity to students' homes, higher education institutions may passively convey some information about college to students and their families (Leppel, 1994; McDonough, Antonio, & Trent, 1997). Geographic proximity may be a proxy for greater availability of information about an institution and greater knowledge of the institution among a student's family, school, and community (Leppel, 1994; McDonough et al., 1997).

Higher education institutions may actively convey information to students and their parents through targeted marketing and recruiting efforts (Chapman, 1981). Most such actions are likely only reactive, however, occurring in response to some type of initiative by the student, including taking college admissions examinations and applying for admission (Cabrera & LaNasa, 2001). Because students with low socioeconomic status are less likely than other students to apply for admission (Cabrera & La Nasa, 2001), the "reactive" ways in which higher education institutions convey information may contribute to differences across groups in knowledge of various aspects of college including financial aid.

Higher education institutions actively convey information about college prices and financial aid to students and their families through the financial aid notification process (Kane, 1999). But colleges and universities typically do not inform students and their families of their eligibility for financial aid until they have applied and been accepted for admission, applied for student financial aid, and been deemed eligible for some amount and type of aid. In other words, students and their families typically only learn about the amounts and types of financial aid that they will receive after they have made substantial investments in the college-going process (Heller, 2006). Along the same lines, some research suggests that financial aid offices of colleges and universities may influence the loan-related experiences of students who actually enroll (Wroblewski, 2007). Although mandatory entrance and exit counseling may improve borrowers' understanding of some aspects of loans (Wroblewski, 2007), such counseling comes too late to influence high school students' perceptions of loans (as only students who successfully apply for and receive admission and financial aid and decide to borrow receive entrance counseling).

Future research should examine the effects on perceptions and use of financial aid of recent efforts by some colleges and universities to replace loans with grants for students from low-income families. Most of these programs have been established by Ivy League institutions (e.g., Princeton; University of Pennsylvania), public flagship universities (e.g., University of North Carolina Chapel Hill; University of Maryland College Park), and elite private liberal arts colleges (e.g., Amherst, Davidson, and Williams Colleges), institutions with relatively small numbers of low-income students (McPherson & Shapiro, 2006). Research should not only consider the effects of these institutional aid programs on enrollment and choice for

low-income students, but also examine how these effects vary based on student characteristics and other institutional characteristics. Among the potentially important institutional characteristics may be the ways that an institution communicates the availability of this aid program to prospective students.

More research is needed to understand how students' perceptions of institutional financial aid, including the lack of knowledge of need-based aid, may lead students to self-select out of particular colleges. One exploratory study suggests that at least some high school students and parents have a particularly sophisticated understanding of institutional scholarships, with some planning to attend the college that makes the best institutional aid offer (Perna, 2008a). But the findings also suggest that other parents believe that, because colleges and universities target aid to students' with the lowest family incomes and highest academic achievement, relatively few resources are available for "average" students (Perna, 2008a).

Finally, additional research is required to understand how colleges and universities may work with high schools to best inform students about the availability of student financial aid (Perna, Rowan-Kenyon, Thomas, et al., 2008). One exploratory study suggests that both schools and higher education institutions benefit from the common practice of higher education staff conducting an annual financial aid night at local high schools; schools benefit from the provision of financial aid information by local experts and colleges and universities benefit from direct access to potential applicants and their families. By working to identify other collaborative opportunities, schools and higher education institutions may not only advance their own goals but also maximize the availability of college and financial aid counseling in the context of scarce resources.

Federal, state, and local providers. Several recent reports argue the need to simplify, and increase the transparency of, financial aid application processes (e.g., Advisory Committee on Student Financial Assistance, 2005, 2009; Baum & McPherson, 2008; Chan & Cochrane, 2008; Commission on Access, Admissions, and Success in Higher Education, 2008; Secretary of Education's Commission on the Future of Higher Education, 2006). But little research has considered the other ways federal, state, and local providers of financial aid may promote or deter knowledge of financial aid. Future research should examine the utility of other mechanisms for disseminating information about financial aid. One potential type of intervention that warrants further consideration is the effort to match available scholarship dollars to eligible students. The Georgia Career Information System (GCIS) offers a potential model for providing students with one source for information about all available scholarship dollars and matching students to scholarship dollars (Perna, 2008a). The GCIS (2007), housed at Georgia State University, is designed to "provide current and accurate career information to schools and agencies throughout Georgia in order to help young people and adults make informed occupational and educational choices." Among other types of information, the GCIS "contains information on more than 3,567 federal, state, and independent aid programs representing about 5 billion dollars" (GCIC, 2007).

Technology. Little is known about the effects on students' and families' knowledge and use of financial aid of Internet sites or other mechanisms for disseminating

information about financial aid, including financial aid workshops, required college and career counseling sessions, or one-on-one counseling sessions with college alumni and others (Porter et al., 2006). Lumina Foundation for Education (2009) urges the Obama administration to work toward the following goal: "By the 8th grade, provide all children and families with information needed to plan for college success." But Lumina goes on to note that KnowHow2Go and other public awareness campaigns alone are insufficient to ensure that students have the knowledge required to enroll in college. Lumina is now focusing on "develop[ing] a ground campaign to link youth to local resources of caring adults and organizations to help students take the steps needed, including developing stronger state and local college access networks." This action suggests a disillusionment with the potential benefits of relying on technology alone as an information source. Given the prevalence of financial aid-related Internet sites, future research should consider the ways technology, with and without other types of support, may provide financial aid information to different groups of students and families (Mundel, 2008).

How Can Financial Aid Promote College-Related Outcomes Other than College Enrollment, Particularly Students' Academic Preparation for College?

A fourth area for future research is to consider how another aspect of context—namely the characteristics of aid—may directly and indirectly promote college enrollment. More specifically, given that college enrollment and success are limited not only by insufficient financial resources but also by inadequate academic preparation (Perna, 2006a), future research should examine the ways to construct aid programs so as to both encourage academic achievement and eliminate financial barriers (McDonough, Calderone, & Purdy, 2007).

Little is known about the effects of federal efforts to use grant aid to improve college readiness, largely because these efforts are still relatively new. Established by then-president Bush in FY2006, the Academic Competitiveness Grant (ACG) and Smart Grant programs award supplemental Pell grant funds to financially needy students who complete a rigorous curricular program in high school, or major in mathematics or science in college. The number of recipients of ACG and Smart grants was higher in 2007–2008, the second year of the program, than in 2006–2007 (465,000 versus 370,000, Field, 2009). Nonetheless, the number of participants and total spending on the program were still lower than expected in 2007–2008. In 2006–2007, about $430 million was awarded to students through the two programs, substantially less than the $790 million Congress had appropriated (Field, 2009). The future of these programs is unclear as President Obama's proposed FY10 budget would allow these programs to expire after 2010 (Lederman, 2009).

Little is also known about the effects of programs with multiple eligibility criteria on student outcomes, even though state aid programs are increasingly including both academic merit and financial need criteria (McDonough et al., 2007). McDonough

and colleagues underscore the policy-relevance of research that informs decisions about the criteria for awarding financial aid by stating:

> As a society, we lack a comprehensive student-aid policy that attempts to provide a threshold of financial aid that truly enables poor students to afford college while providing the appropriate proportion of aid that encourages and rewards meritorious performance (p. 24).

One goal of many merit-based state grant programs is to improve students' educational attainment by increasing their academic readiness (Doyle, 2008). Nonetheless, based on a review Doyle concluded that available research does not establish whether merit-aid programs achieve this result. Similarly, Dynarski (2004) concluded from her research review that state merit aid programs are associated with improved academic performance in high school and college, but that other forces may also explain these trends.

Some research suggests a complex relationship between state merit-aid programs and academic preparation. For example, one exploratory study suggests that Georgia's HOPE Scholarship program may motivate students to achieve the academic requirements of the state grant award (Perna & Steele, in press). By clearly communicating academic eligibility criteria, these programs may increase parents' attention to students' academic preparation (Perna & Steele, in press). This study also suggests potential negative consequences of state merit-aid programs for academic readiness, such as increasing pressure on teachers to inflate grades and encouraging students to take less-rigorous courses (i.e., where they are more likely to meet the grade point average requirement for the merit aid).

More research is needed on other potential unintended consequences of state merit-aid programs for academic preparation. Based on his review of research, Mundel (2008) speculates that, with the apparent simplicity and transparency of state merit-aid programs, some students may conclude that the academic eligibility criteria are impossible to achieve and consequently lower their educational aspirations and forgo other college-preparatory activities (Mundel, 2008). Others may conclude that financial aid is available only based on academic merit, without appropriately recognizing the availability of need-based aid (Mundel, 2008).

One commonly observed disadvantage of state merit-aid programs is that these programs disproportionately benefit students from upper-income families and others who would have attended college even without the aid (Heller, 2004; Heller & Marin, 2002). Given these well-documented challenges, the College Board's Commission on Access, Admissions and Success in Higher Education (2008) declares that "merit aid, particularly when financed publicly by regressive taxes or lotteries, has to clear a very high bar before it can justify itself as appropriate merit aid" (p. 29).

Nonetheless, recent growth in state merit aid (College Board, 2008a) and the establishment of the federal ACG and Smart Grants suggest policymakers' interest in using student aid to motivate students to become adequately academically prepared to enroll and succeed in college. Therefore, future research should further

explore the ways financial aid eligibility requirements may be constructed to promote academic preparation and eliminate financial barriers while also minimizing any unintended negative consequences (McDonough et al., 2006).

Future research should also consider how other types of approaches to financial aid may also improve students' academic performance and readiness for college. One particularly promising approach may be to provide an early commitment of student financial aid. Based on his review, Harnisch (2009) notes that state-based early-commitment programs have several characteristics including targeting of middle-school students and their families; a clear and simple contract that specifies the requirements for receiving financial aid; minimum high school grade point averages and college preparatory curricular requirements; and guaranteed financial aid for college. While some research examines the effects of Indiana's Twenty-First Century Scholars on students' college-related outcomes (e.g., St. John, Musoba, Simmons, & Chung, 2002; St. John, Gross, Musoba, & Chung, 2005; St. John, Fisher, Lee, Daun-Barnett, Williams, 2008), little is known about the effects of other state-based early-commitment programs including Oklahoma's Promise, Wisconsin Covenant, and Washington College Bound Scholarship. Future research should capitalize on the variations across these programs to develop a better understanding of the implications of early-commitment programs for students' academic preparation and other college-related behaviors. These four state-based early-commitment programs vary in terms of the grade level students must make the commitment (e.g., as early as sixth grade in Indiana and as late as 10th grade in Oklahoma); maximum income (e.g., free and reduced lunch status in Indiana and no income requirement in Wisconsin); and minimum high school grade point average (ranging from 2.0 in Indiana and Washington to 2.85 in Wisconsin) (Harnisch, 2009).

How Does Financial Aid Affect College Enrollment for Adult Students, and How is the Relationship Between Aid and Enrollment for Adult Students Mediated by Various Aspects of Context?

A final area for future research is to examine the effects of financial aid on college enrollment for an under-researched population, adult students, and how aspects of context mediate this relationship. Virtually all of the research and the conceptual model presented in this chapter focus on understanding the effects of financial aid on college enrollment for traditional-age students. This focus likely reflects, at least in part, the absence of research on the role of financial aid in college-going decisions for adult students, as well as the general absence of aid programs specifically targeted toward adult students (e.g., Lapovsky, 2008). In his review, Mundel (2008) concludes that little is known about the effects of grants on college-related behaviors of students who delay college enrollment after finishing high school.

Policymakers have begun to recognize the importance of improving college-related outcomes for adult students. As an example, recommendations from the U. S. Department of Education Margaret Spellings Commission on the Future of

Higher Education (2006) include ensuring that individuals have the opportunity to participate in higher education over the course of their lifetimes. Nonetheless, based on her review, Lapovsky (2008) concluded that the existing financial aid system was not developed to promote college access among adult students. She speculates that some aspects of the financial aid system may favor adult students, as suggested by the high percentage of Pell Grant awards received by financially independent students. Other aspects, however, do not, such as the emphasis of state and institutional grant aid programs on full-time enrollment; a spring deadline for applying for many state and institutional aid programs; work disincentives in the needs-analysis formula; and the diversity of personal and enrollment characteristics among adult students (Lapovsky, 2008). Additional research is required to understand the ways these and other dimensions of context influence adult students' use and perceptions of financial aid and their consequences for enrollment-related outcomes. Additional research should also consider the availability, use, and consequences of employer-provided financial aid for the enrollment of adult workers.

Recommended Strategies for Future Research

Further drawing on the limitations of prior research and the proposed conceptual model, this section offers four recommended strategies to guide future research: (1) develop research designs that will identify not just what "works" but how to improve financial aid programs; (2) recognize the contributions of multiple methodological approaches; (3) capitalize on differences among financial aid programs; and (4) recognize the contributions of multiple theoretical perspectives.

Develop Research Designs that Identify How to Improve Programs

In this era of accountability, demonstrating whether a particular financial aid program "works" is critical to a program's future funding. In its discussion of the federal PART ratings, the U.S. Office of Management and Budget (OMB, 2003) clearly articulates the value it places on such research by stating, "No program, however worthy its goal and high-minded its name, is entitled to continue perpetually unless it can demonstrate it is actually effective in solving problems" (p. 47). OMB goes on to underscore this point by stating: "What works is what matters, and achievement should determine which programs survive and which do not" (p. 53).

Certainly program effectiveness should be considered when making decisions about the allocation of scare public resources. Nonetheless, there are at least three cautions associated with relying on measures of program effectiveness to determine whether a program is a good investment. One caution pertains to the interpretation of the findings from such research. In an article in the *New England Journal of Medicine,* Henry Aaron (2008) discusses the question, "What, exactly, is wasteful health care spending?" (p. 1). Like health care, investments in education programs

likely have a continuum of benefits with the magnitude varying across individuals. Even when an investment in health care—or education is labeled as "wasteful" or "ineffective," some individuals are likely benefiting. Given these benefits, whether we continue to offer these programs becomes an ethical decision (Aaron, 2008).

A second caution is that policymakers and practitioners need to know more than simply whether a program "works." Clearly more information is also needed about *how* financial aid programs work and how they may be adjusted to maximize their effects on college-related outcomes (Mundel, 2008). For example, although most research focuses on whether grants are related to college enrollment, policymakers and practitioners would also benefit from knowing how grants directly and indirectly contribute to college enrollment, as well as how grant programs may be improved so as to increase the magnitude of the enrollment benefits and/or the number of individuals who benefit (Mundel, 2008).

Finally, a consideration of the limitations of prior research in light of the conceptual model demonstrates that understanding whether a financial aid program "works" is complicated by the complexities of the contexts in which these programs operate. Other researchers have recognized these complexities (Orsuwan & Heck, 2009). For example, Stout (2008) identifies the "confounding factors" that challenge efforts to isolate the effects of the Academic Competitiveness and SMART grant programs on student outcomes, including other federal, state, and local initiatives; the complexity of the programs; and changes in student eligibility and economic conditions. Considering the role of context suggests the challenges associated with determining whether a particular program causes a particular change in student outcomes, or what student outcomes would have occurred in the absence of the program.

Recognize the Contributions of Multiple Methodological Approaches

Although existing research examining the effects of financial aid on student outcomes has important analytic and methodological limitations (Heller, 2008), no single design or study is without flaws. When selecting a research design or methodology, researchers must acknowledge that all designs have limitations (Baum & McPherson, 2008).

Given the limitations inherent in any design, as well as the complexities of the questions that should be addressed in future research, multiple methodological approaches are necessary. Taken together, findings from multiple methodological approaches will produce a more comprehensive understanding of these complex questions. In particular, researchers should consider the insights that may be gained from randomized control trials, multi-level modeling, qualitative methods, and longitudinal designs.

Randomized Control Trials. According to the federal government, the "gold standard" for research is randomized control trials (RCTs), the only design that

can establish whether a particular program causes a given outcome (U.S. Office of Management and Budget, February 2008). By randomly assigning students to "treatment" and "control" groups, randomized control trials, unlike other methods, are assumed to control for all other explanations for any differences in outcomes between the two groups (besides the treatment). As others (e.g., Heller, 2008; Long, 2004c) have noted, the heavy reliance in existing research on descriptive and quasi-experimental designs necessarily limits what is known about whether financial aid causes improvements in college enrollment.

Ethical and political challenges restrict the use of randomized control trials (Baum & McPherson, 2008). OMB (2008, February) recognizes these challenges by noting that "randomized controlled trials are generally the highest quality, unbiased evaluation to demonstrate actual impact, but [should be used] only when it is appropriate and feasible to conduct such studies" (slide 40). OMB goes on to note that "a variety of quasi-experimental methods (e.g., comparison group studies) and non-experimental methods may help shed light on *how* or *why* a program is effective;" "evaluations must be appropriate for the type of program" (U. S. Office of Management and Budget, 2008, February, slide 40).

Therefore, given the potential insights gained from establishing causal relationships, researchers should consider the ways RCTs may be utilized for examining the relationship between financial aid and college enrollment. When politically and ethically feasible, RCTs may offer important insights.

Multi-level Modeling. A second fruitful approach to future research examining the effects of financial aid on college enrollment is to use multi-level modeling (e.g., hierarchical linear modeling). By explicitly considering multiple levels, multi-level modeling may be particularly useful for understanding the effects on enrollment of multiple dimensions of context.

Some existing studies suggest the insights that may be generated through multilevel modeling. For example, using multilevel modeling, Perna and Titus (2005) explore the ways the characteristics of the high school attended influence the college enrollment decisions of high school graduates. Focusing specifically on the role of parental involvement as a form of social capital, Perna and Titus operationalize aspects of the school context in terms of the extent to which the school encourages parental involvement, the volume of resources that may be accessed via social networks at the school, and the homogeneity of these social networks.

Their analyses show that, regardless of an individual student's social, economic, cultural, and human capital, the likelihood of enrolling in a 2-year or 4-year college after graduating from high school is related to the volume of resources that may be accessed through social networks at the school attended. The volume of resources is measured by such variables as the average levels of parental involvement, family income, parental education, and parental educational expectations at the school the child attends.

Multi-level modeling may also shed light on how the state context influences college enrollment. Perna and Titus (2004) use multilevel modeling to examine the effects of various types of state public policies on the type of college or university high school graduates attend after taking into account student-level predictors of

enrollment. State-level variables included measures of state appropriations to higher education, tuition, availability of need-based and non-need-based student financial aid, K-12 education, and the availability of higher education in the state.

With relatively large sample sizes, high response rates, multiple data sources, national samples, and the clustering of students within high schools, the longitudinal datasets sponsored by the National Center for Education Statistics (NCES) are an important source of data for modeling effects at the student, school, and state levels (Perna & Titus, 2004, 2005). NCES is currently beginning the fourth in a series of longitudinal studies that provide data on students' transition from high school to postsecondary education. The National Longitudinal Study (NLS) of 1972 high school seniors followed students periodically through 1986. The High School and Beyond (HS&B) Study followed 1980 high school seniors through 1986 and 1980 high school sophomores through 1992. The National Educational Longitudinal Study (NELS) contains data for a cohort of students in the 8th grade (1988) when most of the students were high school sophomores (1990), high school seniors (1992), 2 years after their scheduled high school graduation (1994), and 8 years after (2000). The sample was freshened in 1990 and 1992 to ensure representative cohorts of 1990 tenth graders and 1992 twelfth-graders, respectively. The Educational Longitudinal Study 2002 (ELS) tracks the experiences of 2002 tenth graders through high school and into postsecondary education and the workforce, with data collections in 2002, 2004, and 2006. The High School Longitudinal Study (HSLS:09) will follow 2009 ninth graders forward. The HSLS will include data from about 20,000 high school students, their parents, and school staff (i.e., teachers, guidance counselors, and administrators).

Qualitative methods. Existing knowledge of the effects of student financial aid on students' college-related outcomes is largely informed by the results of quantitative research methodologies. A small but growing body of research, however, demonstrates the insights that may also be generated from qualitative research methodologies.

As others (e.g., St. John, 2006) note, qualitative methods may be especially useful for understanding students' perceptions of financial aid and how these perceptions influence their college-related decisions. For instance, using semi-structured interviews with 49 students in the United Kingdom, Christie and Munro's (2003) qualitative study offers useful insights into how students view debt and how financial and cultural resources influence their views.

In an examination of the college pathways of five students attending one urban high school in Los Angeles, Tierney and Colyar (2006) (along with their chapter authors) demonstrate the contribution of qualitative methods to understanding the ways students' educational choices are influenced by their contexts. The authors use intensive qualitative data collection methods, including weekly meetings with each student over the course of 1 year, and "cultural biography" as a framework for identifying the ways cultural contexts influence high school students' college pathways. Colyar (2006) argues that cultural biography is an understanding of students as situated within a particular culture and social context. Together, the portraits of these five students illustrate the ways college-going processes are informed by a

student's "cultural system," including their family (e.g., encouragement to be first-generation college student), school (e.g., scarcity of resources), community (e.g., poverty), and other aspects of their context (Tierney, 2006).

Longitudinal research designs. Longitudinal designs are especially important for understanding how information and knowledge about financial aid influence not only students' actual college enrollment but also other college-related behaviors including aspirations for college, academic preparation for college, search for and application to colleges, and choice among colleges (Long, 2009; Perna, 2004).

Longitudinal designs are especially important for understanding when students need to receive various types of financial aid information. Most agree that providing students and their families with information about college prices and financial aid early in the educational pipeline may encourage students to engage in college preparatory behaviors, such as becoming academically prepared for college (Perna, 2004; Baum & McPherson, 2008). Nonetheless, as explained in this chapter's review of prior research, existing research does not indicate whether having information causes students to engage in college-related behaviors, or whether students who would have engaged in these behaviors anyway acquire information (Long, 2009; Perna, 2004). Data that longitudinally track changes in both knowledge and behavior would help to address this knowledge gap.

Longitudinal designs are also important for addressing other questions regarding the effects of financial aid on students' college-related behaviors. For example, longitudinal designs are needed to better understand the extent to which students retain financial aid (especially merit-based aid) after enrolling and go on to successfully complete their degree programs (Perna & Steele, in press). As another example, Orsuwan and Heck (2009) demonstrate the ways that a longitudinal design (i.e., interrupted time-series analysis) may be used to examine the effects of adopting state merit-aid and prepaid tuition policies on the enrollment of freshmen in out-of-state colleges and universities.

Capitalize on Variations in Student Financial Aid

While complicating efforts to understand the effects of financial aid on college enrollment, variations in existing financial aid programs also offer an opportunity for researchers. In particular, future research might consider exploiting variations in state approaches to financial aid in order to better understand how various program characteristics influence college enrollment and choice.

Some research (e.g., Dynarski, 2004; Orsuwan & Heck, 2009; Perna & Steele, in press) suggests how differences in state approaches to financial aid may be used to better understand how different approaches influence students' perceptions about and use of financial aid. State grant programs have several different goals, including promoting access and attainment of postsecondary education for qualified students; promoting student choice among public and private institutions; encouraging students to attend in-state rather than out-of-state institutions to reduce "brain drain;"

and promoting and recognizing academic achievement in high school or college (Doyle, 2008; Heller, 2004). Need-based aid programs are used to promote access, equalization funds are used to promote choice, and merit-based aid programs are used to reward academic achievement (Doyle, 2008).

States vary in the foci and magnitude of their grant aid. Two states award 100% of their aid for undergraduates based on financial need only (Rhode Island and Wyoming) while one state (Louisiana) awards virtually all aid to undergraduates based only on merit (National Association of State Scholarships and Grant Aid Programs [NASSGAP], 2007). Some states (e.g., South Carolina and Georgia) offer over $1,000 in grant aid per full-time equivalent (FTE) undergraduate student, while others (e.g., Hawaii and Wyoming) offer less than $10 per FTE (College Board, 2008a). State grant expenditures represent at least one-fifth of higher education operating expenses in South Carolina (33%), Vermont (23%), Georgia (22%), West Virginia (21%), New York (21%), Pennsylvania (20%), and Indiana (20%), but less than 1% of higher education operating expenses in North Dakota, Alabama, Arizona, Alaska, Hawaii, and Wyoming (NASSGAP, 2007).

States also vary in the ways they disseminate information about financial aid (McDonough et al., 2007), as well as the extent to which they provide other forms of support for students' college enrollment. Future research should use these variations to examine the ways that "college access marketing" campaigns influence college-related behaviors (McDonough et al., 2007), as well as how the effects of financial aid on college opportunity vary based on the availability of other resources that promote college enrollment. Perhaps the most comprehensive state-grant program, Indiana's Twenty-first Century Scholarship program, includes early commitment of aid, activities to involve parents in college planning and preparation, and academic and social support services for students. Based on a review of data from a survey of students and state records, St. John et al. (2002) found that program participants were more likely to enroll in public 2-year, public 4-year, private, and out-of-state colleges and universities than non-participants and to remain continuously enrolled during the first year of college. Some evidence suggests that, compared to non-participants, program participants are more likely to persist from the first to second semester of their freshman year of college and to attain an associate's degree (St. John et al., 2005, 2002; St. John, Musoba, Simmons & Chung, 2004), while other research suggests that scholars are less likely than non-recipients to attain a bachelor's degree within 6 years (St. John et al., 2008). Students who take the Scholars Pledge are more likely than other students to graduate from high school with an Honors diploma (which requires completion of an advanced preparatory curriculum), suggesting that bachelor's degree attainment rates for Scholars may improve over time (St. John et al., 2008, 2002; St. John, 2003; St. John, Musoba, Simmons & Chung, 2004) conclude that the promise of the availability of financial aid for college during the 8th grade encouraged students to engage in behaviors required to prepare for college. Schultz and Mueller (2006) conclude that the available research provides "promising evidence" of the program's effectiveness for participating students, as the available research shows positive outcomes but uses a quasi-experimental rather than an experimental design.

Future research might also explore how the effects on students' college-related behaviors vary based on other aspects of financial aid, including the providers of information about aid and the extent to which use of financial aid is framed as the "norm" or "default." For example, Long (2009) speculates that students' use and knowledge of financial aid would be substantially greater if students were automatically informed of their eligibility (using IRS data for example) than when students must proactively complete the Federal Application for Federal Student Aid (FAFSA).

Recognize the Contribution of Multiple Theoretical Approaches

Finally, future research should recognize the potential contribution of multiple theoretical approaches for understanding the ways financial aid influences students' college-enrollment behaviors. As described in the conceptual framework section, no one theoretical perspective alone is sufficient. As a substantial body of research demonstrates, human capital models are useful for understanding that financial aid promotes college enrollment by increasing the resources that students and families have to pay college prices. Nonetheless, human capital models alone are insufficient for explaining inconsistencies in students' decision-making (Long, 2009) or for understanding how the relationship between student aid and enrollment-behaviors varies based on other aspects of context (Manski, 2009).

Other perspectives, including those from behavioral economics, psychology, and sociology, may be especially useful for understanding how students acquire financial aid information and develop perceptions about financial aid, how students use this information and their perceptions to make college-related decisions, and how and why these relationships may vary across groups.

Conclusion

Clearly, financial aid is a critical policy-lever for increasing postsecondary access and choice, especially for Blacks, Hispanics, low-income students, and other groups underrepresented in higher education. This chapter argues research that more explicitly examines the ways financial aid is mediated by the context in which students are situated will generate important insights not only for improving public policy and practice but also for demonstrating accountability in financial aid expenditures. This chapter also argues that no single theoretical perspective or methodological approach alone is sufficient for completely understanding all that is still unknown about the effects of financial aid on college enrollment for different groups of students. Multiple theoretical frameworks, using multiple methods, addressing multiple questions, focusing on multiple populations, and recognizing multiple dimensions of context will help to address these knowledge gaps, an important step toward maximizing the effectiveness of student financial aid programs.

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The Pursuit of Student Success: The Directions and Challenges Facing Community Colleges

Linda Serra Hagedorn

> *We hold these truths to be self-evident: that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty and the pursuit of happiness*
>
> —(Declaration of Independence, 1776)

The *Declaration of Independence* proposed an America where its citizens would be the beneficiaries of the unalienable rights of life, liberty, and the pursuit of happiness. Through the centuries, these rights have been held in the highest esteem and are considered fundamental human privileges that cannot be invalidated or denied. Thomas Jefferson, along with others, authored the philosophy of government that has stood steadfast as the foundation for America. It is with respect for our founding fathers and their struggles to create a government designed to protect people's rights that I create an analogy from the most familiar of phrases from the *Declaration of Independence* as the focus of this manuscript on the American community college.

Historically, community colleges have maintained general open door admission policies and provided their services to all who may benefit. As such, I argue that American community colleges offer their students the "pursuit of success". From a community college perspective, success may have multiple definitions including transfer to a 4 year, completion of an associate's degree, earning of a certificate, or just the completion of a course. Whatever the goal, the wide access of community colleges opens opportunities. However, just as our founding fathers could not *guarantee* happiness, only its pursuit, similarly community colleges cannot guarantee success, but have historically offered the opportunities that may lead to it. Thus the traditional mission of the community college has an unspoken mantra that leads students to pursue dreams, success, and victory. The opportunities are provided; a guarantee of success is *not*.

I open the chapter with basic data, history, and information regarding the unique placement of community colleges within the American postsecondary system. I then

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provide a set of frameworks to better understand the emergence and co-existence of community colleges with their 4-year counterparts. The next sections expand on the threats and barriers community colleges must surmount in order to provide opportunities for students to pursue success. Finally, I provide information on distinctive community college programs that exemplify the added level of support to spur student on their personal pursuit of success.

The Basics

The initial version of the community college began in 1901 when the Superintendent of the Joliet Illinois Township High School (J. Stanley Brown) teamed with William Rainey Harper, the President of the University of Chicago to create an experimental postsecondary high school experience. The experiment involved creating an option for those unable to leave the community but still seeking additional education beyond high school. With the emergence of Joliet Junior College, the American community college system was born and emerged onto the American postsecondary environs, a functioning sector dating back to the seventeenth century. The new concept, derived to serve the "common citizen" rather than the elite, adopted a singular identity apart from the existing universities. As a late arriver to the postsecondary arena with novel goals and foci, community colleges have experienced many issues related to their fit, identity, and role. This uncertainty is reflected in the name changes and name confusion that have taken place over the years. In their earlier days, community colleges were called junior colleges. While most colleges have dropped the "junior" designation preferring the community college nomenclature that better designates their tailored service to a geographic locale, some colleges have opted to continue to use the "junior" tag. In addition, there are some colleges included under the community college umbrella that are officially called city colleges, county colleges, technical institutes, or branch colleges. And to add even more confusion, as a result of a current boom of community colleges approved to also confer applied baccalaureate degrees (Floyd, 2006; Floyd, Skolnik, & Waler, 2004) these colleges have now dropped the word "community" from their names and are designated merely as colleges. The former Florida Community Colleges are now termed the Florida College System.

This nomenclature begs the question of "what constitutes a community college in the first decade of the twenty-first century?" The popular definition of a community college is a tertiary/postsecondary educational institution offering programs that lead to an Associate's degree (A.A. and A.S.) as well as an array of non-credit offerings. Community colleges in some states provide certificate programs, basic skills training, as well as credit courses for those who want to transfer but are not necessarily interested in earning the associate's degree along the way. The Carnegie Classification System offers the term "associate's colleges" to identify institutions conferring degrees at the associate's level[1] (Carnegie Foundation, 2009). Amidst the name confusion, community colleges have often been termed "2-year colleges"

because they typically offer the first and sophomore years of liberal arts-type courses even though the majority of students who earn an associate's degree are enrolled significantly longer than 2 years (Hagedorn, Cypers, & Lester, 2008).

Clearly the early junior colleges struggled with mission focus (Bailey & Morest, 2004; Eells, 1931; Vaughan, 1988). But even today it is impossible to provide a statement of the general mission of community colleges because of the great variance by institution. It is however, appropriate to say that most public community colleges share a common target of providing liberal arts instruction at the lower division college level that students can apply to transfer to a university or college offering a baccalaureate degree. Added, most community colleges also participate in vocational training or workforce development leading to applied associate degrees as well as many non-credit offerings that may be termed community, continuing, or enrichment education. While most offer both the transfer and vocational programs, emphasis varies. Finally, governance and financial support structures differ by state.

There is consensus on the common goal of serving the educational needs of adults in the college's geographic service location (Ayers, 2002; Cohen & Brawer, 1996; Gleazer, 1980; Vaughan, 1997). Programs and curricula vary from state to state, but there is usually a shared and basic mantra is to serve anyone in the community who can benefit from the educational services provided. A contemporary heading on the Virginia Community Colleges website boasts of "Education: A better job. A better life. A better future" (2008). While taking a more subtle approach, the Iowa Community Colleges (2008) website asserts a similar message indicating an "'open-door' admission policy which guarantees Iowans an opportunity for educational assistance and career development regardless of previous educational attainment. Community colleges are often used as an avenue to address state economic and workforce issues. For example, in 2006 Arkansas began the Arkansas Career Pathway Initiative sponsoring free community college career training to low-income adults (Economic Modeling Specialists, Inc., 2008). As part of the "Creating a more educated Georgia" movement, Georgia's Technical and Adult Education Institutes (a part of their 2-year college system) expanded their nursing programs in response to a severe state shortage (American Association of Community Colleges [AACC], 2007).

With the differences within the community college sphere acknowledged, it must be said that community colleges differ more dramatically from 4-year institutions in the areas of mission, student demographics, admission criteria, and programs offered. Moreover, differences in curriculum, qualifications of faculty, and funding formulas set community colleges as separate and not as equals to the 4-year institutions. As a result, community colleges have been targets of discrimination, misunderstanding, and even of hurtful humor. In corroboration I offer the example of a popular late-night television host during the 1990s and early 2000s, Jay Leno, who frequently used community colleges as a target of humor through insinuation that community college students are not bright and the value of a community college education is low (Jaschik, 2005). More recently, NBC television announced that the fall 2009 lineup would include a new situation comedy entitled "Community". The network description of the sitcom about a fictitious community college reads, "It's

been said that community college is a 'halfway school' for losers, a self esteem workshop for newly divorced housewives, and a place where old people go to keep their minds active as they circle the drain of eternity" (NBC Universal, 2009). Clearly, community colleges present a target for jokes, innuendo, and assumptions of inferiority.

Growth in the Numbers of Students Served

Several decades ago, the Carnegie Commission on Higher Education stated that the most striking structural development in higher education has been the phenomenal growth of the community college (Olgivie & Raines, 1971, p.V). Currently there are 1,195 public community colleges enrolling more than 11.5 million students; 6.5 million in credit coursework (AACC, 2008). These colleges educate 46% of all U.S. undergraduates (AACC, 2008). The growth of community colleges has been fueled by a steady growth of (1) student aspirations to go to college (Hubbard, 1999; Mau & Bikos, 2000); (2) greater proportions of high school graduates pursing higher education (National Center for Public Policy and Higher Education, 2008); (3) older (non-traditional) individuals returning to postsecondary education, (4) traditionally underrepresented groups pursuing postsecondary instruction, (5) increased college aspirations of women, and (6) growth in the job market sector requiring higher levels of training (American College Testing, 2005). Although student demand has increased among the groups that have traditionally attended college (Schneider & Stevenson, 1999), the majority of the expansion is due to the emergence of new groups such as students of color and first generation college students. In response, some elite institutions have grown enrollments; but they have not grown in proportion to the demand and typically have not altered admission standards to accommodate the latest diversity of college aspirants (ACT, 2002; CollegeBoard, 2009; Washington Higher Education Coordinating Board, 2009) A case in point involves older adults, including retirees aspiring for encore careers and personal enrichment education. Predictions for future decades state that the pool of traditionally aged college students will increase at a much slower rate (and possibly decline) while the group of older adults seeking education is expected to increase (Toosi, 2006; WICHE, 2008). The new Post 9/11 GI bill, scheduled to go into effect in August 2009, is also expected to bring many veterans to the door of community colleges (Field, 2008).

Table 1 provides numbers of the total fall enrollments among credit seeking students in both 4- and 2-year institutions as well as percentage growth by decade. It is interesting to note how the community college enrollments have experienced a higher growth rate than the 4-year sector until the 1995–2005 comparison. The increase in growth rate for 4-year institutions may be due in part to the growth of for-profits that has increased access at the 4-year level and are increasingly attracting community college transfers (Blumenstyk, 2000). The University of Phoenix, probably the best known of the for-profit sector, now boasts of the largest undergraduate

Table 1 Total credit fall enrollments in four and 2-year postsecondary institutions

	4-year Institutions		2-year institutions	
Year	Students	Growth from previous decade (%)	Students	Growth from previous decade (%)
1965	4,747,912		1,172,952	
1975	7,214,740	51.96	3,970,119	238.47
1985	7,715,978	6.95	4,531,077	14.13
1995	8,769,252	13.65	5,492529	21.22
2005	10,999,420	25.43	6,488,055	18.13
Total growth rate from 1965 to 2005		131.67		453.14

Adapted from The Digest of Education Statistics 2007—(Snyder et al., 2008).

enrollment in the country (about 300,000) and is also the number one destination for veterans (Field, 2008). It is estimated that the growing demand for postsecondary enrollment will not abate but will swell to close to 20 million college students by 2014 (Snyder, Dillow, & Hoffman, 2008). It is also of note that recession conditions predict an increase in community college enrollment with special emphasis in vocational offerings.

Types of Students Served by Community Colleges

Community colleges serve a broad spectrum of students. With an average student age of 29 years, clearly some students return to school with "rusty" academic skills (AACC, 2008). Although there are predictions for increased numbers of older nontraditionally aged student returning or entering college, there has been a recent trend of increase in the number of traditionally aged students entering community colleges (Adelman, 2005). The majority of community college students (over two-thirds) are attending part-time while coupling their academic pursuits with employment and/or family responsibilities. A large proportion of students of color who attend college begin their postsecondary enrollments at a community college (AACC, 2008); a statement especially applicable for Hispanic students (White House Initiative, 2000; Hagedorn, Chi, Cepeda, & McLain, 2007). Most community colleges offer opportunities through GED programs appealing to the nearly one-third of all public high school students and close to one half of all Black and Hispanic students who fail to complete high school (Bridgeland, DiIulio, & Morison, 2006).

Table 2 provides additional facts and figures pertaining to community college students. In the period of 1999–2005, the number of conferred community college degrees rose 26.2% (from 5.6 million to 7.1 million) with degrees for underrepresented groups rising a full 51.5% (National Center for Education Statistics [NCES], 2007a). However, while the number of community college degrees for underrepresented groups has drastically increased, the reality is that low income students

Table 2 Comparison of community college and 4-year institution enrollment statistics

	Community colleges (%)	4-year colleges/universities (%)
Women	60	57
Age 21 or younger	58	63
Minorities	37	27
First generation to attend college	39	14
Non-U.S. citizens	1.4	4.5
Receiving any kind of financial aid	44	66

Adapted from AACC (2008)

and students of color continue to seriously lag their more advantaged peers in baccalaureate acquisition (Dougherty & Reid, 2007). Selected positive statistics also mask the number of students who leave the community college prior to achieving their goals (Berkner, He, Mason, & Wheeless, 2007). An analysis of the nationally representative NELS: 88-2000 data revealed that only 37% of the Whites, 26% of the Hispanics, and 9% of the Blacks attending a community college with the ultimate goal of completing a B.A. or more actually earned the coveted degree. These statistics can be compared to students beginning in a 4-year institution where 77% of the Whites, 61% of the Hispanics, and 63% of the African Americans earned their degrees.

The indicators clearly point to a condition where students with backgrounds more likely to add difficulty in accessing a baccalaureate are also more likely to attend a community college. Despite the differences in the populations who begin college at community colleges from those who begin at 4-year universities, there is no shortage of respected studies that level a causal accusation stating that students who seek a 4-year degree become "disadvantaged" if they begin their studies at a community college (Alba & Lavin, 1981; Brint, 2003; Choy, 2002; Long & Kurlaender, 2008). The obvious and stated policy implication of these works is that students aspiring to the baccalaureate should solely attend a 4-year institution and not consider community college attendance. However, to conclude that attendance at a community college is the cause of non-success is a result of flawed logic. The use of sophisticated statistical controls cannot account for the fact that the vast majority of the community college students who have not fulfilled their goals did not have the option of attending a 4-year university. Four-year institutions generally employ admission criteria that promote rejecting the applications of those students deemed more likely to fail. Thus many of these students could not attend a university; leaving attendance at a community college their only postsecondary option (Cohen & Brawer, 2008). Moreover, the studies fail to acknowledge that set of students that despite being denied access to the university sector attend a community college and are ultimately successful. If it were not for the community college's open door, those students would have been denied all postsecondary access. Finally, many students have multiple reasons for attending a community college and thus even though their academic records may have deemed them "4-year acceptable," without a local community college that allowed part-time or perhaps evening only

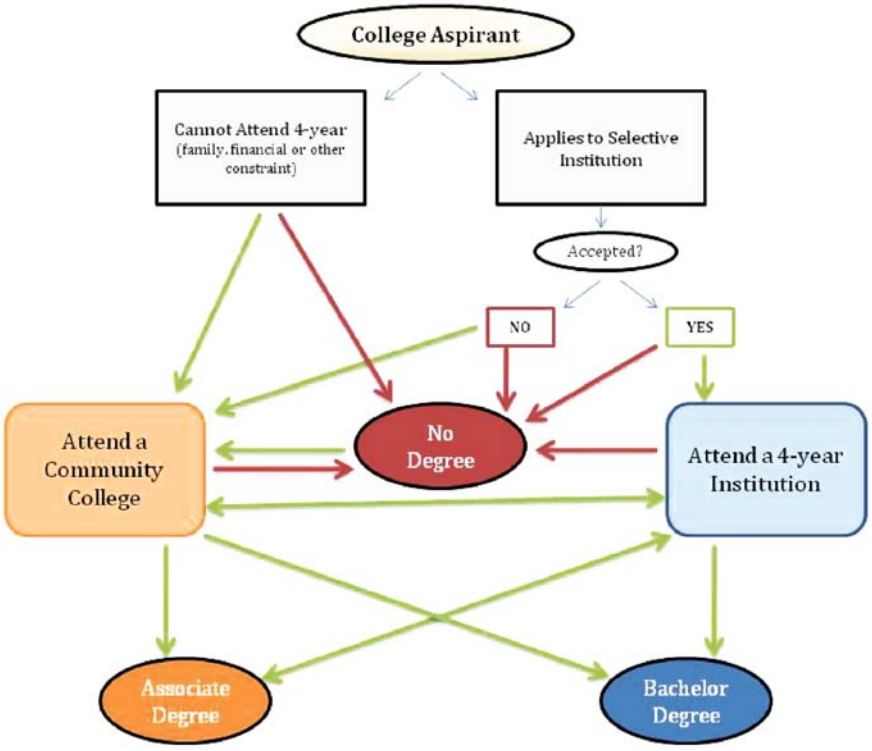


Fig. 1 The community college in the path of the baccalaureate

courses, college attendance would never have been an option. For many community college students the same reasons that prevented them from initially attending a 4-year college may persist and thus prevent transfer and the baccalaureate (at least in the short run). Figure 1 provides the possible paths to the baccalaureate and other college outcomes and indicates that for many students, the community college is the only option if a baccalaureate is the goal. Community colleges offer the pursuit of success not only as an initial postsecondary experience but also for students who have enrolled in postsecondary instruction in the past but have been unsuccessful or require additional supports. Students with 4-year university credits who later enroll in community colleges are termed reverse transfers and provide another example of the non-traditional paths that students may take on their postsecondary route to the baccalaureate (Hagedorn & Castro, 1999).

While I challenge the negative *direct* causal effects of community college attendance on bachelor degree acquisition, I readily acknowledge the *indirect* effects that overlap with and reflect negative aspects of American society. As earlier stated, there are increasing numbers of previously underrepresented groups seeking college admission (Alexander, Pallas, & Holupka, 1987; Aronson, 2008; Hurtado, Inkelas, Briggs, & Rhee, 1997). Yet their overrepresentation within the community colleges

may provide evidence of subjective class differences that reproduce class and race inequities. Of the 1992 high school graduating class, 60% of the Hispanic students who attended any kind of college, began their studies at a community college as compared to 38.8% of Whites and 37.4% of African Americans (NELS: 88-2000 data). Using national data, Adelman (2005) pointed to clear and disproportionate overrepresentations of students from the lowest socioeconomic (SES) quintile in community colleges and stated that "the higher the SES quintile, the less likely the student will start in a community college" (p. xvii). Jencks and Phillips (1998) recorded test score gaps by race that would also predict postsecondary institutional type. Thus while community colleges have served to significantly increase postsecondary access they have also in essence created greater institutional stratification. By providing postsecondary access to students who would otherwise not have gone to college; community colleges created a situation of stretched stratification where low income, students of color, and students needing developmental education are more likely to be located. The stratification negates the traditional and accepted college choice model of beginning with a predisposition to go to college followed by searches for information about colleges ultimately leading to a decision on a specific postsecondary institution (Hossler, Braxton, & Coopersmith, 1989). For the most part, community college students attend the college that is geographically closest to them—typically their only "choice" is to either attend the community college or to not attend college at all. There is likely to be no weighing of institutions or search for fit. The open door access of community colleges which has been viewed as the solution to the college access problem may have in reality spawned another issue—differential access.

While many community college students aspire to the baccalaureate, the goal is not universal. Other students pursue a more vocational route to an applied associate's degree (often an Associate of Science, A.S. or A.A.S.) or certificate that leads directly to the workforce. According to data from the U.S. Census Bureau's 2005–2007 American Community Survey, American workers with an associate's degree or just some college courses earned approximately 72% more than workers without a high school degree or GED and 23% more than workers with a high school diploma[2] (2009). In addition, the Bureau of Labor Statisticsx predicts 18.7 and 13.6% increases in the number of job openings for holders of the associate's degree and vocational certificate respectively in 2016 as compared to 2006 (2009). Hence for those students who enroll in the community college without the goal of transfer as well as those who may choose another path after enrollment, time spent in the community college should not be cast as wasted.

The Assimilation, Acculturation, and Evolution of Community Colleges

To better understand the position and evolution of the community college within the postsecondary sphere I call upon the social theories of immigration and

assimilation- acculturation. I posit that as late-comers to the postsecondary sector, community colleges can be likened to an immigrant arriving to a new country. In the classical immigration model the new entrant to a host culture is cast as "marginal" (Park, 1928) and catapulted into an existing culture with a functioning set of firmly established customs and habitual practices. The immigrant is left at the margins without invitation to join the mainstream and must struggle with culture-shock and ambiguity while attempting to "fit" and to find a rightful place. Classical assimilation theory predicts that time eventually intervenes and prods the "marginal" on a natural yet gradual progression of acceptance of the mainstream culture that by necessity will force him/her to desert the former cultural and behavioral patterns. The United States, often called a "country of immigrants," has used the metaphor of the "melting pot" to indicate that individuals eventually shed their cultural differences through blend and conformity.

The melting pot has been the predominant assumption throughout American history, but presents a simplistic and incomplete picture of race and ethnic change. More modern models of assimilation and accommodation provide evidence of alternate outcomes. In their seminal work on segmented assimilation, Portes and Zhou (1993) describe two additional distinct paths of immigrant integration in addition to the melting pot;

(1) Distinct disconnection with purposeful alienation with the mainstream leading to permanent poverty and membership among an underclass,
(2) Preservation of cultural values and solidarity juxtaposed with positive and harmonious co-existence within the mainstream.

I believe there may be merit in applying the social theories of immigration to community colleges and their entrance into the postsecondary environment. Community colleges entered the postsecondary sphere as "marginal" institutions. During their little more than 100 years of existence there are multiple examples of assimilation and accommodation but I argue that history paints a clearer picture of purposeful alienation that is evident from several perspectives. With notable exceptions, faculty and administrators from the two institutional types rarely meet or network. College and university representatives typically will not attend the same conferences or be invited to the same state-level events. Questions of course rigor and equivalence are often a sensitive subject in articulation and transfer between institutional types. Funding and governance structures of 2 and 4-year institutions in most states are separate. Curriculums, faculty job scope, admissions procedures, and student affairs are very different for the two institutional types (Cohen & Brawer, 1996). The result is that community colleges have retained the status of a disconnected underclass of institutions.

On the other hand I can offer evidence of acculturation and attempts to blend that typically involve actions taken by community colleges versus actions taken by the 4-year sector to reach out and accept. The recent emergence of community college baccalaureate programs offers a prime example of community college action that can be interpreted under the assimilation rubric. While not universally rejected

by the 4-year sector, the new applied baccalaureates have met with mild to hostile negative reactions (Floyd, 2006; Floyd et al., 2004) and is a subject of national debate.

Accusations of "mission creep"—abandoning the unique community college mission and philosophy in an attempt to emulate universities—ring loudly. More specific, there is concern that if community colleges take on this very huge responsibility they will no longer be able to or be interested in offering noncredit programs for workforce development, vocational and technical career development, and remediation. There are also worries that the new degree programs will lead to the abandonment of the open door access in lieu of programs that by necessity involve admission criteria. Questions involving accreditation, articulation, differential tuition charges, and faculty workload leave have yet to be fully answered. Further there is swelling controversy regarding how well the new baccalaureates will be accepted in the workforce and in graduate admissions. In a 2003 interview, the late Dr. James Wattenbarger, often referred to as the "father of the Florida Community College System," expressed concern that the new programs would be deemed "second-class baccalaureates", a descriptor subsequently adopted by other opponents (Mills, 2003).

Finally, there have been a handful of former 2-year colleges in the states of Arkansas, Georgia, Louisiana, and Utah that have evolved into 4-year institutions but continue to also award associate degrees. And there is dialog in other states considering similar actions. These examples of assimilation strike fear in the hearts of community college advocates who worry that not only may the unique philosophy of the American community college "melt" into a new structure more akin to universities, but that the very existence of community colleges may disappear.

Continuing the analogy of community colleges as immigrants to the land of post-secondary education, it may be apparent that of the three pathways of immigration described by Portes and Zhou (1993) the pathway of respected co-existence provides the desired choice to enable students on their pursuit of success. Progress in either the direction of assimilation or continuation of the alienation model is much more likely to lead to more negative outcomes. The current era of student growth amidst economic downturn and new initiatives such as the community college baccalaureates, brings these colleges to a crossroad that will determine the future of the American community college and its ability to provide the pursuit of success to future generations of students. The question remains can the American community college emerge from its current position of alienation and underclass to one of respected co-existence without assimilation/accommodation?

Alienation and Underclass Status

In this section I provide evidence of the conditions and assumptions that have lead to the current state of alienation and underclass status of the American community colleges.

Community College Funding

Community college funding formulas differ from state to state. A typical formula consists of funding from a combination of state funds, local property taxes, student tuition, and grants and contracts. The allocations and formula for a state's community colleges is very different from that applied to state's public universities. A few examples illustrate the differences.

In Maryland, the John A. Cade Community College Funding Formula utilized in Fiscal Year 2007 allocated $1,982 per full-time equivalent student, whereas the state's 4-year institutions received $7,927 per full-time equivalent student (Campbell & Hoy, 2006). The allocation was calculated as 25% of the 4-year equivalent—an increase from the 21% formula of 1998. In fairness, it is important to state that the Maryland formula excludes the Baltimore County Community Colleges that are allocated 66% of the 4-year university funding. A similar situation occurs in Kansas where the 2007 fiscal year formula for community colleges was 50% of the average state general fund expenditures per lower division FTE at the three regional regent institutions (Hollon, 2006). The amount is scheduled to increase to 65%.

In California, the state appropriations for each full-time student equivalent (FTE) for a community college student is less than 60% of that allocated for a student enrolled in a California State University and less than 33% of that allocated for a University of California student (Shulock & Moore, 2007). In addition, the fee revenues for California community college students are less than that for students in the 4-year sector thereby decreasing the funding even further.

The differences in funding models for the 2- and 4-year sectors rest on the assumption that different types of postsecondary education carry different price-tags. Indeed, graduate education with the accoutrements of research is very costly. However, community colleges funding is typically only one-third of that allocated to the elites even though community colleges depend more heavily on the state (Center for Community College Policy, 2000; Wellman, Desrochers, & Lenthan, 2008). Further, community colleges attract and serve the majority of students with special needs that translate into the need for special services—many that are costly. The low funding provides evidence of the underclass status and the state of alienation.

Developmental Needs

The National Research Council (Raju, Pellegrino, Bertenthal, Mitchell, & Jones, 2000) as well as state commissions (Colorado Commission on Higher Education, 2008; Indiana Commission on Higher Education, 2008) have long indicated that the most important challenge facing schools is the raising of student achievement. As earlier stated, community colleges have served the majority of students with weaker incoming academic skills, but it is important to note the full extent of the developmental needs problem facing the entire spectrum of postsecondary education. It

is estimated that approximately 40% of all college students must enroll for at least one developmental course and in some community college districts the proportion is closer to 80% (Adelman, 2004; Breneman & Costrell, 1998; Schmidt, 2006). Data from the National Assessment of Educational Progress (NAEP) indicates that only 17% of high school seniors are proficient in mathematics and about twice that number (36%) achieve proficiency in reading (Braswell et al., 2001). A rather shocking statistic recently released is that nearly 80% of college students placed in less than college level courses earned high school grades of "B" or better (Strong American Schools, 2008). The result is that many students face college with a lulled sense of academic accomplishment but find themselves facing the need for developmental courses that offer no credits toward a degree but do require tuition, fees, books, and time. Perhaps these statistics point to a "disconnect" between the education provided by the K-12 system and the expectations of the college curriculum (Greene & Foster, 2003; Venezia, Kirst, & Antonio, 2003).

There is a long history of debate over "who" is to blame for the expanding need of college remediation as well as who should shoulder the responsibility and costs for providing the instruction (Ignash, 1997; Jenkins & Boswell, 2002). In response, there is a clear trend in relegating the responsibility for developmental instruction to take place through the community colleges. The states of Arizona, California, Colorado, Georgia, Florida, Indiana, Kansas, Louisiana, New Mexico, New York, Massachusetts, South Carolina, Utah, and Virginia have policies in place that either prevent or restrict remediation in the public university systems (Jenkins & Boswell, 2002). Other states are quickly drafting similar policies.

Community colleges by default or by design have been designated as the brokers of developmental coursework; a delineation that separates or alienates the community colleges from the 4-year sector. It is not surprising that a decade ago Adelman (1988) found that the higher the number of remedial courses a student had to take, the less likely he/she was to earn a degree. The pluses and minuses of developmental education continue to be debated and tested, yet it is undeniable that many students attend a community college because their skills are not college-ready (Merisotis & Phipps, 2000). Again I must point to the faulty logic wherein students needing deep remediation are relegated to community colleges and those needing deep remediation are less likely to achieve the baccalaureate which leads to community colleges being cast as ineffective, inferior, and in the underclass. Hence, a serious threat to success exists wherein community college students needing remediation/developmental education must overcome the odds if they are to be successful.

Increasing University Selectivity

The lack of selectivity in the admissions process is another reason why community colleges have been cast as inferior from the selective 4-year colleges and treated as an underclass. The figurative "welcome mat" placed outside the door of the

community college's admission department attracts many students that the elites would never even consider. The warmth of the welcome is very different from that provided by many 4-year universities that pride themselves on their selectivity as evidenced by the large number of applicants they are able to turn away. Unlike the elites, community colleges offer a generic welcome to all without offering privilege to few through legacy admits—special admission to the offspring of alumni, especially wealthy and famous alumni who also donate to the college (Golden, 2006).

Legacy admits aside, enrolling the best and brightest has always been a goal for universities. But in recent seasons the admissions competition has reached a new height (CollegeBoard, 2009). The majority of high school graduates now state a desire to proceed to college, creating a situation of larger pools of applicants from which the universities can select. The battle for the highest scoring students is propelled by the university status rankings produced by the *U.S. News and World Report, Consumers Digest*, and the *Princeton Review*. One of the criteria for higher rank is selectivity as measured by the GPA and SAT scores of incoming students. Elite universities with national prominence are able to skim the top of the academic ability lists. Those students who find themselves a bit lower on the lists have typically been forced to turn to lower ranked state schools, but these institutions are also receiving record number of applications and are in turn becoming more selective. In the end, for a growing number of students the only option available is to attend a community college. The result is an increase in the pool of community college students and a larger demand for services (League for Innovation, 2009).

Lowered Level of College Knowledge Capital

The community colleges are in an alienated subclass because of the academic backgrounds and social economic status of many of the students admitted. A recent report, "Diploma to Nowhere" stated "Students don't know what universities expect of them. Teachers [high school] aren't sure what exactly constitutes college readiness" (Strong American Schools, 2008; pg. 5). Although this report was generalizing among all traditionally aged students, the statement may be especially attributed to the population more likely to enroll in community colleges. College knowledge capital is related to cultural capital (Bourdieu, 1977, 1984, 1986, 1996) but is more narrowly focused on exposure to, experiences with, and a general learned knowledge about college and college life. Students gain college knowledge capital through the interaction and guidance of family or friends who have gone through the experience. Since the majority of community college students are the first in their families to have any kind of postsecondary experience, they are less prepared for the challenges of college and hence more susceptible to non-success. Research has suggested that a successful transition to college is strongly affected by social class and parents' college experiences (Connell, 2004; Karen, 2002; Karen & Dougherty, 2005; McDonough, 1997). The types of knowledge that more advantaged students

may take as "innate," such as the need to make an appointment with a college advisor to create a program of studies, or the availability of tutors, may be absent from first generation students devoid of inherited college knowledge.

Respected Co-existence—Can Change Happen?

In the previous section I provide evidence of the status of community colleges as an alienated subclass within the tiers of postsecondary institutions. Using the social theories of immigration framework, I argue that community colleges and their students will be best served by breaking out of the underclass status and entering that of respected co-existence within the postsecondary sector. The positive news is that the current Obama presidential administration strongly supports and understands community colleges in ways that previous presidential administrations did not. President Obama acknowledges the need to expand college access and recognizes that an educated populace includes diverse training including that of shorter term vocational and technical supplied by the community colleges (White House, 2009). Despite presidential support, there exist serious threats to change.

Demand

Earlier I discussed the increased demand for the community colleges due to the inability of the 4-year sector to serve the number of students demanding postsecondary education. But that is only one of the reasons why the demand for the services of community colleges are increasing. Due to a depressed economy coupled with a tight environment for financial aid, students who may have attended a 4-year university in better economic times with ample aid; are choosing the more economical route of the community college. The fact that college tuition has increased by 440% over the past 25 years, more than four times the inflation rate, contributes to the number of individuals considering community colleges as a cost-effective strategy (Kinzie, 2008).

Space and enrollments at the community college are, of course, not infinite, and some students become supplanted or find themselves in larger classrooms competing for services. In worst cases, they find themselves wait-listed for the courses and programs they want and need.

In their quest to offer an open door to all who can find benefit, community colleges have created a demand for their services that arguably may go beyond their capabilities of service (League for Innovation, 2009; Provasnik & Planty, 2008). Many colleges are operating over their enrollment caps meaning that they may not be reimbursed for the excess of FTE they provide. Space has become a "hot commodity" forcing some college presidents and boards to consider extending course times to late night and very early morning so that precious classroom space is maximally utilized. Indeed one of the reasons behind the growth of community college

online instruction is due the unavailability of brick and mortar classroom space (Allen & Seaman, 2007).

The shifts of developmental instruction to the community colleges is but one example of the increased demands placed upon the colleges by students with academic needs and those in programs that do not come with a wholesale price tag. Similarly workforce development and vocational/technical instruction are typically very costly. English, History, and mathematics courses certainly benefit from technology, but the costs pale in comparison to those of a vocational program such as an automotive theory program or electronics technology. While vocational programs may have additional revenue sources, they typically remain underfunded.

Budgets Cut to the Bone

Academic year (2007–2008) witnessed deep budget cuts and unprecedented mid-year cuts that threatened the quality of all postsecondary education. According to a report based on a survey of the National Council of State Directors of Community Colleges administered by the Education Policy Center at the University of Alabama, nine states had mid-year budget cuts in 2007–2008 for the community college sector (Katsinas, 2008). In addition, 18 states failed to adhere to their funding formulas and did not fully finance their community colleges in 2007–2008.

Pundits, state boards, and educational economists are predicting difficulties and deficits as evidenced from late 2008 and early 2009 announcements that will extend into the next three to 5 years at a minimum. Budget gaps for 2010 and 2011 are estimated to top $350 billion (McNichol & Lav, 2009). The Governor of Maryland has cut the state postsecondary budget by $35 million (WBALTV, 2008); Tennessee announced that an additional $42 million must be trimmed from their budget adding to the $55 million that was reduced earlier in the budget year (WKRN.com, 2008). The state of Florida is experiencing some of the worst economic conditions in the country with a state deficit estimate of $3 billion and an estimated $300 million to be cut from education (WJHG.com, 2008). Nevada proposed a 36% cut in the higher education budget to bridge their revenue gap (Ball, Vogel, & Lake, 2009). In South Carolina, the Governor is threatening to close three of the state's community colleges (branch campuses of the University of South Carolina System) as part of the state's 16% cut in higher education (Adcox, 2009). These budget cuts are especially brutal to community colleges that have historically been underfunded as compared to their 4-year counterparts prior to current economic conditions.

States like Michigan that have historically depended on revenue through local industry contracts are affected in other ways by the economic slowdown that has decreased or eliminated the contract training. For example, a community college in the Detroit area reported that due to the conditions confronting the auto industry, corporate training programs will generate approximately $50,000 in academic year 2008–2009. However a decade ago, corporate training generated approximately $5 million for the same campus (Moltz, 2009).

While there may be some relief from the American Recovery and Reinvestment Act of 2009 (ARRA), the funds are being distributed as a "one-time only" aid. The funds are to be funneled toward improving future cost effectiveness and not to be applied to closing immediate budget deficits (U.S. Department of Education, 2009).

Financial Aid in the World of Community Colleges

Between 1977–1978 and 2007–2008, tuition and fees at community colleges have grown on average by $1,300 (adjusted for inflation) while income for the lowest 20% of the population has increased by $463 (Supiano, 2008). Thus, financial aid may be especially appropriate to provide support necessary for many community college students to complete their degrees. A recent report by the Advisory Committee on Student Financial Assistance (2008) found that "millions of community college students who appear to be eligible for need-based financial aid are not applying (p. i)". In fact, more than half (55%) of all community college students as compared to 37% of students at 4-year institutions did not complete the FAFSA form (King, 2006). The problem is magnified when coupling these statistics with those indicating that community college students are overrepresented in the lower economic strata. According to data from the 2003 to 2004 National Postsecondary Student Aid Study (NPSAS:04) almost one-third of community college students in the dependent or independent without dependents categories in the 0$-$9,999 annual income bracket did not apply for aid.

The reasons for not applying for aid are as diverse as the students themselves. Some students are not aware of their eligibility; others are loan aversive, preferring to work rather than to borrow. Others suffer from the "work penalty" where working full or close to full time creates a negative impact on eligibility with the cruel twist that working long hours also is likely to negatively impact academic achievement and likelihood to be successful (Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1998).

The liberal open admission and open door processes of community college may also be responsible for some students not applying for aid. Conversations with financial aid officers across the country included anecdotes of students enrolling on Monday for courses beginning on Tuesday obviously leaving no time for FAFSAs or any other kind of application for aid. The *Apply to Succeed* report listed the following reasons why eligible community college students may not apply for aid:

- Unaware that financial aid is available for community college study
- Believe that accepting aid in community college will negate ability to collect aid after transfer
- Inability to meet deadlines
- Lack of knowledge that ineligibility due to working status can change if employment changes
- Find the necessary forms too complex and confusing (Advisory Committee on Student Financial Assistance, 2008)

Interviews with community college financial aid advisors revealed additional reasons why low-income community college students may not apply for aid:

1. Fear of attention. Even when the students themselves are U.S. citizens, there may be household members without legal status to be in the U.S.
2. Ineligibility due to lack of a "green card"

- Parents may not file tax returns
- Parents refuse to provide personal financial information
- Inability, due to limited language or reading ability, to fill out the FAFSA form. (Advisory Committee on Student Financial Assistance, 2008)

Financial obstacles may not be totally annihilated even for those community college students who apply and receive aid. A recent study in Maryland found that the majority (83%) of community college students had unmet needs averaging $7,126 even after factoring in financial aid (Maryland Higher Education Commission, 2007). Furthermore, those students in the lowest income bracket had the highest level of unmet need and over half of the students reported using credit cards to meet their financial obligations.

Another consideration in the financial aid formula is the type of aid received. While grants and scholarships are generally preferred over loans, not all loans are equal. By far, a subsidized federal loan is desirable over other types of loans due to a low fixed interest rate and lack of accruing interest while the student is attending school or during established times of economic distress. A report by The Project on Student Debt (2008) stated:

> More than one million students are enrolled at community colleges that have opted out of the federal student loan program. In 13 states, more than 10% of community college students do not have access to federal loans. In eight states, more than 20% cannot get a federal loan. These students must resort to riskier, more expensive forms of debt, such as credit cards or private student loans, when they need help bridging the gap between available grant aid and college costs (pg. 1).

Moreover, this research reported that approximately one-fifth of all African American and Native American community college students were enrolled in colleges not providing access to federal loans while the proportion of Caucasian community college students enrolled in these colleges was only 9%.

Financial aid availability. The backlash of cuts in state appropriations includes reductions in state-based financial aid. In the aftermath of economic downturns, many community colleges are requesting increases in tuition to cover costs (Santora, 2008). In order to pay for college, loans have become a necessity for many students. The current "credit crunch" has produced worries that private loans may not be available or will become very expensive (Student Loans, 2009). Companies either do not have the capital to lend or feel it's too risky to make any new loans. Major lenders such as Bank of America and Education Finance Partners, the third and fourth largest student loan providers in the country, have shut down their student loan programs. Others companies that have suspended or cut their student

loan programs include Wachovia, Citigroup, Massachusetts Educational Financing Authority, My Rich Uncle, Campus Door (owned by Lehman Brothers, which went bankrupt), and the College Loan Corporation. According to Pappano (2008), the amount of private loans has decreased by 20–27% or about $5 billion, in the past year. This may not affect a large number of community college students as during the 2003–2004 year only 1.3% of all part-time students and 3.7% of all full-time students made use of private loans (NCES, 2007b); on the other hand, it may disproportionally affect community college students without access to federal loans.

Lack of Dissemination of Agreements

In order for community colleges to offer the pursuit of success to its students, they must provide a clear pathway to transfer. But the alienation of community colleges may be responsible for depriving some students of the knowledge of what courses transfer, how to transfer, and what steps they must take while enrolled at the community college to insure an easy transition to the 4-year. Articulation agreements are formal arrangements between community and 4-year colleges that specify the community college courses, credits, degrees, and programs that can be applied toward the baccalaureate degree (Education Commission of the States, 2001; Cohen & Brawer, 1996). From a student standpoint, the result of an articulation agreement should be a list of the courses that will transfer and will promote acceptance not only to the university of choice, but also into the program or discipline of the intended major. A well-designed student friendly result will eliminate the taking of superfluous courses and will expedite transfer and the baccalaureate.

Articulation agreements can take many forms. Some agreements provide for the acceptance of the associate degree as a block of credits welcoming a student to enter the 4-year institution with junior-level status. Other agreements may be built upon "the transfer curriculum" or a block of specified courses that will transfer as a block. Still others take the form of a "course by course credit transfer" where community college courses must be matched with equivalence to those offered at the 4-year. Some agreements go so far as to "guarantee" admission to all students who fulfill a certain criteria for transfer (Townsend & Twombly, 2001).

Articulation agreements are generally constrained to agreements within 2 and 4-year colleges in the same state, so students contemplating transfer to another state are often left with uncertainty (ECS, 2001; Townsend & Twombly, 2001). States lacking common course numbering and general education requirements create additional burdens to students who can be likened to travelers with a destination but without a map (Rosenbaum, Deil-Amen, & Person, 2006). The importance of articulation is so fundamental to the pursuit of success that it seems counterintuitive that recent national studies have been unable to find a causal link between strong statewide articulation agreements and student transfer (Anderson, Sun, & Alfonso, 2006; Roksa & Keith, 2008). The research involved the existence of agreements but did not include a measure of dissemination or student comprehension. Studying the

literature and state-level articulation policies, Ignash and Townsend (2000) provided seven guiding principles for developing strong articulation agreements. Their first and most important principle was that of parity among institutions. In their words:

> The first principle, that of *parity among institutions*, affirms that community colleges and four-year institutions are equal partners in providing freshmen and sophomore level undergraduate coursework. Stated differently, the relationship between two- and four-year colleges and universities should *not* be one in which the community colleges are subordinate (p. 2).

The lack of institutional parity may be related to the counterintuitive finding of no relationship between student transfer and strong agreements. Merely having a well-written agreement may be insufficient to promote positive outcomes. A better measure of the strength and effectiveness of the agreement may be better defined by dissemination and comprehension of its users (students).

To support the need for dissemination, I provide the example of the state of California. The California community college articulation program has many levels. First there is the transfer core curriculum, called the Intersegmental General Education Transfer Curriculum (IGETC) consisting of blocks of courses that transfer as a group and fulfill the general education requirements of the California State and University of California systems. Completion of the IGETC sequence does not guarantee admission to a specific California campus. California community college students may also complete general education requirements known as the "General Education-Breadth Requirements" and enter the university with a certification of completion. There are several websites that assist students to understand these requirements and options (ASSIST; http://www.assist.org and CSU Mentor http://www.csumentor.edu) offer a course by course analysis of course credit transfers to specific institutions. While these websites offer excellent support, they are not widely used nor known by students. In a study of the Los Angeles Community Colleges, students entering the Transfer Center[3] were queried about their knowledge of the IGETC curriculum and the courses needed to fulfill the articulation agreements in California. Very few students had any knowledge of the IGETC curriculum and were surprised to hear that a website existed that could assist them (Hagedorn, 2007).

Hence, clear articulation agreements are only valuable if the intended beneficiaries (i.e., students) are aware of their existence and are able to understand the content. If a state of respected co-existence is to be reached both the 2- and 4-year institutions must not only acknowledge the agreements but also disseminate their content.

The Community College Baccalaureate

The emergence of the community college baccalaureate threatens to blur the thickest border separating the 2- and 4-year sectors—the awarding of the bachelor's degree. Arguably, moving into the baccalaureate arena may interpreted as assimilation;

but many community college administrators and faculty proclaim it will bring a deserving level of respect to their institutions (Davis & Nelson, 2009).

But the question remains if the emergence of these new degree programs can aid a respectful co-existence or if it will further alienate the colleges? It is uncertain if the degrees conferred by the community colleges will be viewed as equal or inferior. Perhaps the most important question of all is the effect that the new programs will have on the mission of open access and opportunity.

For decades, community colleges have been involved in bachelor degree programs in collaboration with 4-year campuses in the form of shared facilities, 2+2 arrangements, and local university centers—the difference is that the contemporary breed of community college baccalaureates are independent of any 4-year institutions. The community college baccalaureate refers to degrees not offered by a university, but rather directly offered by the community college with courses taught by community college faculty (Floyd et al., 2004).

Proponents of the community college baccalaureates believe that these new programs are in perfect alignment with the community college mission of opening access (Floyd et al., 2004). Opponents accuse community colleges of "mission creep" and trespass into academic territory reserved for the more elite (Skolnik, 2001). Many worry that to go down the baccalaureate road will negate the community colleges' ability to serve the large number of students who depend on the community colleges for their only chance to pursue a postsecondary education.

Indeed, it can be argued that the origin of the community college baccalaureate is firmly rooted in the pursuit of success. The purpose of these baccalaureates is to better serve place bound students, to respond to local workforce needs, and to provide specialized training in applied and technical fields that have not been adequately addressed by the 4-year sector (American Association of State Colleges and Universities, 2004; Cook, 2000). Community college baccalaureate programs open up access both geographically and in occupational disciplines. Early programs were designed to build upon the Associate in Applied Science (AAS) degree and thus were clearly focused in the applied disciplines such as protective services or mortuary science (Floyd et al., 2004). I offer the example of Bismarck State College (an associate degree offering college in North Dakota) that began offering the applied bachelor's degrees (BAS) in January 2008. With approximately 100 students enrolled in the Bachelor of Applied Science Energy Management program, Bismarck is responding to a local (and national) occupational need that college officials determined was not being adequately addressed by the colleges in the state (J. Schultz, personal communication, October 30, 2008). Bismarck students tend to be "place-bound" and thus welcomed the opportunity for the degree offered in their geographic location in a disciplinary area with ties to local industries. This new program does not yet have data on success, but Bismarck is planning on measuring the success of the program by the number and quality of job offers received by their graduates.

While Bismarck provides an interesting case study of a single college with a focused applied baccalaureate, the state of Florida has been the model for more sweeping and statewide slates of community college baccalaureates. In 1999,

Florida opened the door for its community colleges to seek authority to award their own baccalaureates (Floyd et al., 2004). Two years later, the Florida legislature granted St. Petersburg College the authority to offer the first Bachelor of Arts degrees to address the workforce needs of the state (Florida Education Code 1004.73). Today, St. Petersburg College offers more than 20 bachelor's degrees including nine in education (teacher certification) and a bachelor of science in nursing (Townsend, Bragg, & Rudd, 2008). Thus as Florida has extended into teacher preparation and nursing; both degrees available at 4-year universities, they have expanded the definition of "niche programs" as well as offered degrees that are available via 4-year colleges and universities. Further, several of these community colleges are geographically close to 4-year colleges and universities that also offer similar degrees. Whether it be boon or breaker; the community college baccalaureate is sure to play a major role in the evolution of the community college and its place in the postsecondary tiers.

Programs and Interventions

The previous discussions place community colleges at an evolutionary crosswalk. Returning to the metaphor of social theories of immigration, community colleges may be perched on the brink of assimilation or of taking concerted steps toward respect and a purposeful co-existence with other postsecondary institutions. However, there is also the real threat of sinking even more deeply into an alienated underclass. In this section, I provide a non-exhaustive cataloging of current community college programs and interventions responsible for supporting students in their pursuit of success. Taken into context, these programs provide an extra support structure required by many of the students. The programs acknowledge the unique aspects of students more apt to enroll in the 2-year sector and compensate for their needs. These programs provide evidence of distinction and the rationale against assimilation. The programs and interventions should also be viewed as valiant efforts to increase the educational attainment of the country; hence deserving of respect and a rightful place among the postsecondary system.

My inquiry on community college programs and interventions provided numerous interesting varieties of programs; many unique to community colleges. In this section, however, I provide the major categories under which the majority of supports can be filed.

Student Success Courses at Community Colleges

In response to deficits of college knowledge capital and other barriers to success more often faced by community college students, many colleges have established student success courses (SSC) (Downing, 2007). While the concept of an elongated college orientation has been used by many community colleges for some time, many

of the included topics as well as a more standardized approach to the course provide a "new face" to a highly extended college orientation. SSCs are typically offered for non-transfer credit and are recommended and often required for students during the first semester of enrollment. The exact length of the course, the number of credits awarded, grading structure, and the way faculty are assigned vary by college. Many community colleges assign academic faculty (regardless of discipline) to teach while others may rely more heavily on academic advisors. Still others have devised a partnership between faculty and advisors that results in a team-teaching approach. Regardless of the instructor model, SCCs typically encourage collaboration with student affairs and administrative staff.

"According to the First Year Experience survey, the three most frequently mentioned goals of success courses were to increase ease of transition to the college environment, to develop academic skills, and to provide an orientation to campus resources and facilities" (Choate & Smith, 2003, pg. 180). Promoting soft as well as academic skills with a dose of college-to-life balance, SSCs often include instruction on time management skills, problem-solving, study skills, emotional and spiritual well-being, and note taking, all balanced with a large dose of career development. Responding in part to the extensive research on college involvement and success (Engberg & Mayhew, 2007), SSCs will often immerse students into college life by encouraging them to interact with other students, faculty, advisors, student affairs professionals, and administration (Derby & Smith, 2004). The courses may include introductions and guest lectures by various campus and community personnel and often even a greeting by the college president.

Evidence of the popularity of student success courses is provided by the number of major textbook publishers offering texts for these courses. Three of the more popular textbooks are *Your Guide to College Success: Strategies for Achieving Your Goals* (Santrock & Halonen, 2007); *The College Awareness Guide: What Students Need to Know to Succeed in College* (Rowe, 2006); *and On Course* (Downing, 2007). *On Course offers a full range of supports including a comprehensive website* (http://www.oncourseworkshop.com/), newsletters, and even a national conference for faculty, counselors, and others. Jenkins et al. (2006) reported that highly effective community colleges typically provided instruction in college success skills, especially for those students in developmental courses or who for other reasons could be classified as "at risk." Table 3 provides information on select community colleges and their offerings of student support courses as well as some pertinent information on emphasis and audience. Interestingly, while the goal of student success remains constant, there is variability in the curriculum.

The questions of impact, achievement, and success for students enrolled in SSC courses have not been completely answered. The literature on evaluation generally employs three criteria: student retention, student perseverance, and academic achievement. According to the extant research available, SSCs have been shown to have a positive effect on student retention (Derby & Smith, 2004), student persistence, (Derby & Smith, 2004; Community College Research Center, 2007; Florida Department of Education, 2006; Rasor, 1998; Stovall, 2000) and academic achievement (Florida Department of Education, 2006; Stovall, 2000; Stupka, 1993;

Table 3 Examples of community college success offerings

Community college	Course name	Course emphasis	Credit	Additional information
Austin (TX)	Transition to college success	• Attainment of educational goals • Identification of strengths and weaknesses • Time management and study skills • Familiarity with campus resources and facilities	0	4 week intensive course used diagnostically to determine the skill gaps
Miami-Dade (FL)	College survival seminar	• Familiarity with student services • Self-discovery	1	For new students only Required for ESL students and students with certain deficits.
Harry S. Truman (IL)	College success 101	• Study skills, time management skills, and academic planning • "other useful skills" • Taking responsibility for academic and career choices	3	Required for all first time, full time students or transfer students with a GPA less than 2.0
Des Moines Area (IA)	The college experience	• Introduction to college resources, services, and expectations	1	Not required but strongly encouraged for new entering students. Counted as an elective and good toward graduation
LaGuardia (NY)	New student seminar	• Study and test taking skills • College policies and academic requirements • Academic advisement and career exploration	0	Required for graduation
Los Angeles community college district (CA)	Introduction to college	• Study skills • Preparing papers and reports • Introduction to campus policies and facilities	3	Not required; but students are strongly encouraged to enroll. Credits count toward graduation
San Diego (CA)	College success and lifelong learning	• Skills for both college and life • Personal development and personal health skills • Decision making • Communication skills • Motivation and attitudes • Goal setting	3	Not required but counted as an elective. Recommended for all students on probation

Zeidenberg, Jenkins, & Calcagno, 2007). Moreover, two of the studies (Florida Department of Education, 2006; Stovall, 2000) implied an added advantage to students of color. Although the literature is sparse with respect to non-academic effects, one study reported a positive relationship between student success courses and higher democratic values (Engberg & Mayhew, 2007) and another reported that incorporating material on alcohol consumption and awareness into the course reduced alcohol abuse among students who took the course compared with students who did not (Mayhew, Caldwell, & Hourigan, 2008). Since several of the colleges in the *Achieving the Dream: Community Colleges Count Initiative*[4] have chosen student success courses as an active intervention, there are single-institution, non-published reports indicating, in some cases, very positive results.

Learning Communities

The concept of an academic learning community can be traced to the early twentieth century (Smith, 2001). While the first community college learning community was instituted by LaGuardia Community College in the late 1970s, it took another 20 years for the concept of linked courses with integrated pedagogical presentations by themes, issues, perspectives, or other criteria to be more generally embraced (Minkler, 2002). Community college learning communities encourage interaction that has been shown to be positive for student retention (Tinto, 1998). Further, students in learning communities are much more likely to form academic support groups and to extend their classroom learning outside of class (Matthews, 1996). Although many colleges are implementing learning communities there is great variation in implementation. Few follow the definitions as presented by Gablenick and colleagues (1990) incorporating collaborative learning, team learning and total restructure of classroom techniques that encourage and support student participation. Another drawback is their difficulty in scheduling and isolating the set of courses students are most likely to co-enroll in during a specific semester.

Structured Mentoring

There are various programs in community colleges that incorporate a structured, intense, and ongoing process of mentoring. While research on their effectiveness is sparse, generally the results are highly positive (Tierney & Hagedorn, 2002). For example, Pope (2002) discusses the positive outcomes of the AMIGOS (Arranged Mentor for Instructional Guidance and Organizational Support) program where a protégé and mentor are matched by personalities plus additional criteria. Laden (2000) discusses the Puente Project as a highly successful program of mentoring that is focused on Hispanic students. These are but two examples of other "boutique" types of programs that generally operate on grants or short-term funds. While the available evidence is very positive, the number of students served is alarmingly low

due to the intense structure and high costs associated with this type of assistance. Thus while structured mentoring appears to be highly successful, the intervention lacks the ability to be expanded to large numbers of students.

Concurrent Enrollment—District to Community College Sharing Agreements

Concurrent enrollment programs, also called dual enrollment or dual credit, provide high school students the opportunity to earn college credits often at no cost to the student (Waits, Setzer, & Lewis, 2005). Typically college level courses are taught at the high school by college-endorsed high school instructors using college level curriculum. Advocates of these programs cite savings in money, time, efficiency, and even retention and degree completion (in both high school and college) (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007). In a large study in Florida, students who took dual enrollment courses while enrolled in high schools had higher college grade point averages and more college credits 3 years after high school graduation than similar students who had not participated in dual enrollment (Karp et al., 2007). For some students, dual enrollment may smooth the transition from high school to college. Originally designed for high achieving students, many programs have expanded to include students at all levels. Like other programs, dual enrollment is not free of critics. Negative concerns include the possibility of high school students marring their college transcripts with low grades due to their immaturity or lack of readiness for college level work, and charges that the rigor in dual enrollment offerings is not equal to that of the regular college courses (Krueger, 2006).

In 2006, Florida House Bill 7087 (HB 7087, called the A++ bill;) required Florida school boards to include access to dual enrollment opportunities whenever possible. Valencia College responded by offering dual enrollment to any Florida high school junior or senior with a GPA of 3.0 or higher. Students must supply appropriate assessment scores from the ACT, SAT, or the college's placement test, be approved by their high school counselors, and have parent permission. Some courses are offered at the high school, but students may also take courses on Valencia's campus. Once approved for dual enrollment, students may take Valencia courses during regular school hours as well as during off-hours and/or the summer.

The New York State Board of Regents (2007–2008) has recently adopted a large multi-million dollar program to assist students who historically have not met with much success in high school. The program, entitled *Smart Scholars,* enables disadvantaged students to earn up to 30 college credits by high school graduation.

Every one of the 50 states has enacted some form of dual enrollment policies (Karp et al., 2007). Despite several examples of positive results, there is very little rigorous research that examines the effects of dual enrollment programs on students' college-related outcomes or the cost-effectiveness of these programs. More research with controls for student background characteristics is necessary to examine the true outcomes for students.

Intrusive Advising

Intrusive advising, defined by Glennan (1975), dictates that advisors do not wait for students to take the first steps of contact, but rather embraces a philosophy of colleges taking the initiative in making contact with students when signs of need emerge. Obviously the premise is to seek out students in need and provide the necessary support prior to a situation becoming dire (Backhus, 1989; Earl, 1988). Intrusive advising is especially important for students with college knowledge capital deficits who may not be aware of or how to use college resources effectively. Research involving community colleges identified as highly effective typically had policies that identified struggling students and directed them to the appropriate resources (Jenkins et al., 2006).

A popular proactive and intrusive advising tool is an early warning system. Specifically an early alert is designed to identify students in a stage of academic risk or disengagement. While the process may vary from college to college, the basic form is that of instructors informing struggling students and student-support agents that their difficulty has been noted as well as to direct students to avenues of assistance (Rudmann, 1992). Hudson Valley Community College (NY) recently implemented electronic procedures that allow faculty to generate a letter to students requesting that the student schedule an appointment with the instructor. The Academic Alert Notification System at Iowa Western Community College begins with faculty notifying the Student Success Offices of students in academic difficulty. Students receive a letter and are encouraged to speak to the faculty member and/or contact the Academic Support Center. Intrusive advising requires an ongoing relationship with students that works better when there is more than one contact by an academic advisor or other college personnel (Backhus, 1989).

Intrusive Financial Aid Advising

The principle of intrusive advising is especially urgent in the area of financial aid. Policies such as the College Cost Reduction and Access Act of 2007 (CCRAA, H.R. 2669), which reduces the interest rates of subsidized student loans by 50% over 4 years, reduces the reliance on discretionary income for repayment, and provides for loan forgiveness after 25 years, will only be effective if students are aware of the program and are actively applying. Of course, improvements to the federal loan program will not aid those students enrolled in non-participating institutions. With those caveats, some colleges have designed polices of intrusive financial aid counseling.

One example of intrusive financial aid counseling can be seen at Kingsborough Community College (NY) where an administrator indicated “from the minute students enter the doors they are asked whether or not they have filed a FAFSA, if they need help filling one out they are assisted” (S. Sierra, personal communication, October 17, 2008). Some colleges make use of posters or LCD screens around

campus encouraging students to file for financial aid. Des Moines Area Community Colleges (IA) boast that over 80% of students apply for financial aid due to their assistance and insistence while counseling students (B. Moses, personal communication, October 21, 2008). The key is to keep students informed of their eligibility while actively encouraging and assisting them to apply. Colleges with higher proportions of student aid applications generally begin the process in the high schools assisting students prior to arriving at the community college door.

Supplemental Instruction

Supplemental Instruction (SI) is a formalized program consisting of academic supports that typically target challenging and/or gateway courses. Having its origins at LaGuardia Community College, SI has been used in community colleges for over a decade (Zaritsky & Toce, 2006). SI typically consists of regularly scheduled instruction designed to enhance and reinforce classroom instruction rather than present new material. SI instruction is free of charge to students and facilitated by a SI leader; a student who has excelled in the subject matter in the past. The peer leader attends classes with the regularly enrolled students and is responsible for designing the supplemental materials while in communication with the instructor. Supplemental instruction differs from tutoring and is never considered remedial. While there is evidence that SI can dramatically increase a student's grades (Zaritsky & Toce, 2006; Zaritsky, 1994, 1998, 2001), there is also some evidence that it is no more effective than tutoring or other active interventions (Garcia, 2006) and that the numbers of students who take advantage of the service is relatively low (Berrett, 2008; Blat & Nunnally, 2004).

Monitoring Mandatory Placement and Course-Taking Patterns

Although placement tests are not new to community colleges, historically they have been used as advisory, rather than as compulsory tools for course placement (Alfred & Lum, 1988). More recently some colleges and districts have instituted mandatory placement policies for degree seeking students that establish minimum levels for placement into specific English, Mathematics, and other courses. For example, Texas has implemented the Texas Success Initiative (TSI) legislation that requires all college applicants to take an assessment test in reading, mathematics, and writing. While the specific remediation procedures followed are institutionally controlled, almost all of Texas' community colleges require students not meeting a passing grade to enroll in specific developmental courses. The Community College of Rhode Island has instituted similar policies.

Forced remediation is certainly not without controversy; the obvious assumption is that students will be more likely to succeed if they are properly placed and appropriately challenged. However, critics challenge the accuracy and content validity of

the tests and cite the low success rates of students placed in developmental courses as evidence that more research is needed (Grubb, Worthen, & Byrd, 1999; Marwick, 2002). The jury may be out, but the policy of mandatory placement in remedial courses is certainly a growing trend with the intention of increasing student success.

Related to placement is the importance of course sequencing. An example of course sequencing is the practice of encouraging or requiring students to take mathematics requirements early and consecutively as leaving time gaps between semesters of enrollments may invite memory and ability lapses that run counter to courses that are hierarchical (Bowdon, 2007; Shermis & Chang, 1997). The very scant level of research on the effect of taking courses in a specific sequence suggests that it may be beneficial for students, especially those requiring remedial/developmental coursework (Armstrong & Mellissinos, 1994).

Conclusions

More than a decade ago, Leslie Koltai wrote a chapter entitled "Community Colleges: Making Winners out of Ordinary People." The theme of the chapter was similar to the theme of this one; community colleges offer an avenue for success. Koltai (2003) praised community colleges for their role in "upgrading the employed and retraining the unemployed" (p. 102) before detailing his predictions of the dire challenges that will face community colleges in the 1990s and beyond. Although he lacked a crystal ball, his predictions appear to be quite accurate. He cited increased growth of underprepared students as well as budget cutbacks in the elementary and secondary environments. Additionally, Koltai lamented that community colleges have not received the state and federal funding that they deserve. Also noted was the need to re-examine the dual mission of community colleges in providing both transfer and career education. Koltai clearly expressed his concern that serious vocational students were shortchanged. Had he envisioned the applied workforce baccalaureates perhaps he would have seen them as an appropriate response.

While the community college baccalaureate will no doubt provide needed opportunities for some students and allow them to pursue success, if not handled cautiously the attempt to expand degree options could have negative effects on the community colleges' abilities to support the programs and activities designed for students needing special assistance. The future will determine if the new baccalaureates will widen the path for the pursuit of success or will provide opportunities selectively thus constricting the path for others.

Rather than losing their identities in an acculturation melt, or continue the current pattern of alienation and identity in a subclass, the more desired goal is a turn toward recognition of the role of community colleges and a respected co-existence with the 4-year sector. However, for community colleges to be able to sustain the pursuit of success, the evolution must proceed in ways that preserve the cultural values, mission, and programs that selectively provide opportunity and access to all seekers. Co-existence eliminates competition.

To establish the earned respect for their role in the postsecondary tiers, I offer several policy suggestions:

1. Increase involvement between 2- and 4-year institutions by way of state level meetings, faculty development, and other venues as appropriate. In the era of budget cuts, combining faculty development efforts for faculty employed in state institutions may make sense. Separate is usually not equal. Further, meeting colleagues at other institutions in the same or similar disciplines may have positive curricular effects for all.
2. Two and 4-year colleges may benefit from joint strategic planning—especially among colleges that share articulation agreements. Surprising in some states, university and community college presidents do not have regular meetings or co-consult in decision making. Bringing together the upper administration from both 2- and 4-year state colleges on a regular schedule to discuss current policies may help to bridge the two entities.
3. Shared Facilities. Brick and mortar are becoming increasingly expensive and desperately sought. While it may be that neither community colleges nor the 4-year has excess space to spare or share, but in some instances facilities may be used in a different pattern. For example, some universities may not utilize all of its classroom space in the late evening hours or over the weekend; times that are especially crucial for community colleges. In such cases, establishing a shared environment may be mutually beneficial for colleges within reasonable driving distances.
4. Sharing of technology. Among the two and 4-year sectors, distance education is growing at a very quick pace. Yet establishing and maintaining the technology structures can be very expensive. The supporting software alone can be in the vicinity of $25,000. Setting up a system that includes community and state colleges may be a possible venue for promoting cost efficiency.
5. Transfer policy redo. With increasing numbers of students electing to begin their postsecondary experience at a community college, it may serve universities well to have a process in place that allows them to better plan for transfers. A procedure that is gaining momentum is extending future acceptance to first year students by clearly stating that their acceptance is contingent upon the successful completion of a certain number of credits at a state community college. Universities may also consider allowing community college students within commuting distance to take a limited set of courses direct from the university while still enrolled at the community college. The understanding will be that these credits will apply to the baccalaureate as well as to the associate's degree. For others, universities may consider this type of dual enrollment to be offered via distance mode.
6. Transfer student scholarships. Since many students who begin their postsecondary journeys at a community college are in lower socioeconomic brackets, even small scholarships offered at the 4-year institution may prove helpful. Scholarships for transfer students may provide benefits beyond financial and provide evidence of welcome and acknowledgement.

7. Reverse transfer. When university students leave their institution and attend a community college, the act is typically viewed with a level of disgrace. For many students, this act is one of search for a better fit. The true numbers of students that reverse transfer is underestimated because many do not "transfer" their university credits to the community college (Hagedorn & Castro, 2000). Articulation agreements are almost exclusively written from the perspective of one-way travel. Hence calculating credits from the 4-year to apply to an associate's degree or certificate is like navigating in unchartered waters. In an era of increasing flow from the 4- to the 2- year institution, policies recognizing reverse credit flow may be helpful for students and for institutions.

Let me end this chapter in the same way I began it—with a reference to the *Declaration of Independence.* Whereas "all men may be created equal," the origins and students who attend America's diverse postsecondary institutions demonstrate that colleges exist in a hierarchical structure that is anything but equal. There are clear and purposeful differences of mission which all types of colleges must acknowledge. It appears that the American postsecondary sectors must practice a brand of multicultural response to differences—accepting without judgment. I propose a declaration for the postsecondary sector:

> We hold these truths to be self-evident: that while all students have not had the same level of academic opportunity, nor do all students enter their postsecondary institutions with the same level of academic ability, motivation, or acumen, all deserve the opportunity for access, choice, and the pursuit of success.

Notes

1. The Carnegie Classification System recognizes that many community colleges now confer bachelor's degrees in addition to the associate degree. Colleges are deemed Associate level if bachelor degrees constitute less than 10% of the total number of degrees conferred.
2. Workers with less than a high school degree earned on average $19,089 while workers with a high school diploma earned on average $26,712. Workers with an associate's degree or just some college courses earned on average $32,793 (U.S. Census Bureau, 2009).
3. The transfer center is a physical locations where students go to learn more about the transfer process. Typically transfer centers have a counselor or other professional on staff to assist students.
4. Achieving the Dream: Community Colleges Count is the largest and most comprehensive initiative involving community college students and success. Currently the initiative is in place in 22 states. It is funded by the Lumina Foundation for Education as well as several other foundations.

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Studying the Impact of Parental Involvement on College Student Development: A Review and Agenda for Research

Linda J. Sax and Katherine Lynk Wartman

Introduction

The involvement of parents in the lives of college students has become an area of significant interest to higher education practitioners and the mass media. Calling them "helicopter parents," a term originally used by Cline and Fay (1990) to describe an "ineffective parenting style" in their book *Parenting With Love and Logic: Teaching Children Responsibility*, both the media and college administrators regularly share stories of extreme parent behavior: contacting the college late at night to report a mouse discovered in a daughter's room, complaining about a roommate who snores, or expressing anger over a grade on a paper "my son worked so hard on" (Coburn, 2006, p. 9).

Parental involvement does include examples of such extreme parent behavior. However, it also reflects a more general trend of parents showing interest in the lives of their college-going offspring and in gaining more information about college (Wartman & Savage, 2008). Indeed, the parents of today's traditional-aged college students today maintain close ties with their children (Coburn, 2006; Howe & Strauss, 2003; Taub, 2008), which has also led to a high frequency of communication between parents and students. According to the 2007 National Survey of Student Engagement (NSSE), which posed questions about the parent-student relationship, seven out of ten students said that they communicated "very often" with at least one parent or guardian during the academic year (National Survey of Student Engagement, 2007).

In general, a number of contributing factors have led to the increase in parental involvement (Carney-Hall, 2008; Merriman, 2006; Wartman & Savage, 2008). First, there has been a generational shift where today's college students share a significant closeness with their parents that was not characteristic of the previous generation (Howe & Strauss, 2003). In addition, there have been changes in parenting style. For many parents, the 1990s (the childhood of today's college students) was a time

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where shuttling children from activity to activity was popular and the trend of managing overscheduled kids was dominant (Stearns, 2003, p. 9). Rising college costs have also led parents to become more involved, as parents are more frequently helping to finance the education of their children and bearing the burden of these increased costs (Johnstone, 2005). Finally, growth in the use of technology has also contributed to the phenomenon of parental involvement, providing students and parents with more ways to communicate with one another, whether by cell phone, e-mail, instant messaging, or text messaging.

The trend of parental involvement in higher education represents a cultural shift in the relationship among three respective parties: student, parent, and institution (Wartman & Savage, 2008). Just as the relationship between parents and their students in college has changed over time, so too have the relationships between student and institution and between parent and institution. The student-parent-institution dynamic has evolved from the doctrine of *in loco parentis*, with parents expecting the university to take care of their children, to this new situation where parents have a direct relationship with the university (Henning, 2007). According to Merriman (2006), who surveyed student affairs administrators at 127 doctoral research institutions, 93% of respondents said that there had been an increase in the number of interactions they had with parents in the previous 5 years.

The response from colleges to the phenomenon of parental involvement also demonstrates the shifting relationship between parents and institution, as institutional representatives attempt to "manage" parental involvement (Carney-Hall, 2008). At some colleges and universities, administrators actively resist parental involvement, even to the point of assigning, "parent bouncers" to prevent parents from accompanying students to course registration at orientation (Shellenbarger, 2005). Other institutions have assigned staff to respond to parent concerns and to provide services to parents, including parent orientation programs, parent communications such as newsletters and e-mails, and family-focused events (Savage, 2008; Ward-Roof, Heaton, & Coburn, 2008; Wartman & Savage, 2008).

What effects do the shifts in the parent-student-institution relationship have on student development? Student affairs administrators are concerned that parental involvement negatively impacts students' development (Savage, 2003; Taub, 2008). Many administrators adhere to the theory that students should have a balance of challenge and support in their college experience (Sanford, 1962, and therefore are concerned that parents are upsetting this balance and tipping the scales by providing too much support to students through intervening on their behalf (Taub, 2008). However, the significance of parental involvement has received very little attention in the scholarly literature on college student development. This chapter reviews what we know about the impact of parental involvement on college student development and proposes a research agenda that will advance our understanding of the implications of this phenomenon for college students, researchers, and higher education practitioners. We begin with a review of theoretical concepts used in the current research related to higher education and then highlight the methodology used in these studies, both quantitative and qualitative. Next we discuss findings

of the relevant empirical work. We will conclude with recommendations of how to approach study of this topic in the future.

Theoretical Approaches to Studying Parental Involvement

In general, theories about the relationship between students and parents do not focus on college students' development or on the broader college context. In addition, those theories that do account for college student development largely do not factor in the role of parents. Most student development theories were developed before the shift in the parent-student-institution relationship occurred and the doctrine of *in loco parenti*s was overturned; theorists did not view parents as playing a direct role in students' development at college (Taub, 2008). Further, the student development theories that do include parents focus primarily on the transition to college and students' process of "leaving home." As discussed below, there is a conflicting tension in the literature between the ideas of students' separating from parents and staying attached, and which is the healthier option. In addition, the ways in which autonomy and independence are constructed, and whether college students are children or adults, are important theoretical questions to consider when looking at the impact of parental involvement on college student development.

Separation-Individuation

Separation-individuation is most frequently described as a developmental process that begins with separation from parents in order to gain the ability to function autonomously (Mattanah, Brand, & Hancock, 2004; Rice, 1992). Traditionally, the prevailing theory about college student development was that acquiring autonomy and individuation were necessary developmental goals. According to this theory, students who understand themselves as individuals are better able to perform what is required of them as college students, such as waking up on time, attending classes, choosing courses, and navigating the social atmosphere at college (Mattanah et al., 2004). Erikson used this theory to describe the central task of adolescence (Erikson, 1968; Kenny & Donaldson, 1991). Chickering used this theory as the basis for his idea of autonomy development in *Education and Identity,* first written in 1969 and revised with Reisser in 1993. According to Chickering and Reisser (1993), a necessary developmental process for students is learning to function with emotional independence, or without the need for reassurance, affection, or approval from parents.

Attachment

Human development research has contributed to the largest body of literature on the student-parent relationship. Bowlby originally conceptualized attachment theory

in 1973 to explain the distress that infants and young children experience when separated from their parental caregivers (Schwartz & Buboltz, 2004). It is based on the idea that the infant's ability to explore the world is a direct result of having a parent as a "secure base" (Schwartz & Buboltz, 2004; Vivona, 2000). According to attachment theory, attachment is a bond that can promote autonomy, rather than signaling dependency (Ainsworth, Blehar, Walters, & Wally, 1978; Bowlby, 1988).

Attachment relationships exist across one's life span, not just in infancy (Ainsworth, 1989). When the framework of attachment is applied to the college context, it challenges the more traditional student development concept of separation-individuation. A number of human development theorists support the theory of attachment to more accurately describe the developmental relationship between parents and their college students. For example, according to Kenny (1987), secure attachment relationships offer support in times of stress, allowing students to explore their new environments with more confidence. Therefore, for college students, the process of leaving home can be described as a situation in which the availability of parents may support, rather than threaten, a student's development of competence and autonomy (Kenny, 1987). According to this theory, rather than needing a defined break from parents, students may benefit from regular parental contact and support. Further, some theorists believe that—given the supposed primacy of relationships for women (Gilligan, 1993)—the attachment perspective more adequately accounts for the experiences of female college students than does separation-individuation.

Combining Theories

Ultimately, it may be a combination of separation-individuation *and* attachment that leads to positive emotional adjustment. According to Schwartz and Buboltz (2004), although there appears to be a tension between the concepts of psychological separation and attachment they are not mutually exclusive; there is an equilibrium (Schwartz & Buboltz, 2004). Schultheiss and Blustein (1994) found that the combined effects of separation-individuation and attachment predicted college student development for women and college student adjustment for men (Schultheiss & Blustein, 1994).

In addition, Mattanah et al. (2004) proposed a model where a history of secure attachment leads students to feel more comfortable about the process of separation-individuation and therefore have more success adjusting to college. The authors found that the process of individuation was actually facilitated by the presence of secure attachment relationships with parents. For Josselson (1987), the definition of separation-individuation includes elements of attachment theory. According to Josselson (1987), the problem of separating from one's parents, "is the problem of not only becoming different but of becoming different and maintaining connection at the same time" (p. 171). Therefore, even though it is necessary for students to become distinct individuals from their parents, maintaining the connection to their parents is a central component of separation-individuation (Josselson, 1987).

These theories show that attachment does not need to be positioned in opposition to separation-individuation. Both attachment and separation-individuation may be working together to have combined effects on student adjustment to college.

Measuring Autonomy

In addition to the concepts of separation-individuation and attachment, another question that emerges in the study of college student-parent relationships is how to measure autonomy. Some theories have considered autonomy as different types of independence. For example, Hoffman (1984) discusses psychological separation as functional, emotional, conflictual, and attitudinal independence. Functional independence includes that ability to manage and direct one's practical and personal affairs without the assistance of a parent. Attitudinal independence is defined as having unique beliefs, values, and attitudes from one's parents. Emotional independence refers to a freedom for a need for emotional support, and conflictual independence is having a freedom from guilt or anxiety as these feelings relate to one's parents (Hoffman, 1984).

In addition, Chickering and Reisser (1993) describe their vector, Moving Through Autonomy to Interdependence, as having three components: emotional independence, instrumental independence, and the recognition of interdependence. Similar to Hoffman (1984), Chickering and Reisser's emotional independence refers to a freedom from a need for continuous approval from parents. Instrumental independence is the ability to solve problems on one's own- in a self-directed way. Finally, interdependence includes an awareness of one's role in the larger community (Chickering & Reisser, 1993).

Emerging Adults

The shifting parent-student-institution relationship also raises a fundamental philosophical question about whether college students are children or adults. Arnett (2000, 2006) suggests that college students occupy a unique category in between child and adult. He calls this period "emerging adulthood" and proposes a theory to describe the developmental period from the late teens through the twenties, with a specific focus on ages 18–25. According to Arnett (2000, 2006), "emerging adulthood" is neither adolescence nor young adulthood; it is theoretically and empirically distinct from both. Defined by a relative independence from social roles and normative expectations, the main features of this period are identity exploration, instability, being self-focused, and feeling "in between" (Arnett, 2000, 2006).

Social Capital

The theory of social capital is sometimes used to discuss the role of parental involvement in college access, and might be applicable to studying parental involvement

and the college student experience. According to Coleman (1988), social capital refers to the possession of valuable relationships that can assist students in gaining other kinds of tangible and symbolic resources, such as human capital or education. It may also help students to gain forms of cultural capital, or cultural signals of social and cultural selection processes (such as college admissions) (Bourdieu, 1984; Lamont & Lareau, 1988). Parents' social capital is usually generated from parents' relationship to their students as well as their relationship to other adults (Coleman, 1988). A key component of social capital in the education context is intergenerational closure, or the sharing of commonly-accepted norms and values. Social capital is primarily passed from parents to children, and parental involvement can build social capital (Coleman, 1988). However, students can also gain social capital from sources outside the family, such as school personnel (Coleman, 1988; Stanton-Salazar, 1997).

Perna and Titus (2005) conceptualized parental involvement as social capital in the context of enrollment in college. In their study, they considered the relationship between parental involvement, student social capital, and the chances that a student would enroll in a college or university (either 2 or 4 year) in the fall following their high school graduation. In their model, they constructed parental involvement as a form of social capital based on Coleman's (1988) model of relationships. Parental involvement was based on three primary relationships: parent-student involvement, parent-school involvement, and parent-to-parent involvement as well as any disruptions to this involvement (Perna & Titus, 2005). Perna and Titus found that these measures of parental involvement were related to students' enrollment in higher education immediately following high school graduation.

These existing theories provide several useful lenses for examining the impact of parental involvement, though no single theory emerges as the most appropriate theoretical perspective for considering the role of parents during college. With that in mind, we turn to a discussion of the place of parental involvement within models of college impact.

Models of College Impact

It is important to consider whether and how parental involvement fits (or could conceivably fit) in models of college impact. Existing models focus specifically on the "processes and origins of change" experienced by college students (Pascarella & Terenzini, 2005, p. 52), and consider the impact of a wide range of college experiences after accounting for the socializing influences of students' background and pre-college experiences. Parent-student interactions certainly qualify as a potential source of influence during college, however, as noted by Wintre and Yaffe (2000), "none of the previous models demarcate specific elements of the parent-child relationship, which may contribute to adaptation to the university" (p. 10). Below we review some of the most well-known college impact models (plus one newer model) to assess where parental involvement might be located within the model.

Astin's Input-Environment-Outcome (IEO) model (1968, 1993) provides a clear-cut approach to assessing the process of student change during college. It is probably the most general of the college impact models, in that it views college student outcomes as a function of environmental influences that are considered after controlling for a wide range of input (background) factors. While Astin's model does not explicitly account for the ongoing role of parents (except primarily as an "input" that shapes students' characteristics as they arrive at college), it does not preclude it either. The notion of "environment" is broad enough to account for parents as a potential source of influence.

Similarly, Pascarella's (1985) model of college impact does not directly account for the role of parents during college, though the influence of parents can be inferred. The model highlights the student and institutional factors that contribute to learning and cognitive development, including: student background/pre-college characteristics, structural/organizational characteristics of institutions, institutional environments, interactions with agents of socialization, and quality of student effort. The role of family is mentioned among background traits, though an ongoing parental role certainly qualifies for inclusion in Pascarella's category for "interactions with agents of socialization" (p. 50).

The role of parents is addressed more explicitly in Weidman's (1989) model of undergraduate socialization. The model represents a multi-stage process of development that accounts for the "joint socializing impacts" (p. 298) of student background characteristics, parental socialization, and non-college reference groups on students' experiences and ultimate socialization. Thus, Weidman specifically acknowledges the role of parents as an ongoing source of normative pressure influencing students' socialization during college.

Tinto's (1993) six-stage model of student departure also accommodates the influence of parents during the college years. His model considers the role of family as part of an "external community" that has an ongoing influence on students' departure decision during college. According to Tinto, strong relationships with members of the community before and during college can serve to facilitate adjustment and retention through their indirect effects on academic and social integration. Further, he acknowledges that student-family interactions can serve competing purposes, as they may both support and detract from students' institutional commitments.

More recently, Perna and Thomas (2008) specify "family context" as one of four layers of influence on college success. The other three layers are described as "internal context" (students' attitudes and behaviors), "school context" (which extends from primary school through college), and "social, economic and policy context." In their model, family is viewed as shaping student attitudes and behaviors, and ultimately student success in college. Though the model does not talk explicitly about the influence of parental involvement during college, it represents a notable contribution by emphasizing the ongoing role of families in shaping students' college outcomes.

Thus, to varying degrees, the models described above can be used to study the impact of parental involvement on college student development. One question,

however, is whether to consider parents as an exclusively "external" force, as suggested by several models. Today, with student-parent communication at an all-time high, and with parents increasingly interacting directly with the institution, one could argue that parents have become less of an external influence, and more integrated into the everyday lives of students and institutions. This will be an important consideration as newer models are developed to account for the role of parents during college.

Empirical Research on Parental Involvement and College Student Development

Thus far, we have described a range of theoretical perspectives—sometimes conflicting—on the role of parents in the lives of traditional-aged college students, and we have revealed the fairly tangential role that parental involvement plays in existing models of college impact. Now it is important to review what the empirical literature tells us about the role of parents in the college student experience. We begin with a discussion of the methodological approaches that have been used to study this topic, followed later by a summary of findings emanating from that body of work.

It is important to clarify the scope of the literature included in this review. First, we focus exclusively on research that examines the role played by parents *during college*. We acknowledge that several studies have focused on the pre-college years, such as those using the National Educational Longitudinal Survey (NELS) questions on parental involvement in the preparation for or transition to college (e.g., Ma, 2009; McCarron & Inkelas, 2006; Perna & Titus, 2005). However, as suggested by Arnett's (2000, 2006) concept of "emerging adulthood," an understanding of the role played by parents during the college years cannot rely solely on findings from research on early- and mid-adolescents.

Second, though we aimed to identify research on the impact of parental involvement as a set of behaviors (e.g., frequency and nature of parent-student contact in college), we have learned that much of the research focuses more on the *qualities* of the parent-student relationship (e.g., level of attachment, separation, autonomy, etc.). Some of these concepts are addressed via an assessment of parent behaviors, but often are measured in terms of students' perceptions about their relationship with their parents. Thus, our review adopts a somewhat loose definition of "parental involvement" in order to include the research—mostly out of the field of human development—on the quality of parent-student relationships in college.

Finally, because the majority of research on the interplay between parent-student relations and college student development has been quantitative in nature, the majority of studies included in our review are based on quantitative methods. Thus, our review includes approximately fifty articles that rely on quantitative methods, and about one dozen that use qualitative methods. Some articles use mixed methods, as discussed later.

Quantitative Research

This section reviews this body of work across the following categories: (a) populations studied; (b) measures of the parent-student relationship; (c) student outcome measures; and (d) methodological approaches.

Populations Studied

For the most part, research on this topic has relied on samples of traditional-age college students attending 4-year residential colleges and universities. The samples tend to be fairly small, usually ranging from 100 to 400 students. In about half of the quantitative studies we reviewed, the samples were comprised of first-year college students who were surveyed at orientation or large introductory courses such as Psychology or English. Studies focusing exclusively on first-year populations include those by Bartle-Haring, Brucker, and Hock (2002), Berman and Sperling (1990), Kenny (1987), Kenny and Donaldson (1991, 1992), Kenyon and Koerner (2009); Mallinckrodt (1988), Rice (1992); Samoulis, Layburn, and Schiaffino (2001), and Wintre and Yaffe (2000). In most of this research, students completed survey instruments at a single point in time, though in two studies—Bartle-Haring et al. (2002) and Berman and Sperling (1990)—students were surveyed a second time during their first year in college, and Rice (1992) followed-up his first-year sample in their junior year.

Some research on this topic has drawn samples from multiple cohorts of college students, comparing an aspect of parent-student relations across cohorts (Taub, 1997) or between upper- and lower-division students (Lapsley, Rice, & Fitzgerald, 1990). However, in many other studies where students varied by year in school, a comparison across cohorts is not central to the analysis (e.g., Cutrona, Cole, Colangelo, Assouline, & Russell, 1994; Flanagan, Schulenberg, & Fuligni, 1993; Hinderlie & Kenny, 2002; Ketterson & Blustein, 1997; Lapsley & Edgerton, 2002; Mattanah et al., 2004; Mounts, 2004; Rice, Cole, & Lapsley, 1990; Rice, Cunningham, & Young, 1997; Schultheiss & Blustein, 1994).

Finally, it was surprising that only two of the quantitative studies we reviewed included data collected directly from parents (Bartle-Haring et al., 2002; Kenyon & Koerner, 2009). In both of these studies, parents completed an instrument designed to measure aspects of parent-child separation. As we will discuss later, parents' perspectives and experiences are vital for research on the impact on parent-student relations on college student development.

Measures of the Parent-Student Relationship

How have parental involvement and other aspects of the parent-student relationship been examined in the quantitative literature? Our review suggests that there are two major categories of parent-student measures: (1) theoretically-derived scales drawn from established instruments in the field of psychology; and (2) measurements from

institutional or multi-institutional surveys in the field of higher education. A review of these major categories and specific survey instruments is below.

Established Measures

The majority of published research on the nature of college students' relationship with their parents relies on well-developed psychological scales for attachment, separation, or other aspects of the parent-child relationship. For the most part, these instruments were not designed exclusively for use on the college student population, but on adolescents and/or young adults in general. These instruments are summarized below in terms of their focus on attachment, separation, and other domains (e.g., social provisions, parental reciprocity, parental authority, and family structure).

Attachment. The two most widely used instruments to assess students' attachment to parents are the Parental Attachment Questionnaire (PAQ) and the Inventory of Parent and Peer Attachments (IPPA). The PAQ, developed by Kenny (1985), is a 55-item self-report instrument that measures how young adults perceive their relationship with their parents. Based on Ainsworth et al.'s (1978) notion of attachment, the PAQ is "designed to assess the following: perceived parental availability, understanding, acceptance, respect, and facilitation of autonomy; students' interest in interaction with parents and students' affect towards parents during visits; student help-seeking behavior in situations of stress; and students' satisfaction with help obtained from parents" (Kenny & Donaldson, 1991, p. 480). The PAQ includes three scales—Affective Quality of Attachment, Parental Fostering of Autonomy, and Parental Role in Providing Emotional Support—that have been used in several studies on college students (e.g., Hinderlie & Kenny, 2002; Kenny & Donaldson, 1991, 1992; Kenny & Perez, 1996; Taub, 1997).

The Inventory of Parent and Peer Attachments (IPPA), developed by Armsden and Greenberg (1987), is a self-report questionnaire that assesses students' perceptions of their relationship with parents as well as peers. The 28-item IPPA scale related to parents produces several factors representing aspects of the parent-student relationship: trust, understanding and respect, accessibility, responsivity, predictability, isolation, anxiety, and detachment. Like the PAQ, several studies on college students have used the IPPA, including: Ketterson and Blustein (1997), Lapsley et al. (1990), Mattanah et al. (2004), Schultheiss and Blustein (1994), Schwartz and Buboltz (2004), Sorokou and Weissbrod (2005), and Vivona (2000).

A lesser-used instrument in this body of research is the Continued Attachment Scale—Parent Version (CAS-Mother and CAS-Father), an instrument designed by Berman (1988) and revised by Berman, Heiss, and Sperling (1994) to reflect Bowlby's (1973) conceptualization of attachment and separation behaviors. The questionnaire elicits information such as how much the child thinks about, is reminded of, and misses his/her parents. The CAS was used by Samoulis et al. (2001) in a study of college student identity development.

Separation. We identified two established instruments used to assess the notion of "separation" between college students and their parents. The first is the Psychological Separation Inventory (PSI), a 138-item self-report questionnaire developed by Hoffman (1984) as a way to assess four different dimensions of students' independence from their parents: functional independence, emotional independence, conflictual independence, and attitudinal independence. Several studies have used the PSI to study the relationship between separation/independence and aspects of college student development, including: Kenny and Donaldson (1992), Kenyon and Koerner (2009), Lapsley and Edgerton (2002), Rice (1992), Rice et al. (1990), and Schultheiss and Blustein (1994).

Another survey used to assess separation is the Parents of Adolescents Separation Anxiety Scale (PASAS), a 35-item instrument that was developed by Hock, Eberly, Bartle-Haring, Ellwanger, and Widaman (2001) as a way to assess separation anxiety from the perspective of the *parent*. The instrument includes two subscales: Anxiety about Adolescent Distancing, and Comfort with Secure Base Role. Bartle-Haring et al. (2002) used the PASAS in their study of the impact of parental separation anxiety on identity development among their college-going children.

Additional measures of student-parent relationship. Several other instruments have been used to tap into specific dimensions of the student-parent relationship, though they do not focus exclusively on the concepts of attachment or separation described above. This section describes four that have been used in research on the impact of parents on college student development.

First is the Social Provisions Scale-Parent Version (SPS-P), which was developed by Cutrona (1989) to assess six provisions: "guidance (advice and information), reliable alliance (tangible assistance), attachment (caring), social integration (similarity of interests and concerns), reassurance of worth (positive evaluation of skills and abilities), and opportunity to provide nurturance (providing support to others)" (Cutrona et al., 1994, p. 371). The SPS-P was used by Cutrona et al. (1994) to examine how parental social support predicted college student GPA.

Second is the Perception of Parental Reciprocity Scale (POPRS), developed by Wintre, Yaffe, and Crowley (1995) to examine the reciprocal nature of the student-parent relationship (i.e., the degree of sharing and level of respect in student-parent interactions). Wintre and Yaffe (2000) used the POPRS to assess the impact of parent-student relations on students' adjustment to college and GPA.

Third is the Parental Authority Questionnaire, developed by Buri (1991). This instrument includes scales to assess three dominant parenting styles of mothers and fathers: authoritarian, authoritative, and permissive. It has been used on research on college students by Kenny and Donaldson (1992), Trice (2002), and Wintre and Yaffe (2000).

Finally, the Family Structure Survey (FSS) was used in research by Kenny and Donaldson (1991). The FSS was developed by Lopez, Campbell, and Watkins (1988) to "assess the presence of inappropriate family interactions and consists of four subscales measuring parent-child over-involvement, family fear of separation, parent-child role reversal, and parental marital conflict" (Kenny & Donaldson, 1991, p. 481).

Newer Measurements from the Field of Higher Education

The instruments described above emanate primarily from the field of psychology and reflect well-developed and theoretically-derived notions of parent-child relations. Our review of research findings, which follows in a later section, is based primarily on research that has used these instruments. However, at this point it is also important to acknowledge how parent-student relations in college are assessed via instruments developed out of the field of higher education. The inclusion of questions about parent-student relationships on these instruments does not appear to be a mechanism for testing theoretical conceptions of this relationship, but instead to gather useful information for higher education researchers and practitioners.

As interest in parental involvement in higher education has grown, questions on this phenomenon were added to two of the most well-known and widely-used surveys of college students: the Cooperative Institutional Research Program (CIRP) 2007 Freshman Survey and the 2007 National Survey of Student Engagement (NSSE). The CIRP addressed the issue of parental involvement fairly briefly, with a question asking entering college students how involved their parents (or legal guardians) were in the student's decision to attend college, the college application and college choice process, the student's dealings with college officials, and in decisions regarding course-taking and college activities. Such information on parental involvement was gathered from a very large sample (375,000 college students from over 500 colleges and universities) affording the opportunity to study parental involvement at both the national and institutional levels (Pryor, Hurtado, Sharkness, & Korn, 2007). However, given the timing of the CIRP survey (usually administered at first-year orientation or during the first week of classes), it is important to remember that the survey primarily elicits information on parental involvement just *prior* to college.

The NSSE instrument included a greater number of questions on parental involvement than did the CIRP, however the questions were administered only to a subset of 9,184 students at 24 institutions who completed NSSE online (Shoup, Gonyea, & Kuh, 2009). The NSSE instrument gathered the following information regarding parental involvement and parent-student interaction: frequency and method of contact (in-person or electronic), topic of discussion (academic/vocational, personal, social, financial and family matters), perceived quality of relationship with parents, parental involvement in students' college affairs, and likelihood of following parental advice. A noteworthy aspect of the NSSE questions is that they distinguish between the role played by mothers versus fathers.

Parental involvement also has been addressed by another multi-institutional survey: The University of California Undergraduate Experience Study (UCUES). The UCUES instrument is designed to collect information on the backgrounds and experiences of UC undergraduates, with the ultimate goal of creating a longitudinal database for institutional and scholarly research (Brint, Douglass, Flacks, Thomson, & Chatman, 2007). The 2006 UCUES included a set of questions related to parents in its "Student Development" module, which was completed by 10,760 undergraduates at nine campuses in the University of California system. Students were asked

to indicate the frequency and method of communication with parents (phone, text message, email or in person), aspects of parental involvement in students' academic decision-making, and students' attitude regarding their parents' level of involvement (Wolf, Sax, & Harper, 2009).

Parental involvement is the focus of another multi-institutional research study, currently in the field, sponsored by NASPA—Student Affairs Administrators in Higher Education. The study involves longitudinal surveys of students and parents at six institutions, with the goal of examining the impact of parental involvement on college student development (King, Watson, & Mullendore, 2009). Though findings have not yet been published, it is important to acknowledge the survey of parents as a new development in research on this topic. Specifically, the parent survey asks a wide range of questions about the parent-student relationship, including frequency of contact and communication, degree and nature of parental involvement, and perceived student response to parental involvement. In addition, the survey acknowledges the parent-institution relationship by including questions about the frequency and nature of parents' communication directly with the college, such as during a parent information session, family weekend, or online.

Also worthy of mention is the survey of parents conducted by College Parents of America, a membership organization that serves as a resource for parents of college students (College Parents of America, 2009). Though the survey is not intended for scholarly research, it is useful to point out the nature of the questions included on the instrument, including: frequency and method of contact, who initiates parent-student contact, nature of parent concerns, nature of advice requested by student, and parents' level of contact directly with the institution.

Finally, it is also important to acknowledge the existence of a range of parent surveys administered directly by individual institutions to parents of currently-enrolled students. Though too numerous to mention individually, such surveys serve as a way to collect information on areas of parental satisfaction or concern, to solicit parental interest in involvement or fundraising, and to assess parent services that have been implemented as a response to the perceived "helicopter parent" phenomenon.

Student Outcome Measures

Measures of parental involvement and parent-student relationships that emerge from the instruments described above are typically conceptualized in the literature as a set of independent variables that serve to shape or predict various aspects of college student development. At this point, it is useful to review the nature of outcome (or dependent) variables that have been addressed in research on the impact of parental involvement on college student development outcomes. Because research on parental involvement tends to be cross-sectional, studies often focus on the role of parents in predicting *levels* or *stages* on a particular aspect of development, rather than addressing student development longitudinally. This is especially true for research conducted out of the field of psychology. The following student outcome domains are most prevalent in this body of research: adjustment to college, identity

development, psychological well-being, educational outcomes, and other college behaviors. These outcomes are discussed below in terms of the survey instruments and specific measures that have been used to assess them.

Adjustment to College

Widely used in research on the impact of parent-student relationships is the Student Adaptation to College Questionnaire (SACQ) (Baker & Siryk, 1999). The SACQ is a 67-item scale that measures the variety of ways in which students must adapt to life in college. Items from the SACQ are used to create several factors reflecting various aspects of college adjustment: Academic (e.g., academic motivation, performance, and satisfaction), Social (e.g., involvement in campus social life, quality of relations with others), Personal-Emotional (e.g., physical and psychological well-being), and Goal Commitment (e.g., satisfaction with choice of college and commitment to degree completion). These factors have been used as outcomes in a several studies on the impact of parents on student adjustment to college (e.g., Kenny & Donaldson, 1992; Lapsley et al., 1990; Lapsley & Edgerton, 2002; Mattanah et al., 2004; Rice, 1992; Rice et al., 1990, 1997; Schultheiss & Blustein, 1994; Wintre & Yaffe, 2000).

Identity Development

Research on the impact of parents has also tapped into a variety of instruments designed to assess aspects of identity development. First is the Student Development Task and Lifestyle Inventory (STDLI) (Winston, 1990), an instrument which is based on the theoretical work of Chickering and Reisser (1993) and which measures students' level of success in Establishing and Clarifying Purpose (i.e., having a clear personal, educational, and vocational direction), Developing Mature Interpersonal Relationships (i.e., having high-quality relationships and a respect for difference), and Academic Autonomy (i.e., ability to manage emotional and academic affairs independently).

The STDLI was used in research by Schultheiss and Blustein (1994) to examine the impact of parental attachment on student identity development. An updated version of the instrument—the Student Development Task and Lifestyle Assessment (STDLA)—was developed by Winston, Miller, and Cooper (1999), and is currently being used in the NASPA study introduced earlier.

Research on the impact of parents has also examined student outcomes in line with Marcia's (1966) Theory of Ego-Identity Development, which describes a process by which individuals form identity through engaging in "exploration" (differentiating oneself from peers and searching for identity) and "commitment" (a sense of stability and comfort with one's chosen identity). Samoulis et al.'s (2001) research on attachment and Bartle-Haring et al.'s (2002) research on separation anxiety focus on outcome domains that are based in Marcia's theory.

Psychological Well-Being

Some research has focused on psychological well-being as an outcome of student-parent relations. Using instruments such as the Texas Social Behavior Inventory (TSBI; Helmreich, Stapp, & Ervin, 1974) and the Hopkins Symptom Checklist (HSCL; Derogatis, Lipman, Rickles, Uhlenhuth, & Covi, 1974), Kenny and Donaldson (1991, 1992) consider outcomes including social competence, self-esteem, and psychological functioning in areas such as interpersonal sensitivity, anxiety and depression.

Educational Outcomes and Other College Behaviors

Though numerous studies have examined how students' educational and career decision-making are predicted by parent characteristics such as income and occupation, only a limited number of quantitative studies have specifically focused on the impact of parental involvement on educational outcomes. Examples include studies that predict the impact of parent-student relations on grade-point average (Wintre & Yaffe, 2000), persistence in science (Ratelle, Larose, Guay, & Senecal, 2005), and the "gender traditionality" of students' career choice (Ketterson & Blustein, 1997). Additional outcomes examined in research on the impact of parental involvement and/or the parent-student relationship include college drug and alcohol behaviors as examined by Mounts (2004) and self-reports of assertion and dating competence addressed in Kenny's (1987) research.

Methodological Approaches

As discussed earlier, most research on this topic has been cross-sectional, not longitudinal, so it is difficult to consider parental involvement or parent-student relations as a *predictor* of student development. As a result, research in this area often has been limited to testing relationships among variables or between sets of variables. For example, a range of analysis of variance techniques (e.g., ANOVA, MANOVA, MANCOVA) have been used to compare some aspect of the student-parent relationship (e.g., attachment or separation) by student gender, year in school, residential status or other factor. Studies which have limited their analysis primarily to ANOVA techniques include: Bartle-Haring et al. (2002), Mounts (2004), and Rice (1992). Other research has used Canonical Correlation Analysis to assess the nature and degree of the association between two sets of variables, usually a parental relationship set and a student outcomes set (e.g., Kenny & Donaldson, 1991, 1992; Kenny & Perez, 1996; Ketterson & Blustein, 1997; Schultheiss & Blustein, 1994).

Multiple regression analysis is also used in a number of studies, though again the research is more helpful in understanding relationships among variables than establishing causal connections between parent variables and student development (e.g., Hinderlie & Kenny, 2002; Kenny, 1987; Laspley et al., 1990; Lapsley & Edgerton, 2002; Samoulis et al., 2001; Wintre & Yaffe, 2000). We found only one study that used regression analysis and a longitudinal pretest–posttest design to suggest

causality, in this case between parental separation anxiety and student identity development (Bartle-Haring et al., 2002).

A few studies have contributed an important dimension to this area of research by using structural equation modeling (SEM) to examine variables that may mediate the effect of parent-student relationship. Mattanah et al. (2004), for example, used SEM to examine whether separation-individuation mediates the impact of attachment on student adjustment to college. Similarly, Rice et al. (1997) examined whether the impact of parental attachment on emotional well-being was mediated by students' degree of social competence. As discussed later, the consideration of mediating variables is useful when aiming to determine the impact of parents on students' adjustment and development.

Another key consideration addressed in several studies is whether the impact of student-parent relationships is moderated (or conditioned) by certain student characteristics, such as gender or race. The presumption is that not all students will react in the same ways to the nature of their relationship with their parents. This is an important direction in research on parental involvement, and in fact, numerous studies provide evidence that the impact of parent-student relations differs by gender (Bartle-Haring et al., 2002; Kenny, 1987; Rice, 1992; Samoulis et al., 2001; Wintre & Yaffe, 2000). Though some have examined conditional effects of parent-student relations as a function of students' race (e.g., Mounts, 2004) and combination of race and gender (Rice et al., 1997), there is not enough research on the race-based conditional effects of college to draw firm conclusions. As will be addressed later in this chapter, assessing the conditional effects of parent-student relations based on race, gender, and socioeconomic class remains one of the most important directions for future research.

Qualitative Methodology

While most studies address parent-student relationships using quantitative approaches like those reviewed above, there are a few studies that address the parent-student relationship and its impact on college student development using qualitative methodologies. Many such studies address the role of parents in college choice and enrollment (e.g. Ceja, 2006; Rowan-Kenyon, Bell, & Perna, 2008; Smith, 2001), especially for students from families of lower socioeconomic status. In fact, the majority of qualitative studies we reviewed tended to focus on students from lower socioeconomic class backgrounds as well as students of color (e.g. Attinasi, 1989; Barnett, 2004; London, 1989; Sanchez, Reyes, & Singh, 2005; Torres, 2004; Wartman, 2009). Many studies also include student's relationship to parents as only one factor in the student's experience rather than the main focus of the study (e.g. Attinasi, 1989; Barnett, 2004; London, 1989; Sanchez et al., 2005; Terenzini et al., 1994). As with the quantitative studies, very few of the qualitative studies reviewed included the perspective of parents. However, four studies did capture parent perspectives. Kenyon and Koerner (2009) asked both students and parents to elaborate on survey responses through an open-ended question, and

the NASPA longitudinal study on the impact of parental involvement on college student development also includes open-ended responses on its parent survey (Merriman & Rissmeyer, 2009). In addition, studies by Karp, Holmstrom, and Gray (2004) and Wartman (2009) included interviews with parents.

Different types of methodologies were employed in the studies above, including grounded theory (see Karp et al., 2004; Sanchez et al., 2005; and Torres, 2004), phenomenology (see Wartman, 2009), and general descriptive content analysis (see Barnett, 2004; Kenyon & Koerner, 2009; Merriman & Rissmeyer, 2009). In terms of data collection techniques, in addition to open-ended questions, most researchers used in-depth interviews with students (see Attinasi, 1989; Barnett, 2004; London, 1989; Torres, 2004; Sanchez et al., 2005), parents (see Karp et al., 2004) or both (see Wartman, 2009). Sample sizes for the interview studies ranged from 6 to 83 students and from 7 to 30 parents. Terenzini et al. (1994) used focus groups of up to eight students.

In general, qualitative studies on this topic are limited in number, perhaps due to the value placed on quantitative research in the field of student affairs (Harper & Kuh, 2007). Yet, given the depth of information revealed by individual points of view through a qualitative approach (Denzin & Lincoln, 2005), it is clear that more qualitative studies are needed in order to gain a more nuanced understanding of this phenomenon.

What Does the Research Tell Us?

The studies reviewed above provide an overview of the current research related to the topic of parental involvement and student development. The next section of the chapter will summarize the findings from this empirical research, highlighting what we know and can learn from it. As we stated before, empirical studies of parental involvement and college student development can be placed into two major categories: developmental studies within the field of psychology and more recent institutional or multi-institutional surveys in the field of higher education. Some studies look at the parent-student relationship generally, some consider student identity factors (such as gender or race) as a variable in this relationship, and some include student identity factors as the central focus of the study's research questions. Studies that address student identity factors, like gender and race, as well as socioeconomic class, as the overall focus to the study or as one conclusion among many, are summarized separately in order to highlight the research that exists in these areas.

Results from Psychology

Most of the empirical studies we reviewed about student-parent relationships from the field of psychology focus on the concepts of attachment, separation, and autonomy. Major findings from these studies are organized by the following

student outcome domains, which were discussed earlier: adjustment to college, identity development, psychological well-being, and educational outcomes and college behaviors.

Adjustment to College

One major focus of the psychological research has been the effect of the parent-student relationship on the student's adjustment to college. A number of studies have found that having a positive attachment relationship with parents can assist students in transitioning to college (e.g. Lapsley et al., 1990; Mattanah et al., 2004; Rice, 1992; Wintre & Yaffe, 2000). For example, Lapsley et al. found that attachment to parents was related to adjustment to college, especially for upperclass students. However, Mattanah et al. (2004) found that it was not just secure attachment relationships to parents, but also healthy separation-individuation, that ultimately best predicted adjustment to college.

Schultheiss and Blustein (1994) found that attachment to parents, in addition to attitudinal dependence, or sharing the same beliefs, was associated with positive adjustment to college for women, but not for men. Therefore, for women, sharing an emotional connection to parents as well as beliefs and attitudes helps to facilitate the college adjustment process. In addition, Wintre and Yaffe (2000) found that it was a perception of reciprocity with parents, or a relationship where individuals perceive each other as relative equals, as well as the specific communication content of discussing college-related issues, which led to direct effects on university adjustment. The authors suggest that colleges should educate parents about university life in order to help facilitate these discussions and therefore improve the transition process (Wintre & Yaffe, 2000).

In a mixed methods study, Kenyon and Koerner (2009) looked at autonomy in the transition to college and specifically focused on both students' and parents' perceptions of autonomy. They showed that students and parents had different expectations for levels of autonomy, with parents more likely to hold higher expectations for their child's autonomy, both emotional and functional. In fact, college students reported that they thought they would be more emotionally dependent on parents than their parents reported they would be (Kenyon & Koerner, 2009).

Identity Development

Attachment to parents, particularly for first-year college students, has been positively linked to identity development (e.g. Bartle-Haring et al., 2002; Lapsley et al., 1990; Samuolis et al., 2001). Samuolis et al. (2001) found that a female's identity development was related to attachment to her parents. They did not draw the same conclusion for the males' identity development however, as identity was not significantly related to attachment of either parent. Samulois et al. (2001) concluded that thinking about parents and being in frequent touch with them may be healthy for identity development, particularly for female students. This is a departure from the idea that high levels of attachment and contact lead to emotional distress. Lapsley

et al. performed an additional study that measured effects of parental attachment on identity development and found that parental attachment predicted personal and social identity for men as well as women. According to Bartle-Haring et al. (2002), it was the connection to mothers in particular, and their provision of a secure base, that led both men and women to explore identity.

Psychological Well-Being

Kenny and Donaldson (1991) considered attachment to parents and family structure and how these were related to first-year students' social and psychological functioning. They found that women reported more psychological symptoms in the transition to college, while the results for men were not significant. In particular, family anxiety surrounding separation, along with parental marital conflict, were associated with these psychological symptoms. The women who described themselves as having positive attachment relationships to their parents reported higher levels of both social competence and psychological well-being (Kenny & Donaldson, 1991).

Educational Outcomes and Other College Behaviors

Studies on educational outcomes include a few that focus on the role of parents in student academic success and career choice. Cutrona et al. (1994) measured whether perceived social support from parents would influence academic performance in college during the first 2 years. They predicted that support from family would cause students to have low anxiety and the low anxiety would, in turn, determine academic self-efficacy, or the belief that one has the ability to perform in ways that will allow him or her to meet his or her goals. Academic self-efficacy would then be a predictor of the student's academic performance, which could be measured by his or her GPA (Cutrona et al., 1994). Their study did show a positive correlation between parent support and GPA, when controlling for ACT scores, family achievement orientation, and family conflict. Parental support predicted GPA across a heterogeneous sample group of varying majors and abilities (Cutrona et al., 1994). In their study of first-year students' adjustment to college, Wintre and Yaffe (2000) also considered students' academic achievement but found conflicting results to the Cutrona et al. study. In their analysis, parents did not play a direct role in predicting students' academic adaptation to college (Wintre & Yaffe, 2000).

In another study that focused on academic success as a student outcome, Ratelle et al. (2005) considered how parental support predicted students' persistence in science. They found that when students perceived parental involvement and support, they were more likely to perform well and to persist in a science program. Students' perceptions of parental autonomy led to feelings of autonomy and competence in their field (Ratelle et al., 2005).

Ketterson and Blustein (1997) researched parent-student relationships in the context of career exploration. Their study focused on students' overall level of exploratory activity, defined as exploration of one's personal values and interests as well as exploration of career environments. They also considered the gender traditionality of the students' career choices. Overall, they found that

age, attachment to mother, and attachment to father were associated with more self and environmental exploration; gender traditionality was not related to exploration.

As we mentioned in the previous section on quantitative research, there are two studies that examine the role of parents in additional student outcomes, besides those described above. For example, in a study of the role of parental involvement and college adjustment for Black and White first-year students, Mounts (2004) considered student levels of drug and alcohol abuse. She found that in general White students reported higher levels of binge drinking and drug use, but that parental support was not a predictor of these behaviors for either group of students. In addition, Kenny (1987) considered how parental attachment related to reports of assertion and dating competence, and found that close parental relationships related to higher self-reports of assertion among college women.

Results Focused on Gender, Race, and Socioeconomic Class

In this section we will address the research that exists on the student-parent relationship and differences by student gender, race, and socioeconomic status. These are areas that we believe need attention in future research.

Gender

Some studies have found that female students are more attached to their parents than male students. For example, according to Sorokou and Weissbrod (2005), who measured need and non-need based contact patterns (such as telephoning, e-mailing, visiting, etc.) between adolescents and their parents in the first year of college, male and female students in their study had different contact patterns with their parents. This suggests that men and women in college may show attachment in different ways. Females tended to perceive a higher quality attachment to their mother, while males and females did not differ in their attachment to their father. In addition, Kenny and Donaldson (1991) studied a sample of first-year college students and found that, in general, women considered themselves to be more attached to their parents compared to men. Although they did not specifically measure attachment relationships, Valery, O'Connor, and Jennings (1997) found that female students were more likely to both request and receive emotional support from both their mothers and fathers.

Other studies conclude that gender is not a factor in parent-student attachment relationships. For example, Lapsley et al. (1990) did not find a gender difference in attachment to parents. In addition, Mattanah et al. (2004) suggest that having a history of secure attachment would mediate the effects of separation-individuation and lead to successful college adjustment. The authors found that secure attachment was associated with college adjustment for both men and women, which challenges the idea that men and women may approach these relationships differently (Mattanah et al., 2004).

Research supports the idea that women who have stronger attachment relationships to their parents are more likely to successfully adapt to the college environment. In addition, women who reported higher levels of attachment also reported higher levels of both social competence and psychological well-being (Kenny & Donaldson, 1991). In Rice, Cunningham, and Young's (1997) study of attachment to parents in Black and White college students, women's attachment to both mother and father predicted social competence (attachment to mother alone was not a significant predictor). For the men in the sample, attachment to father was a more important predictor of social competence than attachment to mother.

For women, positive adjustment has also been associated with a high degree of attitudinal dependence; women are more likely to report that they have similar beliefs and values to their parents. Schultheiss and Blustein (1994) note that separation-individuation may actually best be obtained through the context of adolescent parent-connectedness. In their study, Schultheiss and Blustein (1994) tested whether attitudinal independence and parental attachment were positively associated with college student adjustment and development. They found that it was for women but not for men. These results suggest that women have strong attachment relationships to their parents as well as share similar beliefs are more likely to develop autonomy.

In terms of gender and identity formation, Samuolis et al. (2001) studied identity development of both males and female first-year students. Results showed that for women, attachment to mother and to father were both associated with positive identity development, but not for men. This led the authors to conclude that for the women, attachment led to identity development. In addition, Taub (1997) examined autonomy and parental attachment in traditional-age undergraduate women. Results included an observation that students showed increasing levels of autonomy with each class year (seniors were found to be significantly more autonomous than both first-year students, as well as juniors). At the same time, however, Taub (1997) found that parental attachment did not decrease significantly with the increase in autonomy; students could maintain contact with their families and still gain autonomy while maintaining contact with their families. These findings support the idea that undergraduate women may actually become more autonomous without experiencing a break in parental attachment (Taub, 1997).

Race

There is a relative lack of literature on the topic of the role of race in parent-college student relationships. Theorists themselves acknowledge the absence of this topic in the research. For example, according to Mattanah et al. (2004), more attention is needed to examine attachment and separation-individuation across different racial and ethnic groups, especially because there is an emphasis on collectivism and interdependence in certain cultures such as Asian, African, and Latino. For the most part, the topic of race and parent-student relationships is primarily considered in literature when it is combined with other factors, such as parent education level, socioeconomic status, and gender. Studies on race and parental involvement are both quantitative and qualitative.

There is some limited quantitative research looking at race and attachment relationships. For example, Hinderlie and Kenny (2002) studied attachment, social support, and college adjustment among Black students at predominantly White universities. The authors acknowledged that Black students value close family connections, but wanted to find out if family culture would negatively affect adjustment to college. Their goal was to explain more about the relationship between these students and their parents. Results showed that parental attachment was positively associated with all aspects of college adjustment for these students. Kenny and Perez (1996) considered family attachment and the degree to which it is related to psychological well-being at the time of college entry for a sample that included African American, Latino, and Asian American students. They found that students with perceptions of a positive family attachment figure who encouraged their independence were in a better position to adjust to college.

In addition, Rice et al. (1997) and Mounts (2004) compared parental attachment between Black and White college students. Neither found significant differences in attachment to parents between these two populations. In Taub's (1997) study of women's identity development, whether parental attachment varied by race and ethnicity was a secondary research question. Taub (1997) found that in particular, Latinas had significantly higher scores than Asian women in the area of the parents providing emotional support. Taub (1997) suggests that these findings reflect cultural differences in the relationships between these parents and their daughters in college.

Mallinckrodt (1988) studied the experience of Black students. Specifically, the study looked at the relationship between persistence and perceptions of social support from members of the campus community as well as family members. He found that perceived encouragement from family members correlated to persistence for White students, but not for Black students. Relationships with members of the campus community were most strongly associated with persistence.

In terms of qualitative research about race and the parent-student relationship, Sanchez et al. (2005) looked at the role of significant relationships in the academic experiences of Mexican American college students. The students reported that their parents provided different types of support: cognitive guidance, emotional support, informational and experiential support, modeling, and tangible support (Sanchez et al., 2005). These types of support are not that different from attachment. The combination of the love from parents in combination with practical support from educational sources, especially in the area of scholarships and financial aid made the students successful.

Barnett (2004) looked at the ways in which family support contributed to adjustment to college, persistence, and graduation for Black students at an Ivy League university. Barnett (2004) found that family support and interaction with family members led to social adjustment. These results conflicted with those of Mallinckrodt (1988). According to Barnett (2004), Black parents not only encouraged their students to attend college, but they also prepared them for a "racist environment that depreciates African-American values, culture, and people" (Barnett, 2004, p. 54). Parents provided emotional support to their students and

were able to communicate how to navigate the stresses these students encountered at a predominantly White university (Barnett, 2004).

Adjustment to college and identity formation are also primary themes in these studies. In the adjustment to college, students' development of independence and their own identity formation are influenced by their relationships with parents. Torres (2004) studied the familial influences through a longitudinal study of the identity development of Latino first-year students. She found that the primary conveyors of cultural heritage for students were family members, and students' development of ethnic identity was ultimately determined by the degree to which parents were acculturated, or the way in which they combined Latino and Anglo cultures (Torres, 2004).

Socioeconomic Class

There are a number of studies that address the role of parents and socioeconomic class. However, the majority of these address the issue of parents' role in college access. In terms of the relationship between socioeconomic class, parental involvement and student development, the most closely related studies address parental education level and consider first-generation students' perspective of parents' role in their transition to college. What role do their parents play in the college adjustment process, according to these students? The studies on this topic are primarily qualitative.

Attinasi (1989) conducted an exploratory study of first-generation Mexican- to persist or not persist in higher education. He found that oral communication of expectations was extremely important to students. Parents communicated to their students the idea that they were "college-goers" (Attinasi, 1989, p. 270). In addition, a student's willingness to "stick it out" once in college was a result of parents socializing him or her for college (Attinasi, 1989, p. 270).

Some students reported experiencing anxiety over a changing relationship with parents and other family members. For example, students in Terenzini et al.'s (1994) focus groups for a study on the transition to college, particularly those first-generation students from Black, Hispanic, or Native American families reported that as parents (or other parental figures such as grandparents) realized that their children might never metaphorically, "return home," they tried to maintain a consistent relationship. (Terenzini et al., 1994, p. 66).

According to London (1989), one of the biggest challenges for first-generation students is reconciling the tension that emerges between requirements of family membership and upward mobility. For many first-generation students, even though they may experience a personal growth from their college experience, they may also feel a loss in their relationship to their family. Some parents give students conflicting messages: to both stay at home and to achieve in the larger world, which can cause an internal struggle for this student population. In his qualitative study, students speak of this push-pull. Student find they have to renegotiate relationships with their families, as well as with themselves (London, 1992, p. 6). These students talk about existing on the "margins of two cultures" (London, 1992, p. 7).

Wartman (2009) looked at parental involvement for low-income and working class students during the first semester of college, suggesting that the "helicopter parent" image portrayed by the media is socioeconomic-class based. The qualitative phenomenological study of parents and students at 4-year colleges, who had attended an alternative high school where parental involvement was supported and encouraged, focused on aspects of the student-parent, as well as student-parent-institution, relationship. Results showed that these students' parents, who had not attended 4-year colleges, did not have any direct connection to their students' colleges and universities. Instead, students served as intermediaries in the relationship between parent and institution. In terms of the parent-student relationship, the study found that the parents had positive, emotionally supportive relationships with their students. Students were autonomous and functionally independent, but emotionally interdependent with parents (Wartman, 2009).

Although most research that examines the parent-student relationship and socioeconomic class has focused on experience of students from lower socioeconomic class groups, some research does focus on the experience of upper middle class parents, especially as it relates to the concept of "leaving home." If a student's parents attended college, the experience is significantly different than that of first-generation students. Karp et al. (2004) observed that the parents in their study expressed many worries about their students' transition to college. However, these fears were different than those expressed by parents of first-generation college students. In particular, a central concern of parents was whether their children had made the right college choice. Parents seemed to have the idea that the "fit" at some colleges on their students' lists of potential choices might be better than at others (Karp et al., 2004, p. 367). According to the researchers' analysis, these parental worries were often rooted in parents' own experiences of leaving home to attend college.

Recent Research Efforts in Higher Education

The results of the studies just reviewed come from the field of psychology and focus primarily on measuring students' attachment, separation, and autonomy. As we mentioned, within the field of higher education there have been some recent attempts to measure and quantify parental involvement, primarily for researchers and practitioners. These studies include the 2007 Cooperative Institutional Research Program (CIRP), the 2007 National Survey of Student Engagement, the 2006 University of California Undergraduate Experience Study (UCUES) (discussed in Wolf et al., 2009), and the NASPA longitudinal study on the impact of parental involvement on college student development (King, Watson, & Mullendore, 2009), which although not yet completed, has released some preliminary findings.

The Cooperative Institutional Research Program (CIRP)

According to results from the 2007 CIRP survey of first-year undergraduates, students are, for the most part, comfortable with the roles their parents currently play

in their lives. A majority of first-year students considered their parents' participation in their college careers to be the "right amount." Eighty-four percent said their parents were involved the "right amount" in their decision to go to college, 80.5% in their decision to attend the institution they chose, and 77.5% in communicating directly with college officials. At the same time, almost one quarter reported that their parents displayed "too little" involvement in helping them choose their college courses and 22.5% wished their parents were more involved in helping them choose college activities. Students of color were more likely than White students to indicate that their parents were not involved enough in "dealing with college officials," "choosing college courses," and "choosing college activities." Latino students in particular were most likely to report "too little" parental involvement in these three areas. First-generation students were also more likely to report "too little" parental involvement than their peers whose parents attended college (Pryor et al., 2007).

The National Survey of Student Engagement (NSSE)

The 2007 NSSE revealed trends in parent-student interaction. In terms of parent-student communication, seven out of ten students said that they communicated "very often" with at least one parent or guardian during the academic year. It was more popular to communicate using electronic media than face-to-face. Students reported different conversation topics with mothers than with fathers, being more likely to talk to their mother about personal issues, academic performance, and family matters. Academic performance was the most common discussion topic with fathers. In general, students also reported following their parents' advice. About 75% of students said that they frequently followed the advice of a parent or guardian.

The results also revealed information about parent-institution interaction and its effects. Thirteen percent of first-year students had parents who frequently contacted college officials to intervene on their behalf. About 25% had parents who sometimes did so. In addition, according to the results of the 2007 NSSE, the parent-student relationship can have an effect on student engagement and the student-institution relationship. Students who frequently talked with their parents and whose parents contacted the college on their behalf were more likely to participate in college activities and were more satisfied with their college experience overall. However, this group of students with highly involved parents also reported significantly lower grades (National Survey of Student Engagement, 2007).

The University of California Undergraduate Experience Study (UCUES)

The UCUES measured general parental contact as well as parental engagement in college students' academics. In terms of parent-student contact, the telephone was the most popular form of communication with about 25% of students speaking with their parents by phone every day. About 30% said they spoke to their parents

by phone a few times per week. Over half of the students talked to their parents frequently: a few times per week or more. In terms of parental involvement in academics, the majority of students agreed or strongly agreed that parents showed a high level of interest in students' academics but played less of a role when it came to academic decision making such as choosing courses or an academic major (Wolf et al., 2009).

Wolf et al.'s (2009) analysis revealed how these parental involvement factors differed by student year in school, gender, socioeconomic class status, parental immigrant status, and race/ethnicity. In terms of students' year in school, there was a declining involvement over time; seniors had less frequent contact and less academic involvement from parents than first-year students did. Regarding gender, women noted slightly more contact with parents about academics and had higher levels of contact overall. In addition, concerning socioeconomic status, students from higher socioeconomic status groups reported more parental involvement and higher levels of engagement with parents than did students from lower socioeconomic status groups did. Students whose parents were not born in the U.S. had below average involvement from parents in terms of academic subjects but higher than average ratings for general contact with parents.

The study found some significant differences when it came to parental involvement and race/ethnicity. In particular, "above-average levels of contact between Mexican American, Latino/Other Spanish, Japanese/Japanese American, and American Indian/Alaska Native students were paired with below-average ratings of parental involvement in their academics" (Wolf et al., 2009, p. 22). In general, the conclusions from this study point to the idea that parental involvement is not the same among different populations of students.

NASPA Longitudinal Study

The NASPA longitudinal study on the impact of parental involvement on college student development (King, Watson, & Mullendore, 2009) is not complete, yet the study team has released some preliminary findings. Descriptive results from a survey of parents of first-year reveal some broad trends. In terms of the parent perspective on their involvement, 88% of parents reported that they were either "somewhat involved" or "very involved" during the first semester of their students' experience at college and for 71% of these parents, this level of involvement was the same or greater than it had been in high school (King et al., 2009).

The NASPA study also asked specific questions about parent-institution interaction. Only 18.9% of all of the parent participants said that they had contacted their child's institution. Of the parents that had contacted the institution, they, for the most part, had only done so one (52%) or two times (25%) between the beginning of the school year and November. Seventy percent of the parents who had contacted the institution reported that it was their students who had asked the parent to intervene on his or her behalf (King et al., 2009).

Summary of the Literature

Overall, from the studies reviewed in this section, we learn of the prevalence of student-parent interactions, and that strong parent-student relationships can lead to positive outcomes for students such as adjustment to college, identity development, and career exploration. We also learn that these relationships can vary for different student populations. While this information does help us to better understand the parent-student relationship, there are still considerable gaps in the literature. We will discuss the limitations of these studies as well as our suggestions for how to close these gaps in the next section.

Setting a Research Agenda

Our review of previous research reveals the fairly nascent state of scholarship on the topic of parental involvement and college student development. To be sure, there are *elements* of prior research that are useful as we consider an agenda for future study, such as: the existence of established scales for aspects of the parent-student relationship, the exploration of factors that mediate the effects of parental involvement, and the consideration of differences by race and gender. However, existing work does not address our central question: What is the impact of various forms of parental involvement on student development over the course of college? Instead, the existing literature is limited in several major ways.

First, it often lacks an educational perspective. As noted earlier, much of the work on parental involvement and college student development is designed to advance theoretical perspectives on human development. While prior studies include college students in their samples, the focus is not on students' experience in the *college context*. At the same time, research on the impact of college conducted within the field of higher education typically does not account for the influence of parental involvement during college. Instead, parents are usually conceptualized as a source of influence on students' experiences and dispositions *before* arriving at college, and may be represented by measures of parental education, income or occupation.

Second, existing research tends to apply theoretical approaches that view college students as adolescents, not as "emerging adults." As suggested by Arnett (2000, 2006), college students should have their own unique developmental category because they are neither children nor adults, but rather somewhere in between. Research also needs to consider appropriate developmental goals that are congruent with this stage, as current developmental goals (which are often used as outcomes on instruments measuring the parent-student relationship) may not fit with college students' unique stage of development.

Third, most research views attachment and separation as competing concepts. This is perhaps complicated by the fact that, within the field of higher education, separation-individuation remains the most popular student development theory

within this context, while attachment theory has largely been used in the field of psychology (Wartman & Savage, 2008). Research ought to consider the *complementary* role of attachment and separation-individuation, as maintaining close ties with parents and having warm, supportive relationships can provide emerging adults with the security to ultimately develop independence and autonomy (Kenny & Rice, 1995).

Specific Recommendations

These gaps in the literature present significant opportunities to shape a research agenda on parental involvement that adopts an educational perspective, views college students from a post-adolescent framework, and considers both autonomy *and* attachment as markers of healthy student development. Below we propose major questions and methodological approaches that ought to be considered in order to advance this research in a way that contributes to both scholarship and practice in higher education.

Major Questions

Given how little we know about this topic from the perspective of higher education, the possibilities for future research are endless. However, we propose three key questions, and related sub-questions, that we believe are the most critical first steps in advancing research on this topic: (1) What is the nature of parental involvement in higher education? (2) What are the effects of parental involvement on college student development? (3) What does this phenomenon look like for different populations? Each of these questions is elaborated below.

The Nature of Parental Involvement

The very first step is to assess the nature and extent of parental involvement in the lives of college students. Questions that should be addressed include:

- What are the various forms of *parent-student* interaction and communication during the college years?
  - What are the frequency and duration of these interactions?
  - What is the mode of interaction (in-person, telephone, e-mail, regular mail, text-message, online social network, etc.)?
  - What are the primary reasons for the interaction (to seek/provide advice on academic or social matters, to discuss family matters, etc.)?
  - Who initiates the communication—the student or parent?
  - What are students' and parents' perceptions of their interactions with one another?
  - How does the quality of the parent-student relationship correspond to the nature and frequency of interactions during college?
  - How does the nature and quality of the interaction change over the course of college?

- What are the various forms of *parent-institution* interaction and communication during the student's time in college?
  - With whom does the parent communicate (professors, administrators, residential life, etc.)?
  - What is the frequency of parent-institution interactions?
  - What is the mode of interaction (in-person, telephone, e-mail, etc.)?
  - What is the purpose of the interaction (to inquire about the student's well-being, to advocate on behalf of the student, to seek information or advice, etc.)?
  - Who initiates the communication—the parent or institution?
  - How does the nature of the interaction change during the years that the student is in college?
  - To what extent do students negotiate the parent-institution interaction?

Effects of Parental Involvement

After identifying the various forms and purposes of parent-student and parent-institution interaction during college, the next question adopts a longitudinal perspective and asks what impact these interactions have on student development. Specifically:

- What impact does parental involvement have on college student adjustment and development across a broad range of outcomes, especially: academic and social adjustment to college, identity development, sense of autonomy, psychological well-being, academic performance, degree attainment, career orientation, and post-college outcomes?
- How does the impact of parents compare to that of other sources of influence, such as peers, faculty, and staff?
- Are the effects of parental involvement direct or do they operate indirectly through mediating variables such as academic or social integration?
- Does the concept of "emerging adulthood," and the idea that college students are not necessarily adolescents, help us to better understand the impact of parents on students in college?

Differences Across Student Populations

For each of the questions listed above, there must also be a consideration of differences in parent-student and parent-institution interactions across different student populations. As discussed earlier, both the nature and consequences of parental involvement may depend on a range of student characteristics, including: race, class, gender, age, year in school, place of residence, and type of institution attended. Awareness of differences across these subgroups is critical to providing appropriate services to diverse populations of parents and students.

Research must also be sensitive to the diversity of family configurations, where siblings, grandparents, aunts, uncles, or other individuals may function in

a parental role. This may be especially important when studying diverse populations, as Kenny and Perez (1996) found that, among a sample consisting of African American, Latino, and Asian American students, more than a quarter turned to "other family members" (i.e., not the mother or father) as their primary source of support.

Methodological Recommendations

To address the questions raised above, we offer several methodological recommendations for future research. With some exceptions, these recommendations apply to both quantitative and qualitative methodologies. In fact, we encourage researchers to adopt a mixed-methods approach when studying this topic, as qualitative methods will be especially important in providing depth of information regarding the nature of the phenomenon, while quantitative methods will be useful in generating evidence on the frequency of parental involvement and identifying key relationships among variables. Kenyon and Koerner (2009) provide an excellent example of a mixed-methods study on the parental role in students' transition to college.

Recommendations for future research are presented below as they correspond to the three major research questions outlined above:

The Nature of Parental Involvement

- Develop new questionnaires and interview protocols that account for the range of parental involvement behaviors. In the field of higher education, large-scale surveys like CIRP, NSSE, and UCUES have attempted to shed light on this topic, though space limitations have prevented these instruments from going into greater depth on the nature of this phenomenon. The parent survey used in the longitudinal study on parental involvement currently being conducted by NASPA (King et al., 2009) is an important step in that direction by accounting for the frequency and nature of parental involvement with the student *and* with the institution.
- Take advantage of existing instruments designed to measure aspects of parent-student relationships, such as the PAQ, IPPA, PSI, and other instruments described earlier. Scales derived from these instruments have already shown good psychometric properties and have identified several factors that can be useful in assessing the *quality* of the parent-student relationship.
- Ask questions that distinguish between the role of mothers and fathers, and allow for the role of extended family members who might serve in a parental role.
- Collect data at multiple time points to account for the potentially changing nature of parent-student and parent-institution relations during college. Consider collecting data at key transition points, such as: pre-application, choice/decision, transition to college, end of each year, the transition out of college, and even in the years after college.

Effects of Parental Involvement

- Utilize models of college impact when conducting longitudinal research on the effects of parental involvement. Because these models account for both the range of student background (pre-college) characteristics, as well as the broader college context, researchers will be better-positioned to distinguish the effects of parental involvement from the role played by confounding influences.
- Consider whether there are certain variables that mediate the role of parental involvement. For example, if discussions with parents regarding academic matters predict higher grades, we would want to know the mechanism behind this. Perhaps parents provide students with advice on specific strategies shown to improve grades (e.g., effective study habits, meeting with faculty). Alternatively, discussions with parents might increase students' interest in course content, which would then contribute to improved performance. In these cases, the effect of parental involvement would be considered "indirect."

Differences Across Student Populations

- Collect data from large and diverse samples of college students to enable comparisons across various groups as defined by race, class, gender, age, etc.
- Ensure that data collection accounts for the experiences of part-time and commuter students, not just full-time residential populations.
- Collect data from a variety of institutional types, including community colleges, where there is practically no research on the role of parental involvement.
- When developing factors that measure aspects of parental involvement, test the reliability of the factor structures for different student populations.
- When studying the impact of parental involvement, adopt a variety of data collection techniques and use analytical approaches that account for differences in impact across different student populations.

Conclusion

As parents have become increasingly involved in the lives of their college-going students, it is important to develop an understanding of the consequences of that involvement for students. This chapter has reviewed the current state of knowledge on the phenomenon of parental involvement, with special attention paid to the theoretical and methodological approaches that have been used. We have concluded that, despite the existence of a large number of studies on the quality of relationships between college students and their parents, the extant research does not sufficiently address our central question of how parental involvement impacts student development.

We are encouraged by the fact that these questions are gaining attention in the higher education community, as evidenced by three current research efforts currently in the field, all of which use data sources described previously in this

chapter: (1) the NASPA longitudinal study on parental involvement and college student development, which continues with data collection through 2010 (King et al., 2009); (2) a research paper that uses UCUES data to examine the influence of parents on college students' personal, academic and social adjustment (Harper, Sax, & Wolf, 2009); and (3) a recent conference paper that uses NSSE data on the relationship between parental involvement and college student engagement (Shoup et al., 2009). Each of these represent efforts to advance research on this topic by examining parent-student interactions and their relationship to some aspect of student development, though only one of them (the NASPA study) involves the collection of longitudinal data.

In this chapter, we have proposed several important directions and methodological approaches that we believe will considerably advance the state of knowledge on this topic. Future research will contribute to filling significant gaps in the literature, but should also play a vital role in improving institutional practice. The more that we understand the role that parents play—and the extent to which that varies for different student populations—the better-equipped institutions will be to develop programs and services (for both students and parents) that promote healthy student adjustment and development.

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Achievement Emotions in Higher Education

Reinhard Pekrun and Elizabeth J. Stephens

Holding a degree in higher education has never been of more personal, social, or financial significance than it is today. The countless hours college students spend studying, attending class, completing projects, taking exams, and building social and professional relationships translate into progress towards crucial life goals–goals which are attained via individual and collective agency in college settings. Given the subjective importance of these settings, it is no wonder that they abound with emotions.

Emotions are both *experienced* in the college setting as well as *instrumental* for college achievement and personal growth (Pekrun, Goetz, Titz, & Perry, 2002a; Pekrun, Goetz, Titz, & Perry, 2000b). For instance, experiencing enjoyment while working on a challenging project can help a student envision goals, promote creative and flexible problem solving, and support self-regulation (Ashby, Isen, & Turken, 1999; Clore & Huntsinger, 2007, 2009; Clore, Schwarz, & Conway, 1994; Forgas & Vargas, 2000; Fredrickson, 2001; Isen, Daubman, & Nowicki, 1987; Loewenstein & Lerner, 2003; Parrott & Spackman, 2000; Pekrun et al., 2002a). On the other hand, experiencing excessive anxiety about exams can impede a student's academic performance, compel him to drop out of college, and negatively influence his psychological and physical health (Zeidner, 1998, 2007). The far-reaching consequences of emotional experiences are also likely reflected in the tragic numbers of attempted and committed suicides on college campuses each year (Westefeld et al., 2005).

The importance of emotions in higher education equally extends to instructors, professors, and administrators. For example, instructors are not only responsible for imparting knowledge, but also for inspiring passion for the discipline and excitement about learning. Of these outcomes, passion and excitement are the most elusive, because college instructors receive little or no training in the principles of affect and learning. If they succeed at inspiring excitement about the course content, the motivational benefits should extend far beyond the course itself. If they fail, however,

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the ensuing negative emotions, such as anxiety or boredom, can quickly undermine motivation and the will to remain in the course or even in college.

Despite the clear relevance of emotions for education, emotions have been neglected by higher education research, and by educational research more generally (Pekrun & Frese, 1992; Schutz & Lanehart, 2002; see the literature search in Pekrun et al., 2002b). The few exceptions include research on test anxiety (Zeidner, 1998, 2007) and on attributional antecedents of achievement emotions (Weiner, 1985). Over the past 10 years, however, the number of studies focusing on students' emotions has steadily increased (Efklides & Volet, 2005; Linnenbrink, 2006; Schutz & Pekrun, 2007) and produced important, initial findings, particularly with respect to K-12 students' emotions. However, the extent to which these findings can be generalized to college students' emotions may be limited, given the developmental and intellectual distinctions between school-aged children and college students. By implication, there is a clear need for empirical research specifically addressing college students' emotions.

The present chapter addresses the emotions experienced by college students, with a specific focus on their achievement emotions. By necessity, given the paucity of empirical research, much of this chapter will be a call for empirical research, rather than a review of cumulative evidence and derived practical applications. The first part of the chapter discusses conceptual issues and provides definitions of emotion and achievement emotions. Next, the occurrence of emotions in academic settings at college and university is discussed. The third part addresses the assessment of students' emotions, with particular attention given to test anxiety questionnaires and the Achievement Emotions Questionnaire (AEQ; Pekrun et al., 2002b; Pekrun, Goetz, & Perry, 2005) as examples of instruments that measure achievement emotions. The fourth part attends to the functional relevance of students' emotions for academic learning and achievement. The fifth and sixth parts center on the antecedents and development of students' emotions, and on coping, emotion regulation, and therapy. In conclusion, implications for educational practice and future research in higher education are discussed.

Conceptual Issues: Emotions and Achievement Emotions

It is generally accepted that *emotions* are multifaceted phenomena that involve systems of interrelated psychological components including: emotion-specific subjective feelings (affective component), cognitions (cognitive component), motivational tendencies (motivational component), physiological processes (physiological component), and expressive behavior (expressive component; see Kleinginna & Kleinginna, 1981; Roseman, Wiest, & Swartz, 1994; Scherer, 1984, 2000). For instance, a college student experiencing pre-exam anxiety may feel uneasy and nervous (affective component), perceive low personal control to avoid failure (cognitive component), want to flee the impending exam situation (motivational component), have sweaty palms (physiological component), and her brow may be furrowed and her lips pulled backward (expressive component).

In contrast to other emotion components which may or may not be present when an emotion is instigated, the affective component is a necessary, core constituent of emotion. From a neuropsychological perspective, this component comprises an activation of subcortical brain structures (e.g., the amygdala in anxiety), as well as feedback loops between subcortical and cortical structures that make it possible to experience an emotion as a subjective feeling state (Damasio, 2004). In comparison to emotions, *moods* are of lower intensity, have less specific reference objects (Fridja, 1986), and are typically of longer duration (Ekman, 1992). However, since moods can be comprised of similar components as more intense emotions and can be qualitatively distinct from one another (e.g., cheerful, angry, or anxious moods), they can be regarded as low-intensity emotions (Pekrun, 2006).

We define *achievement emotions* as emotions that are tied to achievement activities (e.g., studying) or achievement outcomes (success and failure; see Table 1). Most of the emotions experienced in achievement settings can be classified as achievement emotions because they relate to activities and outcomes that are judged according to competence-based standards of quality. As such, the social emotions experienced in achievement settings (e.g., empathy for individuals in one's study group) would not necessarily be considered achievement emotions. However, overlap between achievement and social emotions can occur in terms of emotions directed towards the achievement of others (e.g., contempt, envy, empathy, admiration; Weiner, 2007).

Past research on achievement emotions predominantly focused on emotions induced by achievement *outcomes*, such as hope and pride related to success, or anxiety and shame related to failure. Two important traditions of research on outcome emotions are test anxiety studies (Zeidner, 2007) and studies on the attributional antecedents of emotions following success and failure (e.g., Weiner, 1985). Though outcome emotions are of critical importance for achievement strivings, emotions directly pertaining to the *activities* performed in achievement settings (i.e., activity emotions) are also achievement emotions and are of equal relevance

Table 1 A three-dimensional taxonomy of achievement emotions

	Positive[a]		Negative[b]	
Object focus	Activating	Deactivating	Activating	Deactivating
Activity	Enjoyment	Relaxation	Anger Frustration	Boredom
Outcome/prospective	Hope Joy[c]	Relief[c]	Anxiety	Hopelessness
Outcome/retrospective	Joy Pride Gratitude	Contentment Relief	Shame Anger	Sadness Disappointment

[a] Positive = pleasant emotion.
[b] Negative = unpleasant emotion.
[c] Anticipatory joy/relief.

for achievement strivings. The excitement arising from the commencement of a new project, boredom experienced when performing monotonous routine tasks, or anger felt when task demands seem unreasonable are examples of activity-related emotions. These emotions have traditionally been neglected.

In Pekrun's (2006, Pekrun et al., 2002a) three-dimensional taxonomy, achievement emotions are categorized along three dimensions: object focus, valence, and activation (Table 1). *Object focus* refers to the differentiation between activity and outcome emotions. For example, enjoyment experienced while working collaboratively with others is an activity emotion, while pride experienced after an insightful contribution to classroom discussion is an outcome emotion. In addition, as emotions more generally, achievement emotions can be grouped according to their valence and to the degree of activation implied (Table 1). In terms of *valence*, positive emotions can be distinguished from negative emotions, such as pleasant enjoyment versus unpleasant anxiety. In terms of *activation*, physiologically activating emotions can be distinguished from deactivating emotions, such as activating excitement versus deactivating relaxation. By using the dimensions valence and activation, the taxonomy is consistent with circumplex models that arrange affective states in a two-dimensional (valence x activation) space (Feldman Barrett & Russell, 1998).

The Occurrence of Achievement Emotions in College Settings

What emotions do students experience in college and how often do they experience these emotions? In our own research, we have conducted a number of exploratory studies, to analyze the diversity of emotions experienced by college students. In these studies we asked our participants about their emotional experiences in three key academic contexts: studying, attending class, and taking tests and exams (Pekrun, 1992a; Molfenter, 1999; Spangler, Pekrun, Kramer, & Hofmann, 2002; Titz, 2001). The studies used semi-structured interviews and questionnaires to explore college students' emotions. In each of these interviews and questionnaires, students were asked a series of fixed questions and could give open-ended answers to provide qualitative narratives of emotional episodes. Video-stimulated recall and psychophysiological analyses were also used in some of this research to facilitate and validate respondents' self-reports. In some of the studies, students were asked to recall typical academic episodes from their autobiographical memories and to report about the emotions experienced within these episodes (Pekrun, 1992a). Other studies used a situated approach in which emotions were assessed immediately after specific academic situations. Students' descriptions of emotional episodes were recorded, transcribed, and analyzed using both qualitative and quantitative methods.

As expected, the results of these studies showed that students experience a wide variety of emotions in academic settings. All major human emotions—save for disgust—were reported in students' narratives. Anxiety, in particular, was reported most often, and constituted 15–27% of all emotional episodes across all three academic situations (i.e., studying, during class, during exams). The pervasiveness

of anxiety found in our research corroborates the importance of test anxiety research and underscores the high-stakes climate of college—factors which may pose serious threats to students' psychological health and well-being. At the same time, however, the findings suggest that the vast majority of emotions experienced in academic settings pertain to emotion categories other than anxiety. Overall, positive emotions (e.g., enjoyment, satisfaction, hope, pride, and relief) and negative emotions (e.g., anger, anxiety, shame, and boredom) were reported with equal frequency. Students also mentioned less frequently experienced emotions like hopelessness, as well as social emotions like gratitude, admiration, contempt, and envy.

The relative frequencies of emotions differed across the three types of academic situations. During classroom instruction and studying, positive emotions accounted for slightly more than 50% of reported emotions, whereas during test taking, negative emotions outweighed positive emotions. Typically, attending class and studying involve less pressure for achievement and more autonomy for self-regulation than writing an exam, which may explain these differential frequencies.

The findings from our exploratory research thus confirm that the college experience is pervaded by a rich diversity of emotions (also see Beard, Clegg, & Smith, 2007). However, there may be limits to the generalizability of these findings. First, emotions that are experienced less intensely may be underreported in any self-report assessment of emotions, since self-report relies on the availability of emotional episodes in situational or long-term memories. Also, culturally defined rules regarding reporting about emotions may play a role, perhaps implying that emotions like contempt or envy are experienced more frequently than acknowledged by participants in self-report studies. Furthermore, our studies used samples of German university students, thus these findings pertain to emotions experienced within the German university system. Higher education systems share many features across countries, but there also are differences that may limit the cross-cultural generalizability of the findings. More exploratory and baserate research on the emotions experienced by students in higher education in different countries is clearly warranted.

Assessment of Students' Achievement Emotions

Exploratory research can be used to investigate the occurrence and phenomenology of emotions, but more rigorous quantitative methodology is needed to gather precise evidence on their functions, antecedents, and development. To begin such an endeavor, measurement instruments are needed. Many self-report instruments assessing students' test anxiety are available; however, suitable measures assessing achievement emotions other than test anxiety are in short supply. This section addresses test anxiety measurement and a recently constructed instrument that assesses various achievement emotions (Achievement Emotions Questionnaire, AEQ; Pekrun et al., 2002b; Pekrun, Goetz, Perry, Kramer, & Hochstadt, 2004; Pekrun et al., 2005).

The diversity of emotion components outlined in the first section implies that there may be numerous ways to assess emotions, including self-report questionnaires, implicit assessment, neuroimaging methods (e.g., EEG, fMRI), analysis of peripheral physiological processes, and observation of nonverbal behavior (e.g., facial, gestural, and postural expression or the prosodic features of verbal speech). With the exception of self-report instruments, all of these methods are still underused within educational research. As a case in point, while video-based research on classroom interaction flourishes, this research has yet to attempt to analyze the emotional processes that characterize interactions between instructors and students. This could be accomplished by adapting methods developed in emotion research (e.g., the Facial Action Coding System, FACS; Ekman & Rosenberg, 1997) for use in classroom observation. Similarly, neuroimaging techniques could be used to analyze neuronal indicators of students' emotional reactions when confronted with academic tasks, and physiological indicators such as heart rate, skin resistance, and cortisol levels could be used to analyze students' emotional activation in academic settings (see e.g., Spangler et al., 2002).

Assessing Test Anxiety

Due to anxiety's long-standing renown among educational researchers, the development of instruments assessing this emotion has made significant progress over the past seven decades (Pekrun, Goetz, Perry, Kramer, & Hochstadt, 2004; Zeidner, 1998). Self-report instruments are the most frequently used method, including interviews, think-aloud protocols, single-item rating scales, and questionnaire scales asking students to report about their anxiety experienced prior to, during, or after exams. Among these instruments, multi-item questionnaire scales are highly popular because they are easy to administer, show good psychometric qualities (Hodapp & Benson, 1997; Zeidner, 1998), and are temporally adaptable by making it possible to assess both momentary emotional reactions to exams (*state* test anxiety) and habitual emotional reactions to exams (*trait* test anxiety).

The first questionnaire that assessed students' test anxiety was developed by C. H. Brown at the University of Chicago in the 1930s (Brown, 1938), but this instrument did not gain widespread acceptance. In contrast, G. Mandler's and S. B. Sarason's Test Anxiety Questionnaire (TAQ; Mandler & Sarason, 1952) became the progenitor of many of the questionnaires that were developed over the past five decades. The TAQ was a uni-dimensional instrument, suggesting that test anxiety is a homogenous, one-dimensional phenomenon. Progress as to dimensionality was made when Liebert and Morris (1967) proposed to distinguish affective and physiological components of test anxiety (referred to as "emotionality") from cognitive components (referred to as "worry"). Since 1967, test anxiety measurement has further refined the worry-emotionality distinction. Today, there are dozens of scales assessing this single emotion and its components (cf. Hodapp & Benson, 1997; Zeidner, 1998). Examples of current instruments that can be used with

university students are the *Test Anxiety Inventory* (TAI; Spielberger, 1980), the *Reactions to Test* instrument (Sarason, 1984), the integrative test anxiety scale proposed by Hodapp and Benson (1997), and the test anxiety scale of the *Achievement Emotions Questionnaire* (Pekrun et al., 2004) discussed below.

The sophistication achieved in test anxiety measurement has enabled research on test anxiety to successfully analyze the effects and developmental trajectories of this emotion, and to analyze the outcomes of treatments against its crippling effects. However, there also are problems that remain to be solved. Specifically, there seems to be little agreement between test anxiety researchers as to the precise nature of the multidimensionality of the construct. Whereas all of the major instruments available to date assess affective, physiological, and worry components of test anxiety, there is dispute as to which additional components should be included in the construct (e.g., lack of self-confidence, task-irrelevant thinking, manifest behaviors; Zeidner, 1998). A second major problem is that test anxiety research has disregarded other exam-related emotions, and has therefore disregarded problems of discriminant validity. For instance, it is often the case that items meant to measure cognitive components of test anxiety also pertain to cognitive components of hopelessness and despair (e.g., items like "Before taking a test, I worry about failure"; Sarason, 1984). Typically, these items do not differentiate between worries associated with anxiety (characterized by subjective uncertainty of failure) and worries associated with hopelessness (characterized by subjective certainty of failure; Pekrun et al., 2004). Additionally, many items tapping into the physiological components of test anxiety also assess physiological activation characteristic of other activating emotions, such as anger and shame. It is therefore possible that current test anxiety instruments still measure "more than they denote" (Nicholls, 1976) by assessing a variety of negative emotions, in addition to anxiety. Future research on the assessment of achievement emotions like test anxiety should pay more attention to issues of discriminant validity, in addition to internal structural validity that has been emphasized over the past decades.

Assessing Diverse Achievement Emotions: The Achievement Emotions Questionnaire (AEQ)

As outlined above, college students experience a wide variety of emotions while engaging in key academic contexts (i.e., studying, attending class, taking tests and exams). However, measures of students' emotions other than test anxiety are still largely lacking. Attending to this deficit, we used the findings from our exploratory research mentioned above to construct a multi-dimensional instrument that would be able to measure a variety of major achievement emotions, including test anxiety and other achievement emotions (Achievement Emotions Questionnaire, AEQ; Pekrun et al., 2002b, 2004, 2005).[1]

The AEQ is a self-report instrument that assesses college students' achievement emotions. This instrument measures a number of discrete emotions for each of the

Table 2 Achievement emotions questionnaire (AEQ): scales and reliabilities

	Scales					
	Class-related emotions		Learning-related emotions		Test emotions	
Emotions	α	Items	α	Items	α	Items
Enjoyment	0.89	15	0.90	14	0.90	23
Hope	0.84	9	0.86	9	0.89	16
Pride	0.86	9	0.84	9	0.92	16
Relief	–[a]	–	–	–	0.89	14
Anger	0.85	11	0.89	14	0.89	17
Anxiety	0.89	13	0.92	18	0.94	31
Hopelessness	0.88	10	0.93	13	0.94	21
Shame	0.91	15	0.90	14	0.93	19
Boredom	0.93	14	0.93	17	–[b]	–

[a] Relief scale for test emotions only.
[b] Boredom scales for learning-related and class-related emotions only.

three main categories of academic situations: attending class, studying, and taking exams (Table 2). Because these situations differ in terms of functions and social structures, the emotions pertaining to these situations can also differ. For example, enjoyment of classroom instruction should be differentiated from the enjoyment experienced during a challenging exam—some students may be excited when going to class, others when writing exams. Therefore, the AEQ provides separate scales for class-related, learning-related, and test-related emotions.

By varying the instructions accordingly, the AEQ is able to assess students' general emotional reactions in academic situations (*trait* achievement emotions), emotional reactions in a specific course or domain (*course/domain-specific* achievement emotions), or emotions at a specific time-point (*state* achievement emotions). In its current version, the AEQ can be used to assess eight different class-related emotions, eight learning-related emotions, and eight test emotions (see Table 2). Specific emotions were selected based upon reported frequency and theoretical relevance (Pekrun et al., 2002b).

The class-related emotion scales include 80 items and instruct students to report how they feel before, during, or after class with regard to class-related enjoyment (e.g., "I enjoy being in class"), hope (e.g., "I am full of hope"), pride (e.g., "I am proud of myself"), anger (e.g., "I feel anger welling up in me"), anxiety (e.g., "I feel nervous in class"), shame (e.g., "I feel ashamed"), hopelessness (e.g., "I feel hopeless"), and boredom (e.g., "I get bored"). The learning-related emotion scales include 75 items and instruct students to report how they feel before, during, or after studying with regard to the same eight emotions as above. Finally, the test-related emotion scales include 77 items and instruct students to indicate how they feel before, during, or after taking tests and exams with regard to test-related enjoyment, hope, pride, relief, anger, anxiety, shame, and hopelessness.[2] Within each section (class-related, learning-related, test-related), the items are ordered in three

blocks assessing emotional experiences before, during, and after an encounter with the specified academic context. Sequencing items this way is in line with principles of situation-reaction inventories (Endler & Okada, 1975) and is intended to help respondents access their emotional memories.

The construct definitions underlying the AEQ use the same definition of "emotion" as cited above. As such, the items in each of the scales pertain to the affective, cognitive, physiological/expressive, and motivational components of each measured emotion. This is consistent with leading-edge test anxiety measures, but extends test anxiety assessment in two important ways. Although most current test anxiety instruments assess affective, physiological, and cognitive components of anxiety, they neglect the motivational component. Items pertaining to this component were originally part of Mandlers' and Sarason's (1952) Test Anxiety Questionnaire, but later motivational components were omitted. Second, effort was made to construct items that ensure discriminant content validity of scales measuring different discrete emotions; this includes differentiating between test anxiety and closely neighboring emotions like test-related shame and hopelessness.

The reliabilities of the AEQ scales range from adequate to very good (Alpha =0.84–0.94; Table 2). The structural validity of the AEQ scales has been tested by confirmatory factor analysis (e.g., Pekrun et al., 2004). As to external validity, the AEQ has been shown to predict students' academic achievement, course enrollment, and dropout rates. Also, achievement emotions as assessed by the AEQ relate to components of students' learning processes such as study interest, achievement goals, intrinsic and extrinsic motivation to learn, cognitive and metacognitive strategies of learning, investment of study effort, and the self-regulation of academic learning (Goetz, 2004; Goetz, Pekrun, Hall, & Haag, 2006; Kleine, Goetz, Pekrun, & Hall, 2005; Molfenter, 1999; Pekrun, Elliot, & Maier, 2006; Pekrun, Elliot, Maier, 2009; Pekrun et al., 2002a, 2002b; Pekrun et al., 2004; Perry, Hladkyi, Pekrun, & Pelletier, 2001; Perry, Hladkyj, Pekrun, Clifton, & Chipperfield, 2005; Spangler et al., 2002; Titz, 2001). Further, gender, social feedback, teachers' instructional behavior, and the composition and social climate of classrooms have also proven important correlates of the achievement emotions assessed by the AEQ (e.g., Frenzel, Pekrun, & Goetz, 2007a,b; Pekrun, 2000; Pekrun, Frenzel, Goetz, & Perry, 2006).

In sum, college students' emotions can be assessed by means of diverse measures including self-report, behavioral observation, neuroimaging, and physiological analysis. Standardized self-report scales are the most widely used instruments to date, and have proven reliable, valid, and cost-effective. Traditionally, these measures solely addressed students' test anxiety; however, instruments such as the AEQ have broadened this spectrum to include a variety of achievement emotions. Future research will benefit from the development of more scales assessing emotions other than test anxiety. Also, research should explore alternative ways of assessing students' emotions, including the measurement of more implicit emotional processes that are less well represented in conscious awareness (an example is the Implicit Positive and Negative Affect Test, IPANAT; Quirin, Kazén, & Kuhl, 2009).

Functional Relevance of Students' Achievement Emotions

Considerable empirical attention has been given to the functional importance of emotions. In experimental research, affective states have been found to influence a wide range of cognitive processes, including attention, memory storage and retrieval, social judgment, decision making, problem solving, and creative thinking (e.g., Ashby et al., 1999; Clore & Huntsinger, 2007, 2009; Isen et al., 1987; Lewis & Haviland-Jones, 2000; Loewenstein & Lerner, 2003). Much of this research, however, has focused on the effects of positive versus negative mood, without drawing distinctions between specific, discrete mood states and emotions (for notable exceptions see e.g., Izard & Ackerman, 2000; Lerner & Keltner, 2000; Zeelenberg, Nelissen, & Pieters, 2007).

Three important, cumulative findings related to cognitive performance deserve mention. First, as addressed by the resource allocation model proposed by Ellis and Ashbrook (1988), emotions (both positive and negative; Pekrun, 1992b, 2006) consume *cognitive resources* by focusing attention on the object of emotion. As a consequence, fewer resources are available for task completion, which can have negative implications for performance (Meinhardt & Pekrun, 2003). For example, while preparing for an exam, a student may fear and worry about failure, which in turn may distract her attention away from the task at hand.

Second, mood can enhance *mood-congruent memory processes* (e.g., Levine & Burgess, 1997). In general, positive mood facilitates the retrieval of positive self- and task-related information and negative mood facilitates the retrieval of negative information. For example, positive mood can foster positive self-appraisals and thus benefit motivation to learn and performance; in contrast, negative mood can foster negative-self appraisals and thus hamper motivation and performance (e.g., Olafson & Ferraro, 2001).

Third, positive and negative mood have been shown to impact *cognitive problem solving*. Specifically, experimental evidence suggests that positive mood promotes flexible, creative, and holistic ways of solving problems, and a reliance on generalized, heuristic knowledge structures (e.g., Fredrickson, 2001; Isen et al., 1987). Conversely, negative mood has been found to promote focused, detail-oriented, and analytical ways of thinking (e.g., Clore & Huntsinger, 2007, 2009). A number of theoretical explanations have been proffered for these findings. For example, in mood-as-information approaches, it is assumed that positive affective states signal that "all is well" (e.g., sufficient goal progress), whereas negative states signal that something is wrong (e.g., insufficient goal progress; e.g., Bless et al., 1996). "All is well" conditions imply safety and the discretion to creatively explore the environment, broaden one's cognitive horizon, and build new actions, as addressed by Fredrickson's (2001) "broaden-and-build" metaphor of positive emotions. In contrast, "all is *not* well" conditions may imply a threat to well-being and agency, thus making it necessary to focus on these problems in analytical, cognitively cautious ways. Furthermore, positive emotions may facilitate flexible thinking via increasing brain dopamine levels (Ashby et al., 1999), and negative moods may promote effort

investment and performance on analytical tasks by inducing a need for "mood repair" (e.g., Schaller & Cialdini, 1990).

While experimental research has exposed some of the basic mechanisms of human mood and emotions, it is open to question whether the findings of this research are generalizable to settings outside of the laboratory, and to the more intense emotions experienced in these settings. It may be that different mechanisms operate under natural conditions, or that these mechanisms interact in different ways. For example, traditional experimental mood research suggests that positive emotions can be detrimental for task motivation and cognitive performance (see Aspinwall, 1998). However, recent empirical evidence, as well as the layperson's everyday experiences, indicate that positive emotions can exert positive effects on performance in academic and work-related settings. Laboratory research is unfortunately confined by methodological and ethical constraints; as such, this research may be useful for generating hypotheses, but it cannot replace a more ecologically valid analysis of college students' real-life emotions.

The following sections examine the available evidence related to the effects of college students' emotions on their academic learning and achievement. To date, this evidence mainly refers to the effects of test anxiety. However, a small proportion of the studies reported here have begun to consider the effects of emotions other than anxiety. Based on the evidence from these studies, a generalized theoretical framework addressing the cognitive and motivational effects of students' achievement emotions is outlined.

Effects of Test Anxiety

The relationships of test anxiety with learning and performance have been analyzed in hundreds of studies (Hembree, 1988; Zeidner, 1998, 2007). Many of these studies focused on test anxiety experienced in college classrooms. Of these, four types of investigations are most prominent. In *group comparison* studies, the cognitive performance of low test-anxious students is compared with the performance of high test-anxious students. In experimental *test anxiety induction* studies, anxiety is induced by increasing the personal value (e.g., ego-threat) of an experimental task (e.g., by delivering social comparison information on performance). In *cross-sectional* field studies, students' test anxiety is correlated with performance scores. Finally, in *longitudinal* field studies, the predictive or cross-lagged relations between test anxiety and academic achievement are analyzed. Whereas group comparison, anxiety induction, and cross-sectional studies are quite frequent, longitudinal field studies on test anxiety remain scarce, and most of these studies pertain to K-12 students (Zeidner, 1998).

In experimental *group comparison* and *anxiety induction* studies, test anxiety has been found to impair performance on complex or difficult tasks that demand cognitive resources, such as difficult intelligence test items. Performance on easy, less complex, and repetitive tasks was found to be either unaffected or even enhanced. Several arguments have been offered to explain this finding. In *interference* and

attentional deficit models of test anxiety (e.g., Wine, 1971), it is assumed that anxiety produces task-irrelevant thinking that interferes with performance on tasks requiring cognitive resources in terms of working memory capacity. These models are in line with assumptions of the resource allocation model cited above (Ellis & Ashbrook, 1988; Meinhardt & Pekrun, 2003). An extension of interference models is Eysenck's *processing efficiency* model, which assumes that anxiety can reduce the efficiency of cognitive processing due to its impact on working memory load (Eysenck, 1997). Finally, an alternative hypothesis proffered by *skills-deficit models* (Zeidner, 1998) suggests that test anxious students suffer first and foremost from a lack of competence, which leads both to an increased likelihood of failure on complex tasks, and to increased anxiety as a function of perceived personal deficits.

We regard these models as complementary rather than mutually exclusive. Empirically, test anxiety has been linked to task-irrelevant thinking, and the available evidence also shows that low-ability students are more prone to experience exam-related anxiety. Furthermore, it seems reasonable to assume that competence, anxiety, and performance are often linked by reciprocal causation over time: Lack of competence can induce anxiety of failure, anxiety can impair the quality of learning and performance, and low quality learning leads to a lack of competence.

In line with experimental findings showing detrimental effects on cognitively demanding tasks, *cross-sectional field studies* have found that self-reported anxiety correlates moderately negatively with college students' academic performance. The results of meta-analyses imply generally that 5–10% of the variance in students' achievement scores is explained by self-reported anxiety (Hembree, 1988; Zeidner, 1998). Importantly, correlations are higher for test anxiety than for students' general anxiety, since measures of general anxiety do not specifically pertain to the academic domain.

However, caution should be exercised when interpreting these correlations in causal ways, for at least two reasons. First, it might be that relations between test anxiety and achievement are primarily caused by effects of academic success and failure on the development of students' anxiety, rather than by effects of anxiety on students' academic performance. The *longitudinal evidence* available to date suggests that test anxiety and students' academic achievement are linked by reciprocal causation across the school years, but this evidence also seems to suggest that achievement effects on anxiety are stronger than effects of anxiety on achievement (Meece, Wigfield, & Eccles, 1990; Pekrun, 1992c; Schnabel, 1998). These longitudinal findings pertain to upper elementary, middle, and high school students, but the basic pattern of results is likely generalizable to college students.

Second, correlations with performance variables have not been uniformly negative across studies. Zero and positive correlations have sometimes been found, pointing to the complexity of anxiety-achievement relationships. Also, between-subject correlations are sample statistics that cannot be generalized to each and every individual student (Schmitz & Skinner, 1993). Detrimental and beneficial effects of anxiety on performance may be balanced differently in different individuals. In general, anxiety likely has deleterious effects in many students, but it may

induce motivation to study harder, and thus facilitate overall performance, in individuals who are more resilient to the devastating aspects of this emotion (Pekrun & Hofmann, 1996). For instance, *defensive pessimists* (Norem & Cantor, 1986) are found to experience anxiety when preparing for performance situations, and in response set low expectations for their performance and extensively think through alternate plans and outcomes. As a function of planning and envisioning possible outcomes, defensive pessimists appear to be able to manage and "harness" their anxiety which is ultimately linked to better performance (Norem & Cantor, 1986).

Furthermore, to get a more complete picture of the effects of test anxiety on college students' academic agency, it would be necessary to also take the motivational effects of anxiety into account. It is noteworthy that so many studies have analyzed the relations between test anxiety and cognitive performance, whereas only few studies have analyzed effects on students' academic motivation. The findings of these studies imply that test anxiety negatively relates to students' interest and intrinsic motivation (e.g., Pekrun et al., 2004). However, they also indicate that test anxiety can positively relate to students' extrinsic motivation. Specifically, test anxiety has been found to relate positively to students' effort investment to avoid failure (failure-avoidance motivation) and performance-avoidance goals (e.g., Pekrun et al., 2006, 2009). In sum, the overall effects of test anxiety on academic motivation appear to be quite variable.

From an educator's perspective, however, any immediate benefits of anxiety are certainly outweighed by its overall negative effects on performance, interest, and intrinsic motivation in the vast majority of students. Despite differences in relative maturity and self-regulatory capacities, the available evidence suggests this should be equally true for college students and K-12 students (Hembree, 1988). Also, beyond effects on academic achievement, test anxiety can have severe consequences for college students' long-term psychological well-being, social adaptation, and physical health (Zeidner, 1998), thus indicating an urgent need to ameliorate students' fear of failing in their academic careers.

Effects of Anger, Shame, Boredom, and Hopelessness

Few studies have addressed college students' negative emotions other than anxiety, despite theoretical accounts that emotions like shame, hopelessness, or boredom can be equally deleterious for academic and personal outcomes (e.g., Metalsky, Halberstadt, & Abramson, 1987). Similar to anxiety, anger and shame are two frequently experienced activating negative emotions (Table 1). Boredom and hopelessness, on the other hand, are two deactivating emotions.

Anger can be induced by many kinds of academic situations, particularly when students' perceive barriers to goal-attainment or well-being. Although college students frequently experience anger related to academic settings (Pekrun, 1992a), this emotion has rarely been studied empirically. The few available studies suggest that overall correlations between self-reported anger and academic performance are zero

to moderately negative in K-12 and college student populations (Boekaerts, 1993; Pekrun et al., 2004; Stratton, 1927; Titz, 2001). Students' anger has been shown to be positively correlated with task-irrelevant thinking (Pekrun et al., 2004) and lack of motivation ("a-motivation"; Assor, Kaplan, Kanat-Maymon, & Roth, 2005), and to be negatively correlated with measures of academic self-efficacy, perceived academic control, interest, and self-regulation of learning (Pekrun et al., 2002b, 2004).

However, as with anxiety, the underlying pattern of functional mechanisms may be complex and imply more than just negative effects. For example, in a study with undergraduate students reported by Lane, Whyte, Terry, and Nevill (2005), depressed mood interacted with anger experienced before an academic exam such that anger was related to *improved* performance in students who did not feel depressed (see also Lane, Terry, Beedle, Curry, & Clark, 2001, for related evidence in school children). Similarly, in a preliminary study examining the differential effects of anger versus anxiety on task-perception, Stephens and Pekrun (2009a) found that college students induced to feel anger were more likely to judge an upcoming math task as a positive challenge, whereas students induced to feel anxiety were more likely to judge the same task as a threat. Likely, anger is detrimental for motivation and performance under many conditions, but can translate into increased task motivation when expectancies for agency and success are favorable.

S*hame* is at the core of negative feelings of self-worth, often implying devastating, pervasive feelings of self-debasement. In traditional achievement motivation theories, shame was regarded as central to the fear of failure motive (Atkinson, 1964; Heckhausen, 1991). Similar to anxiety and anger, students' achievement-related shame (as measured by the AEQ shame scales) tends to show negative overall correlations with academic achievement and overall self-reported effort (Pekrun et al., 2004; Titz, 2001). However, as with anxiety and anger, shame seems to exert variable motivational effects. For instance, in a study by Schwinger and Stiensmeyer-Pelster (2009), college students who experienced shame together with low expectations of success concerning an important upcoming task were more likely to engage in self-handicapping behavior and to demonstrate poor performance. In contrast, Turner and Schallert (2001) showed that students who experienced shame following negative exam feedback increased their motivation when they continued to be committed to future academic goals and believed these goals were attainable (see also Thompson, Altmann, & Davidson, 2004).

Boredom and *hopelessness*, in contrast to anxiety, anger, and shame, reduce both intrinsic and extrinsic motivation, and prove detrimental for any kind of cognitive performance (with rare exceptions of indirect benefits produced by efficient coping with these emotions; Sansone, Weir, Harpster, & Morgan, 1992). Despite findings showing that boredom is frequently experienced by students, this emotion—like the less frequent, but devastating emotion hopelessness—has received very little attention. Early research on emotions suggested that boredom at work is induced by monotonous assembly-line work (e.g., Wyatt, 1930). More recently in educational research, boredom has been discussed with relation to gifted K-12 students, but has

been neglected in research on college students. In our own studies using the AEQ boredom scales, boredom correlated negatively with indicators of motivation and self-regulated learning (Pekrun et al., 2002b in press; Titz, 2001). Similarly, hopelessness has shown uniformly negative correlations with measures of motivation, study behavior, and academic achievement (Pekrun et al., 2004; Titz, 2001).

Effects of Positive Emotions

Traditionally, functional accounts of emotions considered positive emotions maladaptive for performance by inducing unrealistic appraisals, fostering superficial information processing, and reducing motivation to pursue challenging goals (Aspinwall, 1998; Pekrun et al., 2002a). Much of the available experimental, laboratory-based evidence seems to support such a view. For example, positive mood has been shown to (a) lead to illusionary probability estimates for favorable outcomes and an underestimation of the probability of failure; (b) induce relaxation and undermine effortful action by signalling that everything is going well; (c) induce motivation to maintain pleasant mood by avoiding negative thoughts and neglecting cautionary prevention of future adversities; and (d) reduce cognitive resources needed for task purposes (Aspinwall, 1998).

As aptly summarized by Aspinwall (1998), traditional experimental approaches to positive emotions thus imply that "our primary goal is to feel good, and feeling good makes us lazy thinkers who are oblivious to potentially useful negative information and unresponsive to meaningful variations in information and situation" (p. 7). However, recent experimental evidence, in addition to educators' personal experiences, stands in contrast to the view that positive emotions are uniformly detrimental for motivation and cognitive performance. Specifically, as noted above, experimental research has shown that positive mood can enhance divergent thinking and flexible problem solving, and can thus facilitate many kinds of cognitive performance (e.g., Isen et al., 1987). Also, experimental evidence suggests that positive mood can enhance elaborate information processing when the goal is to solve a problem (as is typical for academic situations), rather than just to maintain present positive mood (Aspinwall, 1998).

Empirical evidence on the effects of students' positive emotions in higher education is scarce, but supports the view that positive emotions can enhance academic learning and performance. Specifically, enjoyment of learning is positively correlated with K-12 and college students' academic performance (Pekrun et al., 2002a, 2002b). Furthermore, in research with the enjoyment, hope, and pride scales from the AEQ, we found that all three of these positive emotions correlated positively with study interest, study effort, elaboration of learning material, and self-regulation of learning. These findings highlight that positive emotions can be beneficial for college students' academic agency. However, as with correlational evidence on negative emotions cited above, caution should be exercised when interpreting these correlations in causal ways.

Towards a General Theoretical Model of the Cognitive and Motivational Effects of College Students' Emotions

Thus far, it would appear that the available evidence on the functions of emotions and moods in academic contexts is somewhat disjointed. How can we make sense of these available findings? Clearly, it would seem insufficient to simply distinguish between positive versus negative affect, or to assume uniformly positive or negative effects for specific emotions. Rather, more differentiated conceptions of emotions and their functional mechanisms are needed (for more detailed discussions see Pekrun, 1992b, 2006; Pekrun et al., 2002a, 2002b).

Regarding concepts of emotions, it may be useful to group emotions in terms of both the valence and the activation dimensions mentioned in the first section. This makes it possible to distinguish four groups of emotions, including *positive activating emotions* such as enjoyment, hope and pride; *positive deactivating emotions* such as relief and relaxation; *negative activating emotions* like anger, anxiety, and shame; and *negative deactivating emotions* like boredom and hopelessness (Pekrun, 2006; Table 1). As to functional mechanisms mediating effects of these emotions on students' academic performance, processes that likely are important include (a) emotion-induced consumption or preservation of *cognitive resources*; (b) intrinsic and extrinsic *motivation* to learn and perform; (c) the use of cognitive *learning strategies*; and (d) self-directed versus external *regulation of learning*, including the use of meta-cognitive, meta-emotional, and meta-motivational strategies. Emotions within the four categories described above can be assumed to affect these mechanisms and academic achievement in the following ways.

(1) Cognitive resources. The experimental evidence cited earlier seems to imply that any emotion consumes cognitive resources by distracting attention away from the task at hand. However, in interpreting this evidence, the ecological validity of the experimental procedures of mood research has to be considered. In these settings, mood induction procedures have been used that focus participants' attention on emotion-arousing stimuli (pictures, life events etc.), implying that less attention was available for a subsequent task. This situation is similar to academic situations in which a student experiences emotions focused on objects or events that are separate from the learning task at hand, like anxious worries about an upcoming exam. However, if the emotion is focused on the learning task itself, the situation may be quite different. In this type of emotion arousal, rather than being distracted away from the task, attention can be directed towards on-task efforts. A prototypical example for such an emotion is enjoyment of learning activities. Enjoyment of ongoing activities can induce flow experiences which imply focused attention on the activity, and such immersion in the task that even the perception of time and borders between the self and environment diminish in subjective consciousness (Csikszentmihalyi & Csikszentmihalyi, 1988).

Based on these considerations, it can be assumed that emotions reduce the availability of cognitive resources available for task purposes, with the exception of those

positive emotions that focus attention on the task at hand.[3] We refer to these emotions as *task-intrinsic* emotions, since they relate to inherent properties of the task material or to interaction with the material (Pekrun et al., 2002b). In contrast, we regard emotions focused on aspects of the setting, other persons, the self, the future, etc., as *task-extrinsic* emotions which should distract attention away from learning and task completion.

(2) Motivation, interest, effort, and goal adoption. Generally, emotions are adaptive in that they can instigate, modulate, or reduce emotion-specific motivational impulses underlying adaptive behavior. This also is true for achievement emotions which can induce motivation and motivation-based effort by shaping students' goals and intentions (Daniels et al., 2009; Linnenbrink, 2007; Linnenbrink & Pintrich, 2002; Stephens & Pekrun, 2009b). This process can be facilitated by mood-congruent recall of motivationally relevant information, such as positive self- and task-related information in a positive mood, threat-related information in an anxious mood, and aggression-related information in an angry mood (Levine & Burgess, 1997). From this perspective, positive activating emotions like enjoyment of learning can enhance academic motivation and effort, whereas negative deactivating emotions like hopelessness and boredom should be detrimental. Furthermore, enjoyment of learning can contribute positively to the development of students' interest in learning material (Krapp, 2005). Boredom and hopelessness, on the other hand, can undermine interest development since they are incompatible with enjoyment.

The motivational effects of positive deactivating emotions and negative activating emotions, however, are likely more complex. As argued by Pekrun et al. (2002a, 2002b), positive deactivating emotions such as relief and relaxation may reduce situational motivation, but they may also serve to reinforce long-term investment of effort. Similarly, anger, anxiety, and shame can be assumed to exert ambiguous effects. The evidence cited above is clearly in line with this view. Specifically, whereas these negative activating emotions can reduce intrinsic motivation and interest because they tend to be incompatible with enjoyment, they can produce strong extrinsic motivation to cope with the aversive events that caused them. For example, anger can produce motivation to overcome obstacles, and anxiety, as well as shame, can strengthen motivation to avoid failure. The overall effects on total motivation and effort may depend on the situation-dependent, person-specific balance of these different mechanisms (Pekrun & Hofmann, 1996).

In addition to experienced emotions, *anticipated emotions* can also influence students' motivation and goal adoption. Anticipated emotions serve as indicators of the value of success and failure (anticipated positive emotions in the case of success and anticipated negative emotions in the case of failure). Because subjective values provide a general interpretive frame and behavioral guide for future choices (e.g., Feather, 1988), anticipated emotions about achievement outcomes should guide students' achievement goal adoption (cf. Bagozzi, Baumgartner, & Pieters, 1998). As preliminary evidence for the functions of anticipated emotions in students' goal setting, Stephens and Pekrun (2009b) used one cross-sectional and one prospective study to examine the value of college students' anticipated

achievement emotions for explaining the adoption of goals in the 2 × 2 achievement goal framework (mastery-approach, mastery-avoidance, performance-approach, performance-avoidance goals; Elliot & McGregor, 2001).

In the cross-sectional study, college students were first asked to identify their currently most important class and to imagine succeeding or failing in this class with regard to mastery-related outcomes (defined by individual or absolute standards of competence), or with regard to performance-related outcomes (defined by normative standards of competence; cf. Elliot & McGregor, 2001). For mastery and performance success outcomes, students were asked to imagine how strongly they would feel positive emotions (mastery success emotions, performance success emotions). For mastery and performance failure outcomes, students were asked to imagine how strongly they would feel negative emotions (mastery failure emotions, performance failure emotions). Furthermore, they reported about their current achievement goals in the course (Elliot & Murayama, 2008). In regression analyses, anticipated mastery failure emotions emerged as strong predictors of mastery-approach and mastery-avoidance goals, whereas anticipated performance failure emotions emerged as strong predictors of performance-approach and performance-avoidance goals.

In the prospective study, anticipated emotions were assessed before the beginning of the semester and achievement goals were assessed 6–8 weeks into the semester. Again, anticipated mastery failure emotions emerged as strong predictors of mastery-approach and mastery-avoidance goals. In addition, anticipated performance success emotions were predictors of performance-approach and performance-avoidance goals. The results of the two studies demonstrate that anticipated emotional reactions to achievement outcomes may serve as guides for achievement goal adoption, thus adding to explaining the functional relevance of emotions for college students' motivation.

(3) Cognitive learning strategies. The experimental evidence on mood and problem solving cited earlier suggests that positive emotions enhance the use of creative, flexible ways of learning, like elaboration and organization of learning material or critical thinking. Negative emotions, on the other hand, should sustain more rigid, detail-oriented learning, like simple rehearsal of learning material. The correlational evidence from our own research (Pekrun et al., 2002b, 2004) supports this view. However, for deactivating positive and negative emotions, these effects may be less pronounced. Deactivating emotions, like relaxation or boredom, may produce shallow information processing rather than any more intensive use of learning strategies.

(4) Meta-strategies and self-regulation of learning. Self-regulation of learning includes the use of meta-cognitive, meta-motivational, and meta-emotional strategies (Wolters, 2003) making it possible to adopt goals, monitor and regulate learning activities, and evaluate their results in flexible ways, such that learning activities can be adapted to the demands of academic tasks. An application of these strategies presupposes cognitive flexibility. Therefore, it can be assumed that positive emotions foster self-regulation and the implied use of meta-strategies. Negative emotions, on

the other hand, can motivate the individual to rely on external guidance. The correlational evidence provided by Pekrun and colleagues (Pekrun et al., 2002b; 2004) is in line with these propositions (positive correlations for academic enjoyment and hope with college students' perceived self-regulation of learning, and for anxiety with external, instructor-provided regulation of learning). However, the reverse causal direction may also play a role in producing such correlations—self-regulated learning may instigate enjoyment, and external directions for learning may trigger anxiety.

(5) Academic achievement. Since many different mechanisms can contribute to the functional effects of emotions, the overall effects of students' emotions on their academic achievement are inevitably complex, and may depend on the interplay between different mechanisms, as well as between these mechanisms and task demands. Nevertheless, it seems possible to derive hypotheses on net effects from the above considerations.

Specifically, due to their positive effects on interest, motivation, use of flexible learning strategies, and self-regulation, *positive activating* emotions likely are beneficial to college students' overall academic agency (e.g., Daniels et al., 2009). Specifically, this may be true for task-intrinsic emotions, such as excitement and enjoyment of learning, which focus attention on academic tasks and thereby induce states of flow. In contrast, the attention-distracting and motivation-reducing effects of *negative deactivating* emotions, such as boredom and hopelessness, likely imply that these emotions are simply detrimental. The correlational evidence cited above is in line with these assumptions (Pekrun et al., in press).

In contrast, for *positive deactivating* and *negative activating* emotions, the effects may be diverse and may depend in part on task demands and individual propensities. We expect that emotions of these two groups distract attention, reduce momentary interest and intrinsic motivation, and do not foster flexible, self-regulated learning. On the other hand, there may also be positive motivational effects, including long-term beneficial effects in positive deactivating emotions, and positive effects on extrinsic motivation in negative activating emotions. Also, negative activating emotions may facilitate the use of rigid learning strategies and a reliance on external regulation, which may be beneficial for achievement under conditions of teacher-centered instruction and exams that focus on rote memory performance. For positive deactivating emotions, there is no substantial evidence to validate assumptions and draw any firm conclusions. For the negative activating emotions of anger, anxiety, and shame, the evidence outlined above is in line with these hypotheses. However, this evidence also indicates that, on an average, the deleterious effects of negative activating emotions on academic achievement outweigh any potential benefits.

In sum, theoretical assumptions, the evidence produced by experimental studies, and findings from field studies imply that emotions typically have profound effects on college students' academic learning, motivation, and achievement. As such, administrators and instructors should pay attention to students' emotions. Most likely, the effects of students' enjoyment of learning are beneficial, and the impact of hopelessness and boredom detrimental. The effects of emotions like anger,

anxiety, or shame are more complex, but for the average college student, these emotions have negative overall effects as well.

Origins of Students' Achievement Emotions

Given the relevance of emotions for student learning and achievement, research examining their antecedents is necessary, such that evidence-based recommendations to foster these emotions can be derived. Generally, emotions can be caused and modulated by numerous factors including cognitive appraisals, situational perceptions, emotion schemata, neurohormonal processes, and sensory feedback from facial, gestural and postural expression (Davidson, Scherer, & Goldsmith, 2003; Lewis & Haviland-Jones, 2000; Mauss, Bunge, & Gross, 2007; Scherer, Schorr, & Johnstone, 2001). Among these factors, cognitive appraisals likely play a major role in the emotions experienced by college students. In contrast to emotions aroused in phylogenetically older and more constrained situations, such as enjoyment of physiological need fulfillment or interactions between caregiver and child, emotions in academic situations pertain to culturally defined demands in settings that are a recent product of civilization. In settings of this kind, the individual has to learn how to adapt to situational demands while preserving individual autonomy—a process inevitably guided by appraisals.

This may be especially true in college and university settings, since the transition from high school to college often implies breaking habits developed during childhood and adolescence. Typically, this transition entails challenges to adapt to new academic demands; to leave one's home, move to a new city, and live on one's own; and to create new friendships and social networks. All of these changes make it necessary to appraise new situations and to re-appraise one's personal strengths and weaknesses, and these appraisals certainly play a major role in the emotions college students experience.

In line with such considerations, most theories on the determinants of students' emotions focus on the emotional relevance of self-related and task-related appraisals, and on the importance of situational factors that shape students' emotions by influencing their appraisals. This section discusses theoretical approaches and empirical evidence pertaining to the individual, instructional, and social determinants of students' emotions. Based on this discussion, we outline basic propositions of the control-value theory of achievement emotions (Pekrun, 2000, 2006; Pekrun et al., 2002b) which integrates core assumptions of previous theories and makes an attempt to explain a broader variety of achievement emotions, including the emotions experienced by students at college and university.

Individual Antecedents

Research on the individual determinants of students' emotions has focused on the antecedents of test anxiety, on the causal attributional antecedents of emotions

following success and failure, and on the role of achievement goals for students' positive versus negative affect. Studies beyond these three specific research agendas are rare, with a few exceptions pertaining to the antecedents of activity-related academic emotions like enjoyment of learning and boredom (Pekrun et al., 2002a).

Test anxiety. Test anxiety is a prospective emotion related to threat of failure on an upcoming or ongoing evaluation (i.e., test or exam). Therefore, many authors have regarded threat-related appraisals as the main proximal determinants of test anxiety. More specifically, from the perspective of R. S. Lazarus' transactional stress model (Lazarus & Folkman, 1984, 1987), test anxiety is based on two kinds of appraisals. The *primary appraisal* pertains to the likelihood and subjective importance of failure. In the *secondary appraisal*, possibilities to cope with the situation are explored cognitively. Depending on the combined result of the two appraisals, different emotions can be aroused. In the case of threat and insufficient perceived control over threatening failure, anxiety is assumed to be instigated.

Lazarus' analysis implies that achievement-related anxiety is aroused when two conditions are met. First, there has to be an anticipation of possible failure on a subjectively important evaluative task. Second, the individual has to doubt whether potential failure can be avoided. In an expectancy-value model of test anxiety, and of anxiety more generally, Pekrun (1984, 1992c) has made an attempt to reconceptualize these two assumptions in more precise, mathematically formalized ways. In this model, it is assumed that test anxiety is a function of (a) the expectancy of failure (specifically, the subjective likelihood of failure), and (b) the subjective value of failure. Both components are posited to be necessary for test anxiety to be instigated (if one is sure that failure cannot happen or if one is indifferent to failure, anxiety should not be experienced). The expectancy of failure is postulated to depend on situation-outcome expectancies (Bolles, 1972; Heckhausen, 1991) that failure will result from the situation if no counteraction is undertaken, and on action-related expectancies that suitable actions, such as sustained effort in preparing for an exam, can be performed and will prevent failure. Anxiety is proposed to be a curvilinear function of expectancy, and is expected to be replaced by hopelessness if failure is subjectively certain. The subjective value of failure is seen to be a function of both the intrinsic importance of achievement, and of its extrinsic, instrumental relevance in terms of producing further outcomes. For example, failing an exam may be threatening for a student because failure is inherently negative for him or her, because positive outcomes such as future career prospects are compromised, and/or because negative consequences like punishment can result (for formalized versions of these assumptions, see Pekrun, 1984; for a conceptual discussion, Pekrun, 1992c).

Typically, situational appraisals of these kinds are based on objective characteristics of the setting, such as the relative difficulty of exam material, but they are also influenced by individual expectancy- and value-related beliefs. These beliefs can take "irrational" forms (Ellis, 1962), for example when failure is appraised as likely despite high individual ability, or when failure on subjectively unimportant outcomes is perceived as undermining self-worth. Irrational beliefs can make students highly vulnerable to anxiety and related negative achievement emotions,

like shame and hopelessness ("I am not allowed to fail. If I fail, I am a worthless person").

The available empirical evidence is in line with these propositions. Specifically, test anxiety has been found to correlate positively with students' expectancies of failure, and negatively with their self-concepts of ability, academic self-efficacy expectations, and academic control beliefs (Hembree, 1988; Pekrun et al., 2004; Zeidner, 1998). Also, in research on the relationship between achievement goals and test anxiety, students' performance-avoidance goals (implying high subjective relevance of failure) are consistently positively related to their test anxiety scores (see Linnenbrink & Pintrich, 2002; Pekrun et al., 2006, 2009).

Attributional determinants of achievement emotions. Extending the perspective beyond test anxiety, B. Weiner (1985) proposed an attributional approach to the appraisal antecedents of achievement emotions following success and failure. In Weiner's theory, causal attributions of success and failure in achievement settings are considered primary determinants of many of these emotions. More specifically, it is assumed that achievement outcomes are first subjectively evaluated as success or failure. This outcome appraisal immediately leads to "primitive", cognitively less elaborated, "attribution-independent" emotions, namely, happiness following success, and frustration and sadness following failure (Weiner, 1985, p. 560). Following the outcome appraisal and immediate emotional reaction, causal ascriptions are sought that lead to differentiated, attribution-dependent emotions.

Three dimensions of causal attributions are assumed to play key roles in determining attribution-dependent emotions: (a) the perceived *locus* of causality differentiating internal versus external causes of achievement (e.g., ability and effort vs. environmental circumstances or chance), (b) the perceived *controllability* of causes (e.g., subjectively controllable effort vs. uncontrollable ability), and (c) the perceived *stability* of causes (e.g., stable ability vs. unstable chance). Weiner posits that *pride* should be experienced when success is attributed to internal causes (e.g., effort or ability); that *shame* should be experienced when failure is attributed to uncontrollable, internal causes (e.g., lack of ability); and that *gratitude* and *anger* should be experienced when success or failure, respectively, are attributed to external, other-controlled causes.

Consistent with the retrospective perspective of causal attributions for success and failure, Weiner's theory focuses primarily on retrospective emotions following success and failure; however, some predictions for prospective, future-related emotions also exist. Specifically, hopefulness and hopelessness are expected to be experienced when past success and failure, respectively, are attributed to stable causes (e.g., stable ability). Furthermore, Weiner (2007) recently extended his theory by also speculating about the causal attributional antecedents of "moral" emotions like envy, scorn, sympathy, admiration, regret, and "Schadenfreude".

Much of the evidence on the validity of these assumptions comes from scenario studies in which students were asked how they, or others, might react to success and failure. In such studies, participants' subjective theories about links between achievement outcomes, attributions, and emotions following achievement

were tested. Findings support the congruence between attributional theory and students' subjective theories. However, there also are experimental and field studies with samples of college students corroborating the validity of many of Weiner's assumptions (Heckhausen, 1991).

Additionally, other approaches to the affective relevance of causal attributions have also provided evidence that attributions can play a role in students' emotional reactions. Specifically, studies on the *reformulated helplessness and hopelessness theories* of depression have found that emotions experienced at college can be explained, in part, by students' attributional styles (e.g., Metalsky et al., 1987). In this research tradition, the perceived *globality* of causes, defined as their degree of generalization across situations, is held to be an additional important dimension of causal attributions.

Achievement goals as determinants of positive versus negative affect. A handful of studies have analyzed relations between students' achievement goals and their positive versus negative affect experienced at college and university (see Daniels et al., 2008; Daniels et al., 2009; Linnenbrink & Pintrich, 2002; Pekrun et al., 2006, 2009). Most of these studies have used a dichotomous model of achievement goals, which differentiates between mastery goals (focus on competence defined by individual or absolute standards) and performance goals (focus on competence defined by normative standards; e.g., Elliott & Dweck, 1988). Findings from studies using dichotomous conceptions of goals and affect (i.e., positive vs. negative affect) have been inconsistent, except for the positive relation between mastery goals and positive affect (e.g., Linnenbrink & Pintrich, 2002).

As argued by Pekrun et al. (2006, 2009), this lack of consistency may have been due to insufficient differentiation between types of goals and types of emotions. Specifically, as to goals, approach goals and avoidance goals may have quite different effects on students' emotions. In the studies reported by Pekrun et al. (2006), U.S. and German undergraduate students' achievement goals were assessed early in the semester, and their course-related achievement emotions later in the semester. Mastery-approach goals were positive predictors of course-related enjoyment of learning, hope, and pride, and negative predictors of boredom and anger. Performance-approach goals were positive predictors of pride, whereas performance-avoidance goals were positive predictors of anxiety, hopelessness, and shame (see also Daniels et al., 2008, 2009; Pekrun et al., 2009). These findings underscore how value-related cognitions, like achievement goals, can be important for subsequent emotional experiences.

Determinants of activity-related emotions (enjoyment and boredom). Activity-related emotions have been neglected by cognitive approaches to the determinants of students' emotions. The limited evidence on these emotions seems to imply that positive self-evaluations of competence, as well as task-related goals and interest in academic tasks, are positively related to enjoyment of learning (Daniels et al., 2008; Pekrun et al., 2002a, 2006, 2009). Studies by Vodanovich, Weddle, and Piotrowoski (1997) and Watt and Vodanovich (1999) imply that boredom is related to students' external work values and reduced educational involvement.

In sum, theories and the corresponding empirical evidence on achievement emotions imply that failure expectancies and perceived lack of competence are primary determinants of college students' test anxiety, and that causal attributions of achievement are important antecedents of emotions following success and failure. Moreover, there is evidence that students' achievement goals can be important determinants of their emotions. Beyond these three specific bodies of research, however, the evidence on individual determinants of college students' emotions is too scarce to allow generalizable conclusions.

Classroom Instruction and Social Environments

Within programs of empirical research on psychological phenomena, research questions are often addressed sequentially. As a first step, the relevance of the phenomenon has to be shown such that the scientific community can be convinced that related research should be acknowledged and funded. Typically, the next step involves refining concepts and assessment, and an analysis of internal structures and individual determinants. Contextual antecedents, however, are often addressed last in psychologically oriented research. It seems that research on students' emotions is no exception to this rule. The classroom and social antecedents of college students' emotions have been neglected even more than other aspects of their affective life. Again, research on students' test anxiety is an exception. A number of consistent findings on the relevance of task demands and social environments for students' anxiety emerged from this research. The following summary is based on the overview given by Zeidner (1998), who also provides a detailed list of references to relevant studies.

Instruction and learning environments. Lack of structure and clarity have been found to relate positively to students' test anxiety. Also, excessively high task demands can contribute to achievement-related anxiety. The effects of these factors are likely mediated by students' perceived lack of control and expectancies of failure (Pekrun, 1992c).

Exam format. With exams as well, lack of structure and transparency have been shown to contribute to students' anxiety. The findings suggest that important factors include clarity concerning demands, materials and procedures of exams, and concerning grading standards. Furthermore, open-ended test items are found to induce more anxiety than multiple-choice items. Because open-ended formats require more working memory capacity, the worry and task-irrelevant thinking associated with anxiety can consume cognitive resources needed for the task at hand, thus inducing more threat and debilitating performance in anxious students. The use of multiple-choice formats can reduce these effects. Also, providing external aids, such as books and computers, can reduce working memory load and the threat of failure. Finally, giving students the choice between items, relaxing time constraints, and giving second chances in terms of retaking a test–factors which likely increase perceived control and alleviate expectations of failure–can reduce test anxiety.

Expectancies, feedback, consequences of achievement, and competition in the classroom. High achievement expectancies from important others, negative evaluation feedback, and negative consequences of failure correlate positively with students' test anxiety (Hembree, 1988). Additionally, interpersonal competition within the classroom is positively related to test anxiety—likely because competition reduces expectancies for success and increases the importance of avoiding failure (Zeidner, 1998). In contrast, in K-12 research, social support from parents and teachers and a cooperative classroom climate have been found to be uncorrelated with students' test anxiety scores (Hembree, 1988). Two explanations may account for these findings. First, coercive components of supportive behavior may counteract the beneficial effects of support (Helmke, 1983). Second, support and anxiety may be linked by negative feedback loops: Social support can alleviate anxiety (negative effect of support on anxiety), but anxiety can engender support (positive effect of support on anxiety), thus yielding an overall correlation of zero.

The Control-Value Theory of Achievement Emotions: An Integrative Approach to the Determinants of College Students' Emotions

The assumptions of different approaches to the determinants and effects of students' emotions seem to be largely complementary—not contradictory or mutually exclusive. It should thus be possible to create more integrative frameworks to better interpret extant empirical findings, derive new hypotheses, and develop practical recommendations. To this end, the control-value theory of achievement emotions aims to integrate and expand assumptions from R. S. Lazarus' transactional stress model (Lazarus & Folkman, 1984, 1987), expectancy-value models (Pekrun, 1992c; Turner & Schallert, 2001), as well as attributional (Weiner, 1985) approaches to achievement emotions (Pekrun, 2000, 2006; Pekrun et al., 2002b; Pekrun, Frenzel, Goetz, & Perry, 2007). The theory explains a variety of achievement emotions, including both outcome emotions and activity emotions, and pertains to both individual and social determinants of these emotions. In its most recent version, the theory also addresses the effects of achievement goals on students' emotions (Pekrun et al., 2006, 2009).

Control and value determinants of achievement emotions. Students' control- and value-related appraisals are posited to be the most important proximal determinants of their achievement emotions (Fig. 1). *Control appraisals* pertain to the perceived controllability of achievement-related actions and outcomes, as implied by causal expectations (e.g., self-efficacy expectations and outcome expectancies; Bandura, 1997), causal attributions of achievement, and competence appraisals (e.g., academic self-concepts of ability). *Value appraisals* relate to the positive or negative subjective importance of achievement activities and their outcomes. These appraisals imply judgments about the direction (positive vs. negative) and strength (perceived importance) of values.

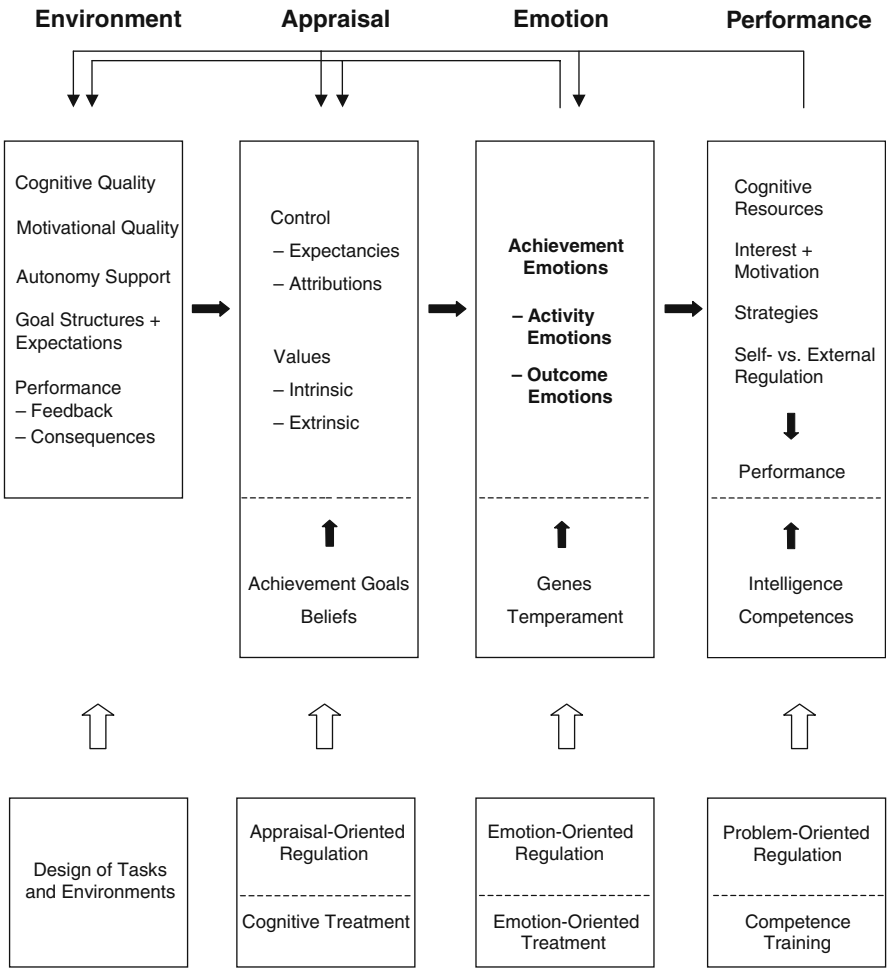


Fig. 1 Basic propositions of the control-value theory of achievement emotions (adapted from Pekrun et al., 2007)

Different kinds and combinations of control and value appraisals are assumed to instigate different kinds of emotions, including prospective outcome emotions, retrospective outcome emotions, and activity emotions (Table 1). According to the control-value theory, *anticipatory joy* and *hopelessness* should be experienced when a student perceives high control or no control, respectively, with regard to upcoming success or failure. Further, *hope* and *anxiety* should be experienced when there is uncertainty about control over achievement outcomes; in the case of hope, attention is focused on the possibility of future success, in the case of anxiety, attention is focused on the possibility of future failure. A student who is unsure about his ability to succeed on an upcoming exam may therefore hope for success, fear failure, or both.

Regarding retrospective outcome emotions, in line with Weiner's (1985) theorizing, the control-value theory postulates that *joy* and *sadness* should be experienced directly following success and failure, respectively, further cognitive mediation by control cognitions not being necessary (control-independent emotions). In contrast, *disappointment* and *relief* are posited to depend on the perceived match between one's expectations and the actual outcome. Hence a student should experience disappointment when an anticipated success does not occur, and relief when an anticipated failure does not occur. Finally, *pride* and *shame* should be experienced when a student attributes success or failure, respectively, to herself, whereas *gratitude* and *anger* should be experienced when a student attributes success and failure to another person.

The control-value theory of achievement emotions (Pekrun, 2006; Pekrun et al., 2007) diverges from Weiner's (1985) attributional theory of outcome emotions with respect to the object focus of controllability for the initiation of these emotions. Specifically, according to the control-value theory, the perceived controllability of success and failure—not the controllability of the *causes* of success and failure, such as ability and effort—is posited to elicit various emotions. Success and failure may be controllable via the use of causal factors that are themselves uncontrollable, such as ability.

Furthermore, the control-value theory proposes that these outcome-related emotions also depend on the subjective importance of achievement outcomes, implying that they are a joint function of perceived control and value. For instance, a student should feel worried if she judges herself incapable of performing well (low control) on an important exam (high value). In contrast, if she feels that she is able to perform well (high control), or is indifferent about the exam (low value), her anxiety should be low. In an experimental test of the effects of control and value appraisals on anxiety, Pekrun, Lichtenfeld, and Maier (2009) manipulated students' perceptions of control (high vs. low) and perceived value (high vs. low) of performance. Across three studies, anxiety scores were highest when students perceived low control and high value of performance; other combinations of control and value appraisals did not show these effects. These findings underscore the importance of control and value appraisals for the emergence of students' anxiety, and achievement emotions more generally (for related correlational evidence, see e.g., Hall, Perry, Ruthig, Hladyj, & Chipperfield, 2006; Pekrun et al., 2002a, 2002b; Pekrun et al., 2004; Titz, 2001).

Finally, achievement-related *activity emotions* are also assumed to depend on control and value appraisals. Based on the control-value theory, *enjoyment* of achievement activities (e.g., enjoyment of working on a project) should be experienced when perceptions of control over the task are high, and when the subjective value of the task (completing the project) and its objects (e.g., project-relevant learning material) are high as well. In contrast, in case of feelings of incompetence or disinterest, the activity is not enjoyable. Further, *anger* and *frustration* should be experienced when the subjective value of the activity is negative (e.g., when working on a complex project is experienced as unnecessarily burdensome). Finally,

boredom should be experienced when the activity lacks any intrinsic incentive values (Pekrun et al., 2008, in press).

Implications I. Automatic achievement emotions. The control-value theory does not posit that students' achievement emotions are always mediated by conscious appraisals. Rather, it is assumed that recurring appraisal-based induction of emotions can become automatic and non-reflective over time. When specific emotion-inducing academic experiences are repeatedly encountered, appraisals and the induction of emotions can become routinized such that conscious mediation of emotions is reduced or no longer occurs (Pekrun, 1988; Reisenzein, 2001). In this way, a direct link can exist between a perceived situation and an emotion (e.g., the mere smell of the chemistry building inducing joy).

Implications II. Achievement goals and achievement emotions. In a recent extension of the control-value theory (Pekrun et al., 2006, 2009), students' achievement goals (Elliot & McGregor, 2001) were posited as distal individual antecedents of achievement emotions. Achievement goals are cognitive representations of positive or negative competence-relevant aims that are used to guide behavior in achievement settings (Elliot & Thrash, 2001). These goals can be organized based on two criteria: the definition of competence (*mastery*: intrapersonal or absolute standard vs. *performance*: interpersonal standard) and the motivational direction (*approach*: focus on success vs. *avoidance*: focus on failure). Crossing these dimensions yields the four types of achievement goals composing the 2 × 2 achievement goal framework (Elliot & McGregor, 2001): mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance goals.

Important for the instigation of achievement emotions, achievement goals are assumed to direct and focus attention during the appraisal process (Pekrun et al., 2006). Mastery-based goals should focus attention on an ongoing activity and its usefulness for competence development. Specifically, mastery-approach goals should focus attention on the controllability and positive value of achievement activities and should thus foster positive activity emotions like enjoyment of learning, and reduce negative activity emotions such as boredom and anger. In contrast, performance-based goals should focus attention on normative outcomes (i.e., performance relative to others). Specifically, performance-approach goals should focus attention on the controllability and positive value of normative success. Therefore, these goals should facilitate prospective hope and retrospective pride (in the case of success). Performance-avoidance goals should focus prospective attention on the uncontrollability and negative value of normative failure. Therefore, these goals should promote the experience of prospective anxiety and hopelessness, and of retrospective shame (in the case of failure).

The available evidence from studies examining the relationships between achievement goals and discrete achievement emotions largely supports these hypotheses. Best documented is the relationship between performance-avoidance goals and anxiety. However, as outlined in the previous section, recent research also shows clear relationships between mastery goals and activity emotions (positive relation to enjoyment, negative relation to boredom) and between performance

goals and pride, shame, and hopelessness (Daniels et al., 2008, 2009; Pekrun et al., 2006, 2009).

Moreover, the close relationships between achievement goals and achievement emotions suggest that emotions may (at least partly) explain the impact of achievement goals on performance. In the prospective study reported by Pekrun et al. (2009), college students' achievement goals (mastery-approach, performance-approach, and performance-avoidance goals) were assessed one week before a midterm exam and their study-related achievement emotions one day before the midterm exam; midterm exam grades were the dependent variable in this study. For performance-approach goals, significant indirect links were observed between these goals and performance through both hope and pride. The goal-performance relation was partially mediated by these emotions. For performance-avoidance goals, significant indirect links were found between these goals and performance through six emotions: hope, pride, anger, anxiety, hopelessness, and shame. The goal-performance relation was fully mediated by the emotions. For mastery goals, significant indirect links were observed between these goals and performance through six emotions: hope, pride, boredom, anger, hopelessness, and shame. Again, the goal-performance relation was fully mediated by the emotions. In sum, these findings suggest that the different foci of achievement goals evoke different emotions during the process of preparing for an upcoming exam, and that these emotions exert a proximal influence on performance outcomes (also see Linnenbrink, Ryan, & Pintrich, 1999, for general negative affect as a mediator of goal effects).

Implications III. Instructional and social antecedents of achievement emotions. The control-value theory proposes that environmental factors shaping students' perceptions of academic control and values also influence their achievement emotions. The following factors are posited to be of particular importance (Fig. 1).

(1) Cognitive quality of learning environments and tasks. Classroom instruction and assignments of high cognitive quality (e.g., clear structure, potential for cognitive stimulation) should positively influence college students' perceived competence and control and the value of academic contents, thus positively influencing achievement emotions. The relative difficulty of instruction and task demands should also influence control and value appraisals. Perceived difficulty should influence perceptions of control, and the match between task demands and students' perceived competencies should influence subjective task value. If demands are too high or too low, task value may be reduced to the extent that boredom is experienced (Czikszentmihali, 1975; Pekrun et al., 2008, in press).

(2) Motivational quality of learning environments and tasks. Professors and peers convey direct (verbal) and indirect (behavioral) messages about academic values (e.g., regarding the importance of mastery vs. performance classroom goals), which should subsequently affect college students' achievement emotions. Two indirect means by which the social environment within the college classroom influence value, and thus achievement emotions, may be most salient. First, instruction, learning environments, and assignments that are shaped to meet students' needs should foster positive activity-related emotions. For example, learning environments that

support cooperative student learning should help students fulfill their need for social relatedness, thus making class more enjoyable (Krapp, 2005; also see Nummenmaa & Nummenmaa, 2008, for positive emotions experienced when actively participating in computer-based collaborative learning). Second, college professors' and instructors' expressed enthusiasm toward academic material can facilitate students' adoption of academic values. Observational learning and emotional contagion may be primary mechanisms that mediate the effects of teachers' enthusiasm on students' values (Hatfield, Cacioppo, & Rapson, 1994; Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009).

(3) Autonomy support. Learning environments constructed to support students' autonomy (e.g., by promoting self-regulated learning) should increase perceptions of control. In addition, such environments should accommodate students' needs for autonomy, and thus increase academic values (Deci & Ryan, 1987). These beneficial effects, however, most likely depend upon the fit between students' perceived competence, individual need for academic autonomy, and the opportunities for autonomy support afforded within these environments. In case of a mismatch, loss of control and negative emotions may result.

(4) Classroom goal structures. Different standards for defining achievement can imply individualistic (mastery), competitive (normative performance), or cooperative goal structures (Johnson & Johnson, 1974). Goal structures can be assumed to influence students' emotions in two ways. First, to the extent that students adopt classroom goal structures (Murayama & Elliot, 2009), they should influence students' achievement goals and any emotions mediated by these goals, as outlined previously. Second, goal structures and grading practices determine the relative opportunities for students to experience success and perceive control, thus influencing control-dependent emotions. Specifically, classrooms with competitive goal structures imply that some students will experience success, and thus positive outcome emotions, whereas others will experience failure, and thus negative outcome emotions. As such, students' average perceived control over achievement within classrooms endorsing competitive goals structures can be low, such that average values of negative prospective outcome emotions like anxiety and hopelessness are increased.

(5) Feedback and consequences of achievement. Cumulative success should strengthen students' perceived control, whereas cumulative failure should undermine perceived control. In environments involving frequent testing, test feedback is likely one primary mechanism determining students' outcome-related achievement emotions. In addition, the perceived consequences of success and failure are important, since they affect the perceived value of achievement outcomes. Positive outcome emotions like hope for success can be increased if success is perceived as both fruitful for long-term outcomes (e.g., future career opportunities) and under individual control (e.g., contingent upon one's own effort investment). Negative outcomes of academic failure (e.g., future unemployment), on the other hand, may increase students' achievement-related anxiety and hopelessness.

Implications IV. Reciprocal causation of antecedents, emotions, and effects. The control-value theory proposes that environmental antecedents, individual antecedents, achievement emotions, learning, and performance are linked by

reciprocal causation (Fig. 1). For example, classroom instruction is assumed to affect the goals and appraisals mediating students' achievement emotions; these emotions, in turn, are assumed to influence learning and achievement. Students' emotions and their emotion-dependent achievement, however, can in return influence individual and environmental determinants. Specifically, emotions can influence goal adoption, control appraisals, and value appraisals, by way of emotion-dependent cognitive processes like mood-congruent recall of task information (see the discussion in the previous section regarding the functional relevance of emotions). Furthermore, students' emotion-dependent academic behaviors and achievement can influence both classroom instruction and the wider social context. For instance, the disruptive, off-task student behavior caused by students' boredom can negatively affect professors' engagement; conversely, engaged students can fuel professors' enthusiasm (cf. Frenzel et al., 2009).

Determinants, emotions, and effects can thus be linked by feedback loops over time. These feedback loops can take different forms. Referring once again to professors' enthusiasm, enthusiasm and students' instruction-related enjoyment can be linked by *positive* feedback loops. Over the semester, professors' enthusiasm should enhance students' enjoyment, which, in turn, should have positive effects on students' course engagement and quality of learning: students' engagement, in turn, should positively impact professors' enthusiasm. Positive feedback loops entailing negative emotions are also possible. For example, achievement pressure in the classroom should increase students' anxiety, which, in turn, should have negative effects on performance: low performance, in turn, may motivate professors to increase achievement pressure in the course. More complex mechanisms may also be at work, including *negative* feedback loops. For example, if a discrepancy between task demands and competence increases a student's anger, but anger fuels effort to raise competences, thus reducing the initial discrepancy, then relative demands, anger, and achievement may be linked by a negative feedback loop over time. Although these reciprocal effects of emotions, their determinants, and their effects have barely been addressed by educational research to date, to attain any complete assessment of classroom reality, these complex dynamics of students' emotions would need to be taken into account (also see Turner & Waugh, 2007).

Implications V. Universality of achievement emotions across genders, settings, and cultures. As for emotions more generally, we assume that general functional mechanisms of achievement emotions are bound to universal, species-specific characteristics of our mind. In contrast, specific reference objects of these emotions, as well as specific values of process parameters (e.g., intensity of emotions), may be specific to different individuals, genders, achievement settings, and cultures. The basic structures and causal mechanisms of achievement emotions are expected to follow nomothetic principles, whereas reference objects, intensity, and duration of emotions can differ (Pekrun, 2009).

Evidence corroborating these propositions comes primarily from studies with K-12 students. For example, we found that the relationships between girls' and boys' appraisals and their achievement emotions in mathematics were structurally equivalent across the two genders (Frenzel, Pekrun, & Goetz, 2007b). However, perceived control in this domain was substantially lower for girls. As a consequence,

girls reported less enjoyment in mathematics, as well as more anxiety and shame. Concerning achievement settings, we found that students' emotions experienced in mathematics, science, and languages differed in mean levels across subject domains, but showed equivalent internal structures and linkages with academic achievement across domains (Goetz, Frenzel, Pekrun, Hall, & Lüdtke, 2007). Similarly, in a cross-cultural comparison of Chinese and German students' achievement emotions, we found that mean levels of emotions differed between cultures, with Chinese students reporting more achievement-related enjoyment, pride, anxiety, and shame, and less anger. Nevertheless, the functional linkages of these emotions with perceived control, important others' expectations, and academic achievement were equivalent across cultures (Frenzel, Thrash, Pekrun, & Goetz, 2007).

Principles of universality may hold for cross-cultural differences between college students' achievement emotions as well. In our research on achievement goals and emotions, students from U.S. and German universities differed regarding mean levels of goals and emotions, but the structural relations between these goals and emotions were equivalent across countries (Pekrun et al., 2006). Similarly, in research analyzing the determinants and performance effects of students' boredom in university courses, Pekrun et al. (2008, in press) found that boredom was predicted by low academic control and values, and had negative effects on academic performance, in structurally equivalent ways in Canadian and German samples of university students.

Emotion Regulation, Coping, and Therapy

As argued up to this point, emotions can be facilitative for academic success, but they can also be deleterious for effortful information processing and students' academic careers. If emotions impede higher-order goals, such as recurring test anxiety perpetually hindering academic achievement, attempts can be made to regulate these emotions. Regulation of negative emotions, and of stress situations which tax or exceed individual capabilities, is referred to as *coping* in the emotions literature (Zeidner & Endler, 1996). More severe emotional problems warrant the help of a professional therapist (*therapy* of achievement emotions). Furthermore, college instructors and administrators can influence students' emotions by shaping *educational practices* (e.g., learning environments and tasks at college) in beneficial ways. In this section, emotion regulation, coping, and therapy of achievement emotions are discussed. Implications for educational classroom practices are addressed in the next section.

Emotion Regulation and Coping with Test Anxiety

Emotion regulation serves higher-order goals like physical or psychological well-being, academic achievement, and the maintenance of social relations. Generally

(but not always), emotion regulation implies strengthening or maintaining positive emotions, and decreasing or preventing negative emotions. Basic components of regulation include recognizing and understanding one's emotions, managing one's emotions, and using emotions for action and goal attainment (e.g., for studying, completing projects). More specifically, managing one's own emotions can be done by targeting the symptoms of the emotion (*emotion-oriented regulation*), by changing underlying appraisals (*appraisal-oriented regulation*), or by acquiring competences to study more efficiently, thus making it possible to experience the emotional benefits of ensuing academic success (*problem-oriented regulation*; see Fig. 1). Furthermore, beyond regulatory competences pertaining to one's own emotions, emotional competences also comprise abilities to recognize, understand, manage, and use the emotions of others. Cognitive competences to regulate one's own and others' emotions have become popular under the label of *emotional intelligence* (Matthews, Zeidner, & Roberts, 2002).

To date, little is known about students' emotion regulation in college and university. The only major exception is research on coping with test anxiety, and with the exam stress causing test anxiety. Coping with anxiety has been addressed by Lazarus' transactional stress model cited above (Lazarus & Folkman, 1984, 1987). In this model, appraisals of threat, as implied by situations taxing or exceeding one's own capabilities, are assumed to induce test anxiety, and anxiety is thought to lead to attempts to regulate this emotion and/or the stress that caused it. After Lazarus proposed his model, many taxonomies of coping with negative emotions, and with test anxiety more specifically, were proposed. Basic to most of these conceptions is a differentiation between (1) problem-oriented coping, (2) emotion-oriented and appraisal-oriented coping, and (3) avoidant coping (Rost & Schermer, 1987; Zeidner & Endler, 1996; for a critical view, see Skinner, Edge, Altman, & Sherwood, 2003).

Problem-oriented coping entails active attempts to change the situation that causes subjective stress and negative emotions. In exam-related situations, problem-oriented coping would involve employing cognitive, metacognitive, and resource-oriented learning- and problem-solving strategies, both while studying and taking exams. Problem-oriented coping related to exams (i.e., preparing for the exam) can have adverse effects, such as increased situational anxiety, since dealing with the exam material can arouse thoughts about the upcoming exam (Bolger, 1990). Over the long run, however, for most students the beneficial effects of preparing and improving one's competences (e.g., increased control beliefs, improved academic performance, and decreased anxiety) likely outweigh any negative situational effects.

Emotion-oriented and appraisal-oriented coping is aimed toward directly changing unpleasant emotions, including attempts at actively modifying the symptoms of these emotions. Typical strategies include (a) anxiety reduction by means of alcohol, nicotine, or pharmaceutical consumption, or by means of relaxation techniques; (b) reduction of emotional tension by simply accepting anxiety and the possibility of failure ("secondary control"; Morling & Evered, 2006; Rothbaum, Weisz, & Snyder, 1982; Perry, Stupnisky, Haynes, Chipperfield, & Pekrun, 2010); (c) induction of positive, anxiety-incompatible emotions (e.g., by using humor, music, or emotional

support from others); and (d) cognitively reappraising the situation as more controllable or less subjectively important. Many of these strategies are in fact effective at reducing negative emotions. Some of them, however, clearly have negative side effects, in terms of reduced achievement or health.

Avoidance-oriented coping implies behaviorally or mentally escaping from a stress-inducing situation. Examples of such strategies include (a) searching for mental distraction by focusing attention on task-irrelevant contents and effort withdrawal; (b) procrastination, prolonged phases of recess, and precocious termination of preparing; and (c) truancy, exam-avoidance, and premature terminiation of study programs and college. Like emotion-oriented coping, these strategies can lead to a reduction of situational (immediate) anxiety. However, the side effects can be severe. First, consciously avoiding the experience of anxiety can lead to a detrimental increase of less conscious emotional arousal on a physiological level (see Spangler et al., 2002). Moreover, although these strategies may immediately, yet temporarily, reduce anxiety, the underlying factors contributing to the experience of anxiety (e.g., low perceived control) go untreated. Finally, all of these strategies can clearly be detrimental for students' learning, achievement, and future career prospects.

Most of the coping literature used these or related concepts to describe coping strategies. All too often ignored, however, was that specific strategies can be classified into more than one of the categories cited. Classifying strategies may depend on the observer's perspective. For example, as seen from the perspective of stress reduction, relaxation techniques would imply emotion-oriented coping. However, to the extent that reduction of emotional tension helps academic agency, relaxation can also be regarded as problem-oriented coping. Contemporary measurement instruments of coping using traditional classifications thus run the danger of assessing behavioral surface structures of students' attempts to cope with stress, while missing deeper structures of functional equivalence.

A second problem in much of the existing literature is the simplistic assumption that problem-oriented coping should be adaptive, and emotion-oriented as well as avoidance-oriented coping maladaptive since they don't change the stress-inducing situation. First, different criteria can be used to judge adaptation (is it more important to increase achievement, or to live a life free of excessive anxiety?). Second, the employment of any strategy can have side effects that themselves can be either adaptive or maladaptive, and need not be congruent to the main effects the strategy produces. For example, while persistent, time-consuming academic studying can raise academic achievement and reduce exam stress, it can also cause a break-up of friendships, implying that problem-oriented coping need not always be adaptive. Conversely, caution should also be exercised regarding emotion-oriented or avoidance strategies as maladaptive by default. In the waiting phase after an exam, for example, it can be quite functional to simply reduce any thoughts about the exam or the upcoming announcement of exam results. Any attempts at problem-oriented coping would be futile in this situation, since exam results can't be changed after the fact. Also, an emotion-driven dropping out of a program of studies that does

not match individual needs and capabilities can be a blessing for a student's future development.

Treating Test Anxiety

Individual test anxiety is treatable; in fact some of the treatments for test anxiety are among the most successful psychological therapies available, with effect sizes above $d = 1$ (Hembree, 1988). Similar to the various kinds of individual strategies of emotion regulation and coping, different test anxiety treatments focus on different manifestations and antecedents of this emotion (Fig. 1). These include: affective-physiological symptoms (emotion-oriented therapy), cognitive appraisals (cognitive therapy), and competence deficits caused by lack of strategies for learning and problem-solving (skills training, competence development; for a review of test anxiety treatments see Zeidner, 1998).

Emotion-oriented therapy includes anxiety induction (e.g., flooding), biofeedback procedures, relaxation techniques (e.g., progressive muscle relaxation; Jacobson, 1938), and systematic desensitization. *Cognitive therapies* aim to modify anxiety-inducing control beliefs, values, and styles of self-related thinking. Examples are cognitive-attentional training, cognitive restructuring therapy, and stress-inoculation training. *Study-skills training* teaches students to understand and use task-oriented learning strategies and problem-solving skills that promote academic success and thus decrease anxiety. Finally, *multimodal therapies* integrate different procedures to address different symptoms and antecedents of anxiety within one treatment.

Cognitive and multimodal therapies have proven especially effective at both reducing test anxiety and enhancing academic performance (Zeidner, 1998). Study-skills training has been shown to successfully reduce test anxiety in students with deficits in their learning strategies. Consistent with the arguments above, therapy focusing exclusively on emotion-oriented procedures has been shown to successfully reduce anxiety, but has proven less effective at improving academic achievement. These kinds of therapy address the affective and physiological components of anxiety, but not the underlying cognitive components of anxiety that are primarily responsible for the performance-debilitating effects of this emotion.

Implications for Practice and Research in Higher Education

This chapter set out to provide a summary review of research on students' achievement emotions in higher education. As described throughout the sections of this review, cumulative evidence exists on the nature, assessment, effects, development, and treatment of college students' test anxiety; however, this is merely one of the major emotions experienced by students at college and university. As such, a number

of practical recommendations for educational practices in higher education institutions concerning test anxiety can be derived. As for emotions other than anxiety, research has only just begun to accumulate knowledge that might help in the development of more complete accounts of students' emotions, and to construct more comprehensive guidelines for fostering these emotions in college classroom settings. By necessity, the findings reviewed in this chapter imply that more research on emotions other than anxiety is necessary, and that evidence-based recommendations to date are largely confined to treating and managing test anxiety.

Implications for Educational Practice in Higher Education

While students' achievement emotions may be deeply rooted in pre-college experiences, the college environment provides new settings and challenges that have the potential to change students' emotional approaches to learning and achievement in fundamental ways. Situational demands for more self-regulation at college, for example, pose new tasks and tests of students' self-development. Also, the community of college students within classrooms and across campus provides new reference groups for evaluating own abilities, and fresh experiences that can drastically differ from any previous experiences at high school. It is the responsibility of educators and administrators to shape college environments to foster students' academic development and health, including their emotional approaches to learning. However, due to the lack of educational intervention research targeting student emotions to date, practical recommendations regarding how to foster students' adaptive emotions and prevent or reduce maladaptive emotions remain largely speculative.

Theoretically, it can be assumed that educational practices intended to foster adaptive emotions such as enjoyment of learning can refer to different components and antecedents of emotions, much as treatment practices pertaining to test anxiety do (see above). For example, while announcements of specific grading practices can be suited to change students' emotion-inducing control perceptions, teachers' own emotions can model the affective and expressive components of students' emotions by way of emotional contagion. As to environments and practices that may be suited to influence student emotions, assumptions can be inferred from the discussion on instructional and social determinants of emotions in the previous section, and a limited number of more firmly based recommendations can be derived from test anxiety studies.

Shaping learning environments and task assignments. One potential means of positively affecting college students' learning-related enjoyment relates to increasing the *cognitive quality* of tasks and classroom instruction. As noted earlier, this can be achieved by creating learning assignments that optimally match task demands and students' competences (e.g., by using differentiated task structures; Rosenholtz & Simpson, 1984), which should prevent boredom and promote enjoyment. Furthermore, shaping learning environments such that they meet students'

needs for social relatedness should also have beneficial emotional effects (e.g., by providing opportunities for collaboration; Johnson & Johnson, 1974).

Learning environments that create demands to engage in *self-regulated learning* can also promote positive emotions. As stated above, when the learning environment affords opportunities for self-regulated learning and when students perceive themselves as capable of regulating their learning, positive course-related emotions (e.g., enjoyment) should be increased for at least two reasons. First, students can fulfil their need for autonomy and increase their sense of personal control. Second, students can select and organize learning material to meet their individual interests, thus increasing the subjective value of the course and course material. However, if the learning environment is not designed to support self-regulated learning and/or if students feel unable to regulate their learning, negative emotions may be promoted.

Extending beyond the structure of learning environments and tasks, displays of *excitement and enthusiasm* may be one primary emotional tool instructors can use in the college classroom to induce enjoyment of academic learning, and to prevent boredom in classrooms. However, excitement and enthusiasm probably need to be enacted such that true emotions are displayed, since insincere emotions can be recognized from subtle cues indicating incomplete or distorted facial expression, which would probably undermine any positive modelling effects.

Shaping exams, grading practices, and the consequences of achievement. As implied by the evidence on the determinants of test anxiety, structuring exams and grading practices in appropriate ways can be one of the most effective, albeit complex means of fostering adaptive emotions. Drawing from test anxiety research, measures that increase perceived control, decrease the importance of failure, or decrease the impact of anxiety on performance, can be beneficial. Regarding *exams*, these measures include: (a) making demands transparent by clearly structuring materials and procedures; (b) giving students a choice between tasks; (c) giving students second chances; (d) providing external aids, such as access to lecture notes, text books, or computers; and (e) using closed item formats to ease working memory load. Naturally, some of these measures also have disadvantages. For example, using highly structured material may benefit anxious students, but may impede less anxious students' performance. Further, using only multiple-choice items may reduce anxiety, but may preclude the use of item formats that are better suited to assess deep-level thinking and creative problem-solving.

As to *grading practices* and the ensuing classroom goal structures, competitive practices based on social comparison norms probably increase average levels of student anxiety, shame, and hopelessness by limiting chances for success and raising the visibility and social importance of academic performance (by increasing the value of achievement, competition might also increase positive emotions if success is experienced; Frenzel, Pekrun, & Goetz, 2007a). Grading based on social comparison may be needed for purposes of placement and selection, implying that goals of fostering student emotions, on the one hand, and producing usable information on student achievement, on the other, may be in conflict. However, to the extent that assessments aim to serve teaching and learning rather than being used for selection

purposes, criterion-oriented grading pertaining to mastery of the learning material probably is more recommendable than the normative practices prevailing in today's college classrooms.

Finally, regarding *consequences of achievement* and the value of academic success and failure for future outcomes (e.g., career opportunities), it should prove helpful to highlight connections between students' academic effort and the attainment of future prospects. Effort-outcome associations of this type should increase perceived control, thus strengthening positive and reducing negative future-related achievement emotions. To the contrary, should future desired outcomes not be contingent upon students' academic effort, then students may experience reduced perceived subjective control and increased negative prospective emotions like anxiety or hopelessness.

Directions for Future Research

Given the clear importance of many of the achievement emotions experienced by college students, more extensive research on these emotions is overdue. This section discusses some of the pressing concerns that research should attempt to tackle and resolve in the upcoming years (see Pekrun & Schutz, 2007).

Concepts of emotion and emotion taxonomies. At present, the boundaries of the concept of "emotion" still remain unclear. While there is consensus that anxiety, anger, or joy are basic emotions that belong to this conceptual category, this is less clear for a number of other phenomena. For example, interest has variously been seen as an emotion, as an amalgam of values and emotion (more specifically, enjoyment), or as a construct different from emotion. Defining the conceptual relations betweens students' interest and their emotions, however, is a necessary precondition for conceptualizing their functional relations (is students' interest part of the domain of emotions, or does it function as a determinant or an effect of emotions?).

Also, should emotions be seen as separate from students' mood, or is mood just one subcategory of emotion? In social psychological theories, mood and emotions are often seen as distinct entities, the boundaries being defined by intensity (high vs. low), duration (short vs. long), and object focus (emotions having a clear focus, mood having a less clear or no focus). Since both of these differences seem to imply dimensional distinctions rather than categorical differentiation, it might be more fruitful to see mood versus emotion as bipolar ends of a conceptual continuum, rather than as a categorical distinction between qualitatively different phenomena. This view has been used in the present chapter, but to date this issue seems far from being settled in mood and emotion research.

Furthermore, there is disagreement regarding how students' emotions, and emotions more generally, should best be classified. Dimensional approaches focus on the common denominators of emotions and distinguish emotions along common dimensions. A prototypical example is the circumplex model of affect using the dimensions of activation and valence (Feldman et al., 1998). In contrast, categorical approaches focus on the specific, discrete qualities of different emotions. Among

the many specific implications of this debate is whether the emotional consequences of students' achievement goals should be defined in terms of positive versus negative affect (e.g., Linnenbrink & Pintrich, 2002), or in terms of discrete achievement emotions like enjoyment, hope, anger, anxiety, etc. (e.g., Pekrun et al., 2006, 2009).

Integrating theoretical approaches and research traditions. To date, many disciplines within education and psychology are characterized by a prevalence of mini-theories addressing isolated phenomena, and by related research traditions working in relative isolation. Emotion research is no exception to this rule. For example, experimental research addressing the effects of positive and negative mood on cognitive performance is in a disintegrated state to date that makes if difficult, for researchers and practitioners alike, to draw any generalizable conclusions. In order to build cumulative knowledge and lay the foundations for integrating empirical findings, it seems necessary to construct more integrative theories by identifying common assumptions of existing approaches, combining these assumptions, and extending assumptions so that gaps between emotion research and neighboring fields (like motivation) can be bridged. The control-value theory of achievement emotions outlined above represents one attempt to do so.

Mixed-method research strategies: I. Analyzing emotions from idiographic and nomothetic perspectives. In field-based educational research on emotion, inferences about the within-person functions and antecedents of college students' emotions are often derived from interindividual correlations of variables. For example, inferences on the causal role of test anxiety for performance are often deduced from correlations of test anxiety scores with subsequent academic performance. Such inferences may be quite misleading, since it may happen that an interindividual correlation between two variables does not represent the intraindividual relation between these two variables in any single person under study. Generally, interindividual and intraindividual correlations of variables are statistically independent, such that any inferences of this type may be unwarranted (see Robinson, 1950; Schmitz & Skinner, 1993).

Rather than relying on interindividual correlations, future research should take care to make use of strategies analyzing the psychological functions of emotions within individuals first, before drawing any population-oriented conclusions. Such an approach would imply first using *idiographic,* intraindividual analysis, then analyzing the distributions of intraindividual functions across individuals, and finally, drawing *nomothetic* conclusions about more general mechanisms of functioning, on condition that there is sufficient homogeneity of idiographic findings across individuals (for empirical examples in the field of student emotion and motivation, see Pekrun & Hofmann, 1996; Schmitz & Perels, 2006; Schmitz & Skinner, 1993).

Mixed-method research strategies: II. Integrating qualitative and quantitative methodology. Educational research on emotion uses both qualitative and quantitative approaches (Schutz & Pekrun, 2007). However, rarely are both approaches combined such that the benefits of each of them are maximized. Also, the limitations of both types of approaches are rarely fully acknowledged. For example, while qualitative evidence may well be used to generate hypotheses on college students' emotions, it is less suited to test these hypotheses in more precise ways.

Conversely, while quantitative evidence is needed to test a priori hypotheses, it often needs added qualitative insights to explain findings, especially in the case of anomalies. Future investigations of college students' emotions should make use of systematically combining both types of approaches.

Baserates, phenomenology, and components of student emotions. As noted at the outset of this chapter, there is a clear lack of exploratory research into the occurrence and phenomenology of college students' emotions. Such research seems necessary to judge the relative importance of different emotions as experienced by different students, and in different types of academic situations. Also, it would be important to explore if there are differences between the emotions found in college classrooms and the emotions experienced by students in other educational settings, such as K-12 classrooms or settings of business education. In addition, phenomenological evidence is needed in order to generate more comprehensive conceptions of the contents and functions of student emotions, beyond hypotheses that can deductively be derived from existing theories. Finally, we also need more qualitative and quantitative evidence on the structural relations between the different components of student emotions. To date, it is clear that different component processes of emotions are, typically, loosely coupled instead of showing deterministic relations, but the precise mechanisms of reciprocal relations between components, and the degree to which components can be predicted from information about other components, are still largely unclear.

Evidence on baserates and structures can have far-reaching consequences for assessment, treatment, and educational practice. For example, if components of emotions strongly influence each other, modifying one component can produce spill-over effects such that the other component is changed as well. If influences are weak, effects of treatments or educational practice would be more circumscribed. For example, if cognitive treatment additionally changes physiological emotion components, it might well be suited to foster students' emotion-dependent health. If the effects are confined to cognitive components of emotions, other methods would have to be used instead of, or in addition to, cognitive therapy.

Assessment and modelling of student emotions. As noted in the section on assessment, different methodologies to assess human emotions are available to date, but most of these methodologies have not yet systematically been applied to college students' emotions. Specifically, this pertains to neuropsychological methods of mental imaging, and to observational procedures of assessing emotions in academic situations like classroom interaction. As to self-report methods, many instruments are available to assess students' test anxiety, but there is a clear lack of multidimensional instruments measuring a broader range of emotions (the Achievement Emotions Questionnaire discussed above being an exception). A specific, important deficit is the lack of real-time indicators of emotions being able to assess their dynamics over time (EEG methods are an exception; e.g., Meinhardt & Pekrun, 2003). Since instruments are lacking, it also is open to question which types of indicators (self-report, physiological, observational, etc.) might be best suited to assess specific aspects of college students' emotions.

Emotions are processes that unfold over time. Therefore, beyond static measures of students' trait or state emotions, methods to assess and model the dynamics of these emotions, and the multidirectional linkages between the implied component processes, would be needed to develop more fine-grained descriptions of emotions and their functional properties. Experiments can deliver evidence on no more than isolated segments of these dynamical, multidirectional relationships. Many non-experimental approaches (e.g., structural equations modelling based on field studies), on the other hand, have difficulties disentangling the multiplicity of causal effects often operating simultaneously in the dynamics of emotions. It is a challenge for future research on student emotions to develop or adapt dynamic modelling procedures that are better suited to model real-time emotional processes.

Effects of student emotions on achievement, social relations, personality development, and health. As outlined in the preceding sections, evidence on the consequences of college students' emotions is largely lacking, except knowledge about the performance effects of test anxiety. However, even for test anxiety, two research deficits should be noted. First, the bulk of test anxiety research focused on the effects of anxiety on academic learning and performance. Far less evidence has been accumulated as to the consequences of students' anxiety for their social relationships, long-term identity formation, and health. Second, as noted, most empirical studies have used unidirectional designs analyzing the performance effects of students' anxiety. There is a clear need for more longitudinal investigations addressing the reciprocal linkages between emotions (including anxiety), on the one hand, and students' academic learning and performance, on the other (e.g., Folkman & Lazarus, 1985).

Determinants, development, and regulation of student emotions. As with the effects of college students' emotions, evidence on individual determinants, social and classroom antecedents, development, and regulation of these emotions is largely confined to test anxiety to date, with the exception of studies on the attributional antecedents of emotions following success and failure. More research on cognitive as well as non-cognitive individual determinants is needed, including research on the precise mechanisms linking appraisals and emotions (Reisenzein, 2001), on the genetic and physiological foundations of achievement emotions, and on the interactions between different types of determinants. Similarly, research should systematically analyze how different learning environments, academic tasks, and behaviors of important others influence students' emotions. Finally, coping research should address emotions other than anxiety as well, and students' regulation of their emotions, as well as the role of their emotional competences and emotional intelligence, should be analyzed.

The role of higher education systems and institutions. Higher education institutions are among the oldest institutions in our societies. To our knowledge, however, no attempt has yet been made to situate perspectives on college students' emotions in the larger socio-cultural and historical context that shapes higher education institutions and the learning environments these institutions provide. Also, in contrast to international assessments of K-12 education (e.g., Organization for Economic Cooperation and Development, 2004), empirical evidence implying international and

cross-cultural comparisons of students' emotional situation across higher education systems of different countries seems to be largely lacking to date. Contextual knowledge on cross-cultural differences and similarities across the centuries, and across different nations, might prove helpful for planning long-term institutional transformation such that it takes retrospective accounts of possible change into account, while at the same being embedded in future-oriented perspectives.

Intervention research: Need for evidence-based knowledge on therapy, prevention, and "emotionally sound" college environments. To date, we lack knowledge about effective treatment for college students' problems with negative academic emotions, with the exception of test anxiety therapy. Furthermore, there also is a lack of knowledge on ways to prevent maladaptive emotions, even for test anxiety (Zeidner, 1998). Finally, evidence is needed how higher education institutions and their learning environments can be shaped such that college students' emotions are fostered and influenced in "emotionally sound" (Astleitner, 2000) ways. Researchers should conduct intervention studies exploring ways to do so. This may not be an easy task, as can be seen from the obstacles that recent K-12 intervention studies targeting students' emotions have encountered (e.g., Glaeser-Zikuda, Fuss, Laukenmann, Metz, & Randler, 2005). However, in order to lay the foundations for transferring the insights of emotion research into educational practice, and to do so in empirically based ways, there is no alternative to intervention research directly addressing the impact of change.

Conclusion

In the concluding chapter of their 2000 *Handbook of Self-Regulation* covering the state of the art in research on self-regulation, Boekaerts, Pintrich, and Zeidner (2000) posed the question, "How should we deal with emotions or affect?" (p. 754). The review provided by the present chapter has shown that research on college students' academic agency is still grappling with this question. It seems that higher education research has not even begun to search for systematical, evidence-based answers to questions about college students' emotions, research on students' test anxiety being an exception.

Theoretical considerations and the little evidence available, however, suggest that the achievement emotions experienced in academic settings are critical to college students' academic development. This pertains to students' motivation to learn, use of learning strategies, and self-regulation of learning underlying their acquisition of knowledge. Furthermore, beyond their functional relevance for knowledge acquisition and performance, emotions likely are no less important for college students' long-term persistence and dropout behavior in pursuing their academic careers, and for their overall personality development, social behavior, and physical and psychological health.

By implication, higher education research would be well advised to pay more attention to the affective sides of students' academic development. With the

advent of broader conceptions of human psychological functioning replacing an exclusive focus on cognitive processes by including neuropsychological, emotion-oriented, and socio-cultural perspectives as well, chances may in fact have increased that researchers start analyzing the emotional aspects of students' learning and achievement, and of their personality development and well-being more generally.

In conclusion, it should be noted that similar arguments can be made for the emotions experienced by instructors, professors, and administrators in higher education institutions. To date, next to nothing is known about professors' emotions experienced in classroom teaching, and the role these emotions play in the quality of their teaching, their professional development, and their well-being, burnout, and physical health (for emotions in K-12 teachers, see Frenzel et al., 2009; Schutz & Pekrun, 2007). Future research should analyze college students' emotions, but it should also extend perspectives to include the emotions experienced by professors and administrators.

Notes

1. The Achievement Emotions Questionnaire was first published under the name "Academic Emotions Questionnaire" (Pekrun et al., 2002b).
2. The test emotions section of the instrument has been published under the name "Test Emotions Questionnaire" (TEQ; Pekrun et al., 2004). The Test Emotions Questionnaire is an integral part of the AEQ.
3. Whereas enjoyment of learning should focus attention on the learning task, the situation may be more difficult for other positive achievement emotions like hope or pride having both task-related and task-irrelevant reference objects. For example, social-comparison pride may focus attention on having defeated others, thus distracting attention. Mastery pride, on the other hand, may focus attention on task-related progress, thus preserving task-focused attention. For different kinds of hope, similar arguments can be made.

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The Use of Panel Data Models in Higher Education Policy Studies

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Introduction and Motivation

This is an exciting time for policy studies in higher education. The demand for scientifically-based evidence to inform important policy decisions in higher education has never been higher. The fundamental question of almost all policy studies is to determine what works and what does not work, whether it is financial aid programs, academic interventions, or public resource allocations. For example, does need-based financial aid improve college persistence and graduation? Are state-sponsored merit-based aid programs successful in retaining the best and brightest students in their home states? Does remedial math education increase student retention? Do higher state appropriations result in better institutional outcomes such as student learning and research productivity? Many debates in program evaluation ultimately lead to the critical issue of causality: Is the relationship between policy variables and outcomes we observe in empirical data causal or is it simply a correlation that is driven by confounding factors? The importance of causal inference is not a new call in educational research; however, it has recently undergone a renaissance following the publication of several influential reports that advocate the use of scientific research in education (National Research Council, 2002, 2005; Schneider, Carnoy, Kilpatrick, Schmidt, & Shavelson, 2007).

Randomized field trials, which have long been regarded as the gold standard for establishing causality, are relatively rare in educational research. Indeed, randomized trials would be impossible or not appropriate in many situations. For instance, to estimate the effect of need-based financial aid programs, a true experimental design would require financial aid to be randomly distributed among students with financial need. Or to estimate the effect of college quality/prestige on student outcomes, an experimental design would randomly assign students into colleges of varying quality/prestige. The majority of policy evaluation studies in higher education have therefore used observational data and correlational methods, yet the leap

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from correlations based on observational data to causal relations is a large one. The common technique in quantitative empirical research is to use multiple regression to control for confounding factors that may have produced observed correlations in the hope that policy variables would be independent from individuals' pre-treatment characteristics thereby leading to valid conclusions. The burden is, however, on the researcher to argue that no important confounders have been omitted, a tall order in many situations.

Over the past several decades, social scientists have developed a variety of methods beyond conventional multiple regression methods to permit the identification and estimation of treatment effects based on observational data. These techniques include fixed effects models, instrumental variables approach, matching and propensity score, and the regression discontinuity approach. Card (2001) provides an excellent review of the studies that have used compulsory schooling laws and differences in the accessibility of schools as instrumental variables to estimate the return to schooling and college education. Doyle (2009) and Reynolds and DesJardins (2009) use propensity score matching to examine whether attending a community college lowers the probability of completing a bachelor's degree. Van de Klaauw (2002) uses discontinuities in the financial aid assignment rule to estimate the effect of financial aid on student enrollment decisions. A brief discussion on each of these methods is also provided in Schneider et al. (2007).

In using these methods, however, one has to be aware of their inherent assumptions and tradeoffs. In the instrumental variable approach, for example, an instrument is assumed to be as good as random assignment. That is, the instrument affects the outcome variable only through the variable it instruments (i.e., through the first stage regression) but has no direct effect on the outcome variable. As such, the effect estimated using instrumental variables only applies to those for whom the instrument is binding. Similarly, in the regression discontinuity approach, observations around the discontinuity or "cut" point are assumed to be randomly assigned into treatment and control groups, emulating an experiment. From this point of view, regression discontinuity is a special case of the instrumental variable approach, and any estimated effects can only be generalized to those around the cut point.

Panel data provide yet another strategy to control for individual differences. Panel data contain multiple subjects observed multiple times, which provide both variation across subjects at particular points in time and changes for each subject over time. The advantages of using panel data include the ability to control for individual heterogeneity, statistical efficiency due to more information, a temporal dimension that enables dynamic adjustment, and better and more detailed data that allow researchers to model individual behaviors and identify effects (Baltagi, 2008). The use of panel data models is particularly attractive to policy studies in higher education for statistical and conceptual reasons.

The statistical attraction of panel data models lies in their ability to control for individual heterogeneity. More often than not, the unit of analysis in higher education research, whether it be student, faculty, department, institution, or state, is heterogeneous in both observed and unobserved ways. Cross-sectional analyses not

controlling for this heterogeneity run the risk of omitted variable bias. For example, in Zhang (2007), nonresident enrollment at an institution is modeled as a function of nonresident tuition at that institution, the alternative resident tuition faced by nonresident students, and family income in neighboring states where the majority of nonresident students come from. The economic theory of demand holds that when nonresident tuition is high at an institution, nonresident enrollment at that institution will be low. However, there are many institution-specific variables that may also affect nonresident enrollment. These variables include institutional prestige, geographical location, and the academic programs available. Some of these variables are difficult to measure or hard to obtain, as a result, these unobserved individual differences may lead to biased estimates when cross-sectional data and traditional statistical methods are employed. Panel data and the methods designed to apply to this type of data can help remedy some of these analytic problems.

The conceptual appeal of panel data model lies in its attention to within-unit variations, i.e., changes for each unit (e.g., student, school, college, etc.) over time. Cross-sectional studies use between-unit variation and focus on explaining variations across units; whereas panel data models are used to help us understand changes within individual units. Arguably, results obtained from examining within-unit variations are more appropriate and meaningful for policymaking in many scenarios. Again, take the above nonresident enrollment as an example. Using a cross-sectional sample of institutions, one is most likely to obtain a positive relationship between nonresident tuition rates and nonresident enrollment across institutions, i.e., nonresident enrollment is higher at institutions that charge higher nonresident tuition. This may not be an incorrect finding, although it may not be particularly relevant if the goal is to determine the optimal nonresident tuition rate at a particular institution. Indeed, the majority of policy questions in higher education are concerned with changes within units rather than variations across them.

As Collins (2006) argues, longitudinal studies are characterized by three interrelated elements: a theoretical model of change, a temporal research design that highlights the process of change, and a statistical model that is an operationalization of the theoretical model. To answer policy questions in higher education that are based on change in nature, we need research designs and statistical models that reflect and operationalize this reality.

Panel data methods have been widely adopted in social and behavioral sciences to address a broad range of issues. Halaby (2004) and Collins (2006) provide excellent overviews of panel data methods in sociological and psychological studies. Halaby (2004) in particular claims that "panel studies are fast displacing their cross-sectional counterparts at the heart of sociological research" (p. 507). In contrast, advantages of panel data methods have not been fully capitalized in the field of higher education to answer important policy questions, partly because the availability of panel data is a fairly recent phenomenon in higher education and partly because the literature on panel data models has not been made readily accessible to higher education researchers.

To get a sense of the application of panel data methods in higher education research, we did a thorough scan of all research papers published in the three

major journals in higher education (*Journal of Higher Education*, *Research in Higher Education*, and *Review of Higher Education*) in 2007 and 2008. Of the more than 110 studies that used quantitative data, about two dozen used a longitudinal design. The majority of these longitudinal studies, however, employed techniques that exploit between-subject variations. For example, a few studies have adopted event history analysis to analyze student persistence (e.g., Chen & DesJardins, 2008; Ishitani, 2008) and adoption of public policies (e.g., Hearn, McLendon, & Mokher, 2008; McLendon, Deaton, & Hearn, 2007). Only three studies have utilized within-subject variations over time to study whether state characteristics of higher education governance affect state performance grades (Volkwein & Tandberg, 2008), whether tuition rates affect college enrollment (Zhang, 2007), and whether state appropriations affect voluntary support (Cheslock & Gianneschi, 2008).

It is timely that we use this handbook chapter to discuss the use of panel data in higher education policy studies; however, we do not intend to provide an exhaustive review of all panel data models. For those who are interested in a systematic treatment of panel data models, please refer to Chamberlain (1984), Baltagi (2008), Hsiao (2003), and Arellano (2003). Wooldridge's (2002, 2003) texts also discuss key principles that apply to the analysis of panel data. This chapter examines the basic principles and models of panel data analysis and the variations of these techniques that are particularly relevant to the study of higher education issues. They include fixed effects models, random effects models, pooled cross sectional models, difference-in-differences estimator, and random coefficient models. Special topics such as heteroscedasticity and serial correlation will also be discussed briefly. This chapter also provides two empirical examples derived from recent publications to illustrate how panel data models can be used to answer a variety of important higher education policy questions. The chapter will conclude by a brief discussion about statistical packages and procedures that are often used to conduct panel data analysis.

Having been trained in economics, I often follow the notation and terminology in the econometrics literature and ignore the psychometrics literature on longitudinal data and the parallels of panel data methods used in psychometrics [for excellent reviews of these refer to Harris, 1986; Collins & Horn, 1991; Raudenbush, 2000]. Given my disciplinary bias, the discussion herein may be constrained by epistemological differences among the disciplines. For example, sociologists and psychologists tend to focus on individual growth and how time-invariant and time-variant factors figure into this process, whereas economists emphasize and indeed are often very concerned about the importance of controlling for individual heterogeneity when explaining social and economic phenomena.

The next section provides a detailed discussion of commonly used panel data models. I begin with a discussion of the structure of panel data and compare it to both cross-sectional and time series data structures. I then discuss the issue of individual heterogeneity in higher education studies. The majority of the section is devoted to different panel data models that address the individual heterogeneity problem in higher education policy studies.

Panel Data Models

Structure of Panel Data

Based on the number of time points we collect data and the number of observations at each time point, data sets can typically be classified into three structures: cross-sectional, time series, and panel data. All three types of data sets have been used in higher education research, depending on the nature of subjects studied and research questions asked.

Cross-sectional data contain a number of subjects (e.g., students, institutions, and states, etc.) at a single point in time, or during a relatively short time window. This type of data provides a snapshot of the population of interest at a particular time point. For example, if one is interested in the variation in college graduation rates, tuition rates, and/or levels of state funding across 4-year public institutions for a particular year, a cross-sectional sample could like the one described in Table 1 below.

Table 1 Example of a cross-sectional data set

Unitid	Entering year	Carnegie classification	Grad rate (%)	Tuition ($)	STFTE ($)
100654	1999	Comprehensive I	31.95	2412	6777
100663	1999	Research I	35.87	3351	15706
...	...	...	...	...	...
100706	1999	Doctoral II	43.84	3218	7793
209542	1999	Research I	61.08	3683	9163
...	...	...	...	...	...
240329	1999	Comprehensive I	63.83	3219	4779
240365	1999	Comprehensive I	48.04	3100	5023

Unitid: Unique ID to identify institutions in IPEDS
Entering Year: The year when an entering cohort starts college, i.e., the 6-year graduation rate for the 1999 cohort is collected in 2005
Carnegie Classification: 1994 Carnegie classification
Grad Rate: Six-year graduation rate for the 1999 first-time full-time freshmen cohort
Tuition: In-state tuition and fees, in 2005 constant dollars
STFTE: State appropriation per FTE enrollment, in 2005 constant dollars

Cross-sectional data sets are the most commonly used data structure in higher education research. Analysis of cross-sectional data typically consists of comparing and contrasting among subjects. Regression analysis can also be used to study the association or relationship among variables across subjects. The majority of studies published in the three major higher education journals during last 2 years utilize cross-sectional data sets. For example, Johnson (2008) uses a cross-sectional sample of high-school graduates to examine the impact of high-school characteristics on students' college attendance, persistence, and graduation, after controlling for a host of socio-economic status and academic ability factors, and the results are not surprising. The proportion of SAT takers in a high school has a positive (and a concave shape) effect on college attendance, retention, and graduation. Students coming from schools with a higher proportion of students receiving free lunch are less likely

to persist, and students coming from schools close to colleges are more likely to attend and persist in college. These results provide valuable tools for enrollment management; however, these results are not suitable for strong causal inference, limiting their relevance for public policies in promoting college attendance, retention, and graduation.

Because cross-sectional data only provide a snapshot of the population of interest, we do not know for example, from the data provided above, whether the graduation rate has increased or decreased over time for each institution. Time series data remedies some of the problems inherent when using cross-sectional data by observing a subject over time, thereby presenting a more complete history of that subject. For example, time-series data are often used in institutional research to track changes in events and outcomes within an institution. For example, a typical data set that records changes in college graduation rates, tuition, and state funding for a single institution (hence why there is only one Unitid) might look like the one presented in Table 2.

Compared with the use of cross-sectional data, time series data is used less frequently in higher education research. An exception is Archibald and Feldman (2008), who compare trend data on real cost of higher education (as measured by expenditures per FTE) and of other industries to test whether the revenue theory of costs (Bowen, 1980) and/or the cost disease explanation seem to be operating (Baumol & Bowen, 1966; Baumol, 1967). Another exception is Noorbakhsh and Culp (2000) who use data on nonresident enrollment and tuition in Pennsylvania over a 12-year period to estimate nonresident a student demand function.

A panel data set combines both cross-sectional and time series data: it follows multiple subjects over multiple time periods, thereby providing both variation across subjects and changes over time. Continuing our example, Table 3 provides an example of a typical panel data set.

The panel data structure tracks observations across two dimensions, the first identifying the cross-sectional unit of observation, often subscribed by *i*, and the other a temporal reference, *t*, that indexes time (in this case the year). Some variables in a panel data set do not vary over time and others do. In the above example, institutional characteristics such as Carnegie Classification are typically constant over time, whereas other variables such as graduation rates, state funding, and tuition

Table 2 Example of a time-series data set

Unitid	Entering year	Carnegie classification	Grad rate (%)	Tuition ($)	STFTE ($)
100663	1992	Research I	32.74	3004	14587
100663	1993	Research I	35.18	3097	14777
100663	1994	Research I	33.61	2916	16726
100663	1995	Research I	37.74	2942	15502
100663	1996	Research I	37.59	2964	15090
100663	1997	Research I	38.57	3058	14847
100663	1998	Research I	37.73	3231	14964
100663	1999	Research I	35.87	3351	15706

Table 3 Example of a panel data set

Unitid	Entry year	Carnegie classification	Grad rate (%)	Tuition ($)	STFTE ($)
100654	1992	Comprehensive I	37.37	2621	5978
100654	1993	Comprehensive I	39.94	2546	5504
...	...	...	...	...	...
100654	1999	Comprehensive I	31.95	2412	6777
100663	1992	Research I	32.74	3004	14587
100663	1993	Research I	35.18	3097	14777
...	...	...	...	...	...
100663	1999	Research I	35.87	3351	15706
209542	1992	Research I	58.72	4498	10799
209542	1993	Research I	55.02	4974	9172
...	...	...	...	...	...
209542	1999	Research I	61.08	3683	9163
...	...	...	...	...	...

rates fluctuate over time. If there are no missing observations in each time period, the panel is called "balanced," if not, it is deemed an "unbalance" panel.

Historically, the use of panel data was very common in medical and biostatistical studies where subjects were tracked over time. Because of the rich information contained in panel data sets, they have become increasingly popular in social science research. In addition, the development of statistical packages and procedures designed to construct, manage, and analyze panel data makes it much easier to do so today.

The use of panel data in higher education is a relatively new phenomenon, but has already played an important role in enhancing policy analysis. For example, three studies published in higher education journals over the last 2 years have used panel data methods to explore a variety of important policy questions. Cheslock and Gianneschi (2008) use annual data on state appropriations and voluntary contributions between 1994 and 2004 at public institutions to test whether private donations were used to offset the reduced state appropriations. Their results suggest the opposite might be true: There is a slight positive relationship between state funding and private donations; lower state funding does not lead to higher private donations at individual institutions. Volkwein and Tandberg (2008) investigate whether state performance grades from Measuring Up 2000, 2002, 2004, and 2006 are influenced by state level characteristics such as size, wealth, education levels, and growth. Results reveal little relevance of these state characteristics on state performance scores. Finally, Zhang (2007) uses data on nonresident enrollment and tuition rates from IPEDS between 1986 and 2004 to examine how nonresident enrollment at public institutions responds to tuition rates at national, state, and institutional level. Results suggest that there is a great deal of variation across states and different types of institutions. In each of these studies' cases, a major advantage of using panel data and the models specifically designed to analyze this type of data is the ability to control for individual heterogeneity, which is discussed in the next section.

Individual Heterogeneity

Many policy questions in higher education are explicitly or implicitly causal in nature, and evaluating the effect of policy variables is at the core of the recent "treatment effect" literature. But the use of cross-sectional data to examine causal questions hinges on strong assumptions (in particular the *ceteris paribus* or other things equal assumption), and the common practice is to employ multiple regression to control for individual heterogeneity that might drive observed correlations between policy and outcome variables. The *ceteris paribus* assumption is a strong one in view of the complexity of educational processes. For example, to estimate the effect of need-based financial aid on student college persistence, one has to consider a host of variables such as individual characteristics, family background, academic performance, academic integration, social integration, and others. Complicating things further, some confounding factors such as individual motivation and peer influence are usually unobserved or difficult to measure. From a practical point of view, it is impossible to include all potential variables that might affect an outcome of interest. But even if possible then one runs the risk of being accused of other statistical "crimes" such as inclusion of irrelevant variables and data "mining" instead of relying on theory driven model estimation.

So what is omitted variable bias? To illustrate, suppose a true linear regression model has the following form:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + u_i \tag{1}$$

Where x_1 is our main policy variable and its effect on y is of main interest, but the outcome variable is also affected by x_2. By "true" model we mean that the error term u_i satisfies a series of classic assumptions, in particular that the error term is assumed to be orthogonal to x_1 (and x_2).

Unfortunately, we often do not have the luxury to include all the variables represented by x_2 in the model. These reasons include missing or unknown information and/or that some variables are just very difficult to measure or collect. Consequently, the following regression is often estimated instead:

$$y_i = \alpha_0 + \alpha_1 x_{i1} + v_i \tag{2}$$

In this textbook example of omitted variable bias, the estimate for the effect of x_1 obtained from Equation (2) is different from that in Equation (1). The magnitude of the difference (bias) depends on two factors: the magnitude of the effect of x_2 on the outcome and the correlation between x_1 and x_2. That is:

$$\hat{\alpha}_1 = \hat{\beta}_1 + \hat{\beta}_2 \hat{\delta}_1 \tag{3}$$

where $\hat{\delta}_1$ is from a regression with x_2 as the dependent variable and x_1 as the independent variable.

One way to understand how individual heterogeneity affects the estimated effect of policy variables on outcomes is to view individual heterogeneity as an omitted variable problem. Imagine that there are two components (a_i and u_i) in the idiosyncratic error term:

$$y_i = \beta_0 + \beta_1 x_{i1} + a_i + u_i \tag{4}$$

with the difference being that a_i could be correlated with x_1 (One can also think of a_i as capturing what the term $\beta_2 x_{i2}$ in Equation (1) accounts for). Obviously, these two error terms cannot be identified separately when using cross-sectional data. Because a_i could be correlated with x_1, estimating Equation (4) by assuming one error component (as in Equation 2) violates the orthogonality assumption of linear regressions.

Some cases of omitted variable bias can be easily identified. Suppose a researcher is interested in learning how the rapid increase in tuition might affect student first-year retention rates at 4-year institutions. The researcher decides to use a cross-sectional sample of 4-year colleges and institutions in a given year and collects data on tuition and first-year retention rates. Given the positive correlation between tuition and institutional quality/prestige and the matching between institutions and students, the correlation between tuition and retention rate is likely to be positive in a cross-sectional sample of institutions. In this particular case, student ability is an obvious omitted variable. Because of positive correlations between student ability and their retention probability and between student ability and the tuition rate charged by the institutions they attend, the estimation for the effect of tuition on retention rate is positively biased as Equation (3) suggests.

There are more complicated scenarios, the leading case of which is self-selection bias. For example, assume a researcher is interested in evaluating the effect of starting college education at a community college (rather than a 4-year institution) on the probability of obtaining a bachelor's degree. Because the researcher has no control over where students initially attend (a community colleges vs. a 4-year institution) these two groups may be quite different on a number of observable and unobservable characteristics. Comparing their bachelor's degree graduation rates without controlling for these differences is likely to lead to severe bias. One common strategy is to remedy this statistical problem is to obtain information on individual differences between the two groups and control for them in a regression model. The problem is that some differences are observable but others are not. Student information such as demographic characteristics, family background, and educational preparation are usually available, but other differences such as motivation are usually not easy to measure and/or collect. But if highly motivated students are more likely to attend 4-year institutions and they are also more likely to graduate, then self-selection will result in a (positive) bias for this group. In the literature this type of self-selection has been viewed as a special case of omitted variables bias and treated with techniques used to remedy this analytic problem (Heckman, 1979).

In summation, individual heterogeneity, if not properly accounted for, may lead to incorrect or misleading results and subsequently inappropriate policy decisions.

For example, over (or under)-estimation of the economic return of college education may lead to over (or under)-spending in college education, both from a social and individual perspective. Panel data provides one strategy to control for individual heterogeneity thereby leading to more rigorous findings and hopefully sounder policy recommendations. Two such panel data methods, fixed and random effects regression, are the most commonly used panel data models in empirical research and discussed more fully below.

Fixed Effects Models

Perhaps the simplest way to make use of panel data is to ignore the time dimension of the data structure and treat each observation as independently drawn. That is:

$$y_{it} = \beta_0 + \beta_1 x_{it} + \varepsilon_{it} \tag{5}$$

where x_{it} represents independent variables and ε_{it} is the error term. Suppose the panel data set contains N subjects in each of T periods, a total of N×T observations. For the pooled regression in Equation (5) to produce consistent and efficient estimates, the error term ε_{it} needs to be orthogonal with independent variables and be independent from each other. Unfortunately, these two conditions are not likely to hold with panel data. Because subjects are observed over time, it is most likely that error terms for the same subject over time are correlated with each other, thus violating the independence assumption. Simply put, the same subjects observed at two time points are more alike than two randomly drawn subjects. To illustrate, suppose ε_{it} has two components:

$$\begin{aligned} \varepsilon_{it} &= a_i + u_{it} \\ u_{it} &\sim IID(0, \sigma_u^2) \end{aligned} \tag{6}$$

where a_i captures the subject-specific effect that does not vary over time. (Note that a_i does not have t subscript.) a_i is often called fixed effects, although this is not entirely accurate because it is estimated as fixed effects in a fixed effects model but as individual-level random error terms in a random effects model. Regardless of its name, a_i represents a time-invariant component specific to observation i. Finally, u_{it} captures time-varying error, which is independently and identically distributed with variance σ_u^2. Consequently, a simple panel data model can be represented as:

$$y_{it} = \beta_0 + \beta_1 x_{it} + a_i + u_{it} \tag{7}$$

Before estimating this model, let us make sure that the assumption of this additional individual-level component a_i is indeed necessary. That is, to set up the panel data as in Equation (7), non-zero a_i is assumed; otherwise, Equation (5) is the correct specification that produces consistent and efficient estimates. An F test can be

performed to test the joint significance of these individual specific effects. The unrestricted model in this particular case is Equation (7), estimated with a group of N–1 dummy variables indicating N different subjects; and the restricted model with the null hypothesis is the pooled regression model where all a_i are assumed to be zeros. The residual sum of squares can then be obtained from the unrestricted (RSS_{ur}) and restricted (RSS_r) models. If N is large, an F-statistic can be computed as follows:

$$F = \frac{(RSS_r - RSS_{ur})/(N-1)}{RSS_{ur}/(NT - N - k)} \sim F_{N-1, NT-N-k} \tag{8}$$

where k is the number of independent variables in the pooled regression (excluding the constant term). Based on this F test, one can determine whether it is safe to pool all observations together and treat them as a large cross-sectional data set or whether additional panel data models are necessary.

The mathematical notations for the fixed effects and random effects models are identical as in Equation (7). The important difference between these two approaches is whether a_i is assumed to be orthogonal to other independent variables in the model, and that consequently determines how the component a_i is estimated. For the time being, suppose that one wishes to estimate a_i as fixed effects for individuals. A straightforward way to estimate Equation (7) is to compute a series of N–1 dummy variables and actually estimate all k+N coefficients in the model. This approach is also called Least Squares Dummy Variable (LSDV) regression. When a_i is estimated as fixed effects in Equation (7), all time-invariant independent variables will be spanned by the individual specific effects. As a result, estimating a_i as fixed effects together with time-invariant variables will result in perfect multicollinearity.

The alternative and conceptually more appealing approach is to use so-called within-in transformation to eliminate fixed effects a_i. Note that averaging Equation (7) over time yields:

$$\bar{y}_{i.} = \beta_0 + \beta_1 \bar{x}_{i.} + a_i + \bar{u}_{i.} \tag{9}$$

Subtracting Equation (9) from (7) gives:

$$y_{it} - \bar{y}_{i.} = \beta_1 (x_{it} - \bar{x}_{i.}) + (u_{it} - \bar{u}_{i.}) \tag{10}$$

Interestingly, the individual specific effect a_i has disappeared in Equation (10). This transformation suggests that one could estimate (10) by pooled OLS after taking deviations for both dependent and independent variables in the model. The estimates obtained using within transformation are called within estimators because Equation (10) uses within-subject variations over time instead of between-subject variations to estimate the coefficients in the model.

Mathematically, the approach using within transformation is identical to LSDV. It is often argued that LSDV consumes too many degrees of freedom because of the large number of dummy variables in the model; however, in calculating the deviation forms in Equation (10), we also lose N degrees of freedom. The loss of degrees of

freedom needs to be taken into account when the standard errors are calculated in equation (10). This adjustment is automatically handled by most statistical software. Another interesting result is that the within transformation not only eliminates the individual specific effects a_i, but also all time-invariant independent variables. This is not surprising since within variation cannot be used to estimate the effect of time-invariant variables.

One way to obtain estimates for time-invariant variables is to use Equation (9). That is, time-averages for both dependent and independent variables can be used to run a cross-sectional regression. The estimates obtained by exploiting the cross-subjects variation are called between estimators. Note that in Equation (9), individual specific fixed effects are now part of the error term. Therefore the unbiasedness of the between estimator rests on the assumption that a_i is uncorrelated with x_{it}. However, if that assumption holds, the random effects estimator (discussed in next section) becomes a better estimation strategy that produces consistent and efficient estimates.

Although the between estimator itself is not particularly interesting, it does provide a powerful model specification test. Because a_i is estimated as a fixed parameter in fixed effects models and disappears in the within transformation, the within estimator is always unbiased and consistent, no matter whether x_{it} is orthogonal to a_i. But the between estimator is only unbiased and consistent when x_{it} is orthogonal to a_i. Consequently, the difference between the within-estimator and between-estimator can be used to test whether x_{it} is orthogonal to a_i. The difference between these two estimators and its variance can be constructed as follows:

$$\hat{\gamma} = \hat{\beta}_W - \hat{\beta}_B \tag{11}$$

$$\text{var}(\hat{\gamma}) = \text{var}(\hat{\beta}_W) + \text{var}(\hat{\beta}_B) \tag{12}$$

The covariance term between the within and between estimator is zero thus suppressed from Equation (12). Based on (11) and (12), one can devise a test statistic $\hat{\gamma}'[\text{var}(\hat{\gamma})]^{-1}\hat{\gamma}$, which is asymptotically distributed as χ^2_k under the null hypothesis that x_{it} is orthogonal to a_i. When $k = 1$ (the number of independent variables), we can use the more familiar t-test:

$$t = \frac{\hat{\beta}_W - \hat{\beta}_B}{\sqrt{\text{var}(\hat{\beta}_W) + \text{var}(\hat{\beta}_B)}} \tag{13}$$

Under the null hypothesis, the above statistic is asymptotically distributed as standard normal. This is a variation of the well-known Hausman (1978) specification test between fixed effects and random effects models, which will be discussed in the next section.

In addition, it turns out that estimates in the pooled regression are a matrix-weighted average of within and between estimators. Detailed proof (see Wooldridge,

2002) requires matrix notation thus is not provided here, but the result is not surprising given that the within estimator ignores between variation and the between estimator ignores within variation, while the pooled regression uses both within and between variations. Consequently, one can also use the difference between the pooled estimators and within estimators to test whether x_{it} is orthogonal to a_i.

One of the advantages of treating a_i as fixed effects is that it allows arbitrary correlation between a_i and independent variables in the model. When individual-specific effects are correlated with explanatory variables, fixed effects models yield unbiased estimates for those explanatory variables. In many scenarios in higher education research, there are strong reasons to believe that the individual-specific effects are correlated with explanatory variables. For example, let us revisit the example of nonresident enrollment at public institutions. Suppose there is an institutional fixed effect for each institution. For simplicity we can imagine this fixed effect as institutional prestige although in reality it could be a combination of a variety of factors such as geographic location, weather, diversity, etc. Institutional prestige is likely to be correlated with the nonresident tuition that an institution is able to charge. As a result, regression based on a cross-sectional sample of institutions is likely to produce biased estimates for the effect of nonresident tuition on nonresident enrollment when institutional prestige is not properly controlled for. The fixed effects models effectively eliminate this institutional fixed effect by focusing on within-institution variations and directly test the relationship between changes in nonresident tuition and changes in nonresident enrollment.

Fixed effects models have several drawbacks. They consume a large number of degrees of freedom by putting in one dummy variable for each individual, or by using within transformation. This could be a problem when we have a large number of units but relatively short time periods. In addition, fixed effects models are notoriously vulnerable to measurement errors (Griliches & Hausman, 1986). For example, imagine one is interested in the relationship between the SAT scores of incoming freshmen class with their graduation rates. Using fixed effects models, one can estimate how the change in SAT scores is related to the changes in graduation rates. Those who are familiar with SAT score data (e.g., in College Board data or in IPEDS) often come across this rather mysterious phenomenon: The SAT scores of the incoming freshmen cohort, instead of fluctuating slightly year-by-year as one would expect, are usually constant for several years before a sudden increase or decrease occurs, making one wonder whether the person who reported the data sometimes simply copied the SAT scores from the immediate prior year. This does not cause a big bias if the *level* of SAT scores is used in the regression because the measurement error tends to be a small proportion of the true variance, leading to a relatively small attenuation effect. When a within transformation is used in fixed effects models, however, using the *deviation form* of SAT scores (after taking away the time-average) could be dominated by noise, leading to a substantial attenuation effect. Griliches and Hausman (1986) provide a complete discussion of measure errors in panel data and maintain that the presence of measurement error could be one of the reasons why fixed effects models generate severely downward biased estimates.

Finally, because individual-specific effects and all other time-invariant variables are wiped out in the within transformation, fixed effects models cannot produce estimates for the effects of time-invariant variables on the outcome. In many situations, however, these effects are of great interest. Again, take the nonresident enrollment at public institutions as an example. Fixed effects models are not able to estimate the effects of such factors as geographic location and weather on nonresident enrollment. Although one can always use the between estimator to produce these effects, both time-invariant and time-variant dependent variables are biased when a_i is correlated with x_{it}.

Random Effects Models

If the Hausman test does not reject the null hypothesis that x_{it} is orthogonal to a_i, random effects models are preferred. Random effects models start with the same Equation (7); however, a_i is now part of the error term and is assumed to be uncorrelated with each explanatory variable in the model:

$$\begin{aligned} &\text{cov}(x_{it}, a_i) = 0 \\ &a_i \sim IID(0, \sigma_a^2) \end{aligned} \tag{14}$$

With this additional assumption, all parameters in the model can be consistently estimated by using a single cross-section at any time period. This strategy, however, does not use all of the useful information in other time periods. Alternatively, one could use fixed effects models to produce either within or between estimators, both of which are unbiased under the assumptions that are necessary for random effects models. The problem is that there are too many parameters to be estimated and the loss of degrees of freedom can be severe when we have large N. Finally, one could ignore the time dimension of the panel data and run pooled regressions. This again will produce unbiased and consistent estimates under the assumptions that are necessary for random effects models. This approach, however, does not take into account an important feature of the error terms of the model. Because a_i is in the composite error in each time period, the overall error terms are serially correlated across time. The covariance structure of error terms looks like:

$$\begin{aligned} \text{cov}(\varepsilon_{it}, \varepsilon_{js}) &= \sigma_a^2 + \sigma_u^2 \text{ for } i = j, t = s \\ &= \sigma_u^2 \text{ for } i = j, t \neq s \\ &= 0 \text{ for } i \neq j \end{aligned} \tag{15}$$

It suggests that the correlation coefficient among error terms for the same individual is:

$$\rho = corr(\varepsilon_{it}, \varepsilon_{is}) = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_u^2} \quad \text{for } i = j, t \neq s \tag{16}$$

This positive correlation reflects the reality that observations of the same individual across time are more alike than observations randomly drawn from independent individuals. Depending on the relative magnitude of σ_a^2 and σ_u^2, the serial correlation could be substantial. When this serial correlation is ignored in the pooled OLS regression, the estimates are inefficient, leading to incorrect test statistics.

Generalized least squares (GLS) technique can be used to estimate models with autoregressive serial correlation. Deriving the GLS transformation involves heavy matrix algebra. For those who are interested in this particular topic, see Wansbeek and Kapteyn (1982, 1983), Fuller and Battese (1973, 1974), Baltagi (2008), Hsiao (2003), and Wooldridge (2002). The actual transformation itself is relatively simple:

$$y_{it} - \lambda \bar{y}_{i.} = \beta_0(1 - \lambda) + \beta_1(x_{it} - \lambda \bar{x}_{i.}) + (\varepsilon_{it} - \lambda \bar{\varepsilon}_{i.}) \tag{17}$$

where

$$\lambda = 1 - \left(\frac{\sigma_u^2}{T\sigma_a^2 + \sigma_u^2} \right)^{1/2}$$

Equation (17) is similar to Equation (10), except that in Equation (17) the time averages are weighted by a factor. After this transformation, pooled OLS can be used to generate consistent estimates. The only remaining task is to get a consistent estimate for λ, which further requires the estimation of σ_a^2 and σ_u^2 based on data. The feasible GLS estimator that uses the estimated λ is called the random effects estimator.

Clearly, both fixed effects and random effects models have the same mathematical notation as in Equation (7). In other words, both fixed effects and random effects models take individual heterogeneity into account; however, the random effects models only consider individual heterogeneity insofar as adjusting for serial correlation it induces in the error structure and do not correct for bias in the estimated parameters it causes. If a_i is uncorrelated with x_{it}, random effects models produced more efficient estimates than fixed effects models; otherwise, estimates from random effects models are biased and inconsistent. Efficiency becomes irrelevant when the estimated parameters are biased and inconsistent.

It turns out that the random effects estimator is also a weighted average of the within and between estimators as in the pooled regression. The weighting scheme is more complicated, however. In the case of pooled regression, the weighting only involves the proportion of within and between variance, while the weighting for the random effects estimator also involves λ. Consequently, the difference between the random effects estimator and within estimator also provides a model specification test. Under the null hypothesis that x_{it} is orthogonal to a_i, both within and between estimators are consistent, so is the random effects estimator that is a weighted average of the two. One can then use the difference between the random effects estimator and the within estimator, between the random effects estimator and the between estimator, or between the random effects estimator and the pooled estimator to test

whether x_{it} is orthogonal to a_i. Hausman and Taylor (1981) and Baltagi (1989) have shown that tests based on these different paired differences are numerically identical.

The transformation (17) allows for explanatory variables that are constant over time, and this is one advantage of random effects over fixed effects models. Mathematically, because of λ, those time-invariant explanatory variables are not wiped out by the transformation in (17), while in fixed effects models, these time-invariant variables are spanned by individual dummies (or are wiped out in the within transformation).

Fixed or Random Effects Models

In empirical research, a frequently asked question is which model to use, the fixed effects or the random effects. The choice hinges entirely on the key assumption whether x_{it} is uncorrelated with a_i. If a_i is uncorrelated with independent variables, then both within and between estimators provide unbiased and consistent estimates. Since estimates based on pooled regression and random effects models are weighted averages of within and between estimators, they are unbiased and consistent too. However, random effects models further provide more efficiency and valid test statistics. If a_i is correlated with independent variables, only within estimators in fixed effects models yield unbiased and consistent estimates. In empirical studies, sometimes researchers prefer random effects models merely because they simply want to obtain the effects of time-invariant variables. This is usually not a sufficient justification. On the other hand, model specification tests only provide us with general guidance in model selection. It is also important to link models with specific research questions.

Hausman specification tests can be used to determine whether a_i is correlated with the independent variables. It is important to note that although time-invariant variables are not identified in fixed effects models, it is crucial to include them in the random effects models when conducting the Hausman test. Including time-invariant variables in the model might help mitigate the severity of heterogeneity bias. Hence it is entirely possible that fixed effects models are preferred when only time-variant variables are included, whereas random effects models are preferred when both time-variant and time-invariant variables are included in the random effects models.

So what method should one use? Fixed effects models yield unbiased and consistent estimates but do not produce estimates for time-invariant variables, which are often of great interest. In contrast, random effects models provide estimates for both time-variant and time-invariant variables, but the unbiasedness and consistency of these estimates hinges on the assumption that individual heterogeneity is uncorrelated with these independent variables. Is there a compromise that both takes the advantage of the unbiased and consistent within estimator and yields estimates for time-invariant variables?

One common approach is a two-step procedure. To illustrate, let us rewrite Equation (7) to explicitly include both time-variant and time-invariant variables:

$$y_{it} = \beta_0 + \beta_1 x_{it} + \gamma z_i + a_i + u_{it} \tag{18}$$

where x_{it} represents time-variant variables and z_i represents time-invariant variables. Averaging Equation (18) over t yields:

$$\bar{y}_i = \beta_0 + \beta_1 \bar{x}_i + \gamma z_i + a_i + \bar{u}_i \tag{19}$$

In the first step, a fixed effects model is used to obtain the within estimator for β_1. The individual specific effects can be estimated as:

$$\hat{\varepsilon}_i = \bar{y}_i - \hat{\beta}_1 \bar{x}_i \tag{20}$$

In the second step, an OLS is estimated by using the above estimated residual as the dependent variable:

$$\hat{\varepsilon}_i = \beta_0 + \gamma z_i + a_i + \bar{u}_i \tag{21}$$

In order for the estimated γ to be consistent, one has to make the assumption that the time-invariant variables are uncorrelated with a_i. This two-step approach overcomes the disadvantage of fixed effects models that do not yield estimates for time-invariant variables. Meanwhile, it still requires the random effects assumption for those time-invariant variables because γ and a_i cannot be separately identified in Equation (21). Nonetheless, it is a nice compromise between fixed and random effects models.

Another approach that most econometrics texts recommend is the Hausman-Taylor (1981) procedure. The Hausman-Taylor method is a special case of instrumental variable approach in the context of panel data. The basic idea is to use the time averages of time-variant variables that are uncorrelated with unit specific effects as instruments for time-invariant variables (for a detailed discussion of this approach see Hausman and Taylor, 1981, and this method is also discussed in Wooldridge, 2002, pp. 325–328 and Hsiao, 2003, p. 53). As in other instrumental variable cases, this procedure is effective only when the number of instruments (i.e., the number of time-variant variables that are uncorrelated with unit specific effects) is equal to or greater than the number of variables that need instruments (i.e., the number of time-invariant variables that are correlated with unit specific effects). This could be a formidable task, especially when unit specific effects are not observed.

Two Way Error Components Models

So far we have maintained the assumption that there are unobserved individual-specific effects that are stable over time. Similarly, there could be unobserved time-specific factors that affect all individuals in the same period. Take the relationship between state funding and college enrollment rates as an example. There could be year-to-year fluctuations in macroeconomic conditions such as unemployment rates that might affect college enrollment rates. So we assume:

$$\begin{aligned} \varepsilon_{it} &= a_i + \eta_t + u_{it} \\ u_{it} &\sim IID(0, \sigma_u^2) \end{aligned} \tag{22}$$

where a_i is time-invariant and accounts for any individual specific effects; while η_t is individual-invariant and accounts for any time specific effects. Consequently, a simple panel data model can be represented as:

$$y_{it} = \beta_0 + \beta_1 x_{it} + a_i + \eta_t + u_{it} \tag{23}$$

As in the case of one-way error component model, the joint significance of individual and time specific effects can be tested. Depending on specific empirical contexts, we might want to test the two-way error component model in Equation (23) against the pooled model in Equation (5) to determine whether to have both individual and time-specific effects simultaneously in the model, or to test the Equation (23) against (7) to determine whether to add time effects to the one-way error component individual-specific effects model. F-statistics can be constructed based on different restricted and unrestricted models.

If the F-test indicates that the two-way error components model is necessary, we will proceed with the estimation of equation (23). When both a_i and η_t are assumed to be fixed parameters, Equation (23) becomes a two-way fixed effects model. As in the one-way fixed effects model, these unobserved fixed effects can be arbitrarily correlated with independent variables. Again, one could adopt the LSDV approach and put in a total of $(N–1)+(T–1)$ individual and time dummy variables. Alternatively, one could use within transformation to eliminate the fixed effects terms. The transformation is slightly more complicated than that involved in the one-way error component model because both individual- and time-specific effects have to be eliminated. In addition to Equation (9), which takes averages over time, we also need the averages across subjects in each period and grand average over time and across subjects:

$$\bar{y}_{.t} = \beta_0 + \beta_1 \bar{x}_{.t} + \eta_t + \bar{u}_{.t} \tag{24}$$

$$\bar{y}_{..} = \beta_0 + \beta_1 \bar{x}_{..} + \bar{u}_{..} \tag{25}$$

Equation (24) uses average across individuals in the same time period and Equation (25) uses the grand averages. Note that to avoid dummy variable traps (by

excluding one of the dummy variables), we assumed that $\sum_i a_i = 0$ and $\sum_t \eta_t = 0$. Using Equations (7), (9), (24), and (25), we get:

$$(y_{it} - \bar{y}_{i.} - \bar{y}_{.t} + \bar{y}_{..}) = \beta_1(x_{it} - \bar{x}_{i.} - \bar{x}_{.t} + \bar{x}_{..}) + (u_{it} - \bar{u}_{i.} - \bar{u}_{.t} + \bar{u}_{..}) \quad (26)$$

OLS can then be applied to Equation (26) to obtain the within estimator. Similarly, the within estimator in this two-way fixed effects model cannot be used to estimate the effect of time-invariant and individual-invariant variables because the within transformation in Equation (26) wipes out these effects. These effects can be estimated by using between variations.

As in the case of one-way random effects, two-way random effects model starts with assumptions that $a_i \sim IID(0, \sigma_a^2)$, $\eta_i \sim IID(0, \sigma_\eta^2)$, $u_{it} \sim IID(0, \sigma_u^2)$, and that these three error components are independent of each other. More importantly, x_{it} is orthogonal to all error components for all i and t. The covariance structure of error terms looks like:

$$\begin{aligned} \text{cov}(\varepsilon_{it}, \varepsilon_{js}) &= \sigma_a^2 + \sigma_\eta^2 + \sigma_u^2 \text{ for } i = j, t = s \\ &= \sigma_u^2 \text{ for } i = j, t \neq s \\ &= \sigma_u^2 \text{ for } i \neq j, t = s \\ &= 0 \text{ for } i \neq j, t \neq s \end{aligned} \quad (27)$$

This creates positive correlations among the same individual over time and across individuals in the same time period. GLS techniques can be used to take this error structure into account. The GLS transformation is rather complicated in this case (see Hsiao, 2003 for a detailed derivation), but the result is similar to that in the one-way random effects model: The GLS estimator is a weighted average between the within and between estimators. Several statistical tests are available for model specification and selection. The Breusch-Pagan (1980) test can be used to test whether $\sigma_a^2 = \sigma_\eta^2 = 0$. The Hausman (1978) specification test can be used to choose between fixed effects and random effects models.

Further Econometric Issues

There are common econometric issues such as heteroscedasticity and serial correlation that may plague basic panel data models. Heteroscedasticity arises when the variance of error terms varies across individuals and over time. Researchers have assumed the error structure in several different ways. Mazodier and Trognon (1978) and Baltagi and Griffin (1988) assume:

$$a_i \sim (0, \sigma_i^2) \quad \text{and} \quad u_{it} \sim IID(0, \sigma_u^2) \quad (28)$$

Baltagi (1988) and Wansbeek (1989) make a different set of assumptions:

$$a_i \sim IID(0, \sigma_a^2) \quad \text{and} \quad u_{it} \sim (0, \sigma_i^2) \quad (29)$$

The more general form of heteroscedasticity is used by Randolph (1988), where both a_i and u_{it} are assumed to be heteroscedastic:

$$a_i \sim (0, \sigma_i^2) \quad \text{and} \quad u_{it} \sim (0, \sigma_{it}^2) \tag{30}$$

GLS can be used to accommodate the error structure. Since these heteroscedastic variance terms need to be estimated, feasible GLS may be used. In the fixed effects model, a_i is estimated as fixed effects instead of part of the error and heteroscedasticity only occurs in the error u_{it}. One could use a White heteroscedasticity consistent covariance estimator with ordinary least squares estimation to obtain robust standard errors (Greene, 2003; Wooldridge, 2002), however, recent research demonstrates that with fixed time periods, the White heteroscedasticity-robust error covariance tends to be inconsistent (Stock & Watson, 2006).

We have assumed so far that conditional on individual-specific effects, error terms are independent of each other. This maybe a restrictive assumption because many unobserved shocks (e.g., economic conditions, public support, political climate) tend to influence outcomes across several periods. This type of serial correlation, arising from reasons other than individual-specific effects, is not considered in basic panel data models. Prais-Winsten or Cochrane-Orcutt transformation can be used to remove autocorrelation.

Models such as Equations (7) and (23) are basic yet widely used when analyzing panel data because they provide a reasonable general alternative to the assumption that parameters are constant for all individuals at all times, as is the case in the pooled regression model. There are more general alternatives, for instance models that permit intercepts and coefficients to vary across individuals and over time periods. These general models are not discussed in this handbook chapter. For readers who are interested in these models, please refer to Hsiao (2003).

Next I discuss several variations of panel data models that are particularly relevant to policy studies in higher education.

Variations of Panel Data Models

Pooled Cross Sectional Data

A close relative of panel data is pooled (or repeated) cross-sectional data. It is obtained by randomly sampling from a large population at different points in time. The difference between panel and pooled cross-sectional data is that the former follow the initial sample over time, while the latter draw a random sample at each time point. Examples of pooling cross-sectional data in higher education are National Postsecondary Student Aid Study (NPSAS) and National Study of Postsecondary Faculty (NSOPF). Take NPSAS as an example, NCES collected seven cohorts of NPSAS data between 1986/87 and 2007/08. For each cohort, it drew a nationally representative sample of students in postsecondary institutions. Because students

included in a particular cohort may not be included in the following surveys, this data set alone cannot address questions such as how financial aid affects student college experience. These questions are addressed by other postsecondary studies that follow part of the NPSAS sample over time.

Because a pooled cross sectional data set provides multiple snapshots of the same population over time, it has several advantages over one simple cross section. When different cross sections are truly drawn from the same population, pooled cross sectional data sets are no different than one large cross section. Obviously, increased sample size allows for more precise estimators and more statistical power in hypothesis testing. However, pooling multiple cross sections will only be helpful insofar as there is no structural change in the underlying relationship between the dependent and independent variables.

When multiple cross sections are drawn, the purpose is often to uncover structural changes between outcomes and independent variables over time. For example, using seven waves of NPSAS surveys, one can study how changes in tuition rates and different types of federal, state, and institutional financial aid have influenced the affordability of college education for different types of students at different types of institutions. Or using four waves of NSOPF studies, one can study how faculty employment patterns (e.g., part-time vs. full-time, tenure-track vs. off-track, etc.) and monetary incentives for faculty work (i.e., how faculty salary is determined) have changed over time.

Dummy variables can be used to test whether there are any structural changes over time. To start with, one might be interested in time effects only. That is, we allow intercepts to vary over time. An example of such a research question would be: After controlling for possibly confounding factors, have college persistence rates increased over time? To estimate this model, a series of dummy variables can be created to indicate the different cross sections used to create the pooled data set. The estimated intercept for this expanded multiple regression reflects the effect of the base year in the cross sectional data, and the estimated coefficients for each period dummy variable represent the differences between that year and the intercept (base year).

A more interesting question may be whether the effect of specific variables (on the outcome of interest) changed over time. For example, does the effect of financial aid on college persistence increase or decrease over time? To address this question, one approach is to interact the year dummies with specific explanatory variables of interest. More generally, if there is interest in knowing whether all the explanatory variables have different effects on the outcome variable over time, one could interact the time dummies with all the explanatory variables. The latter method is equivalent to running a single regression for each time period. There are statistical tests (F-test or Chow (1960) test) that can be used to determine whether there are any structural changes in the determination of the outcome variable over time.

At this point, one must be wondering whether it is possible to solve the problem of individual heterogeneity posed in Equation (7) by using pooled cross sectional data sets. That is, suppose that individual-specific effects are correlated

with explanatory variables, can we use cross sectional data to obtain unbiased and consistent estimates for explanatory variables? In general, cross sectional data are not useful to deal with individual-specific effects. Note that in the case of panel data, multiple observations of the same individual allow for the cancelation of individual specific time invariant terms. However, if pooled cross sections are random samples from a stationary population at different time and each cross section is sufficiently large, it may be possible to use individuals with common characteristics to achieve identification with additional assumptions (Deaton, 1985; Heckman & Robb, 1985). The identification involves aggregation of individual level variables to group level, assuming that individuals in the same group with common characteristics such as gender, race, and education have the same individual specific term a_c. With this key assumption of intra-cohort homogeneity, we obtain the following cohort level aggregation:

$$\bar{y}_{ct} = \beta_0 + \beta_1 \bar{x}_{ct} + a_c + \bar{u}_{ct} \tag{31}$$

The resulting data set is a pseudo-panel with repeated observations of groups over T time periods. The usual panel data models can then be applied to this pseudo-panel.

Difference-in-Differences Estimator

Another variation of fixed effects models is the difference-in-differences (DD) technique. Many public policies in higher education occur at the aggregate level, such as at the federal and state levels. Examples include Pell Grant, GI Bill, and state-sponsored merit-based aid programs. From statistical point of view, the main policy variable varies at a more aggregate level rather than at the individual level. As such, the source of heterogeneity or omitted variable bias must be controlled at corresponding aggregate levels (Angrist & Pischke, 2009). With appropriate assumptions, aggregate level heterogeneity can be captured by fixed effects at these levels and identification can be achieved.

Since the work by Ashenfelter and Card (1985), the use of the DD technique has been increasingly popular, especially in program and policy evaluation research (e.g., Cornwell, Mustard, & Sridhar, 2006; Dynarski, 2000). To begin with, we consider the simplest set-up of the model. Suppose there are two subjects that are observed for two time periods (this is in fact the simplest panel data one can imagine). One subject is exposed to a treatment in the second period but not in the first period, while the other is not exposed to any treatment in either period. The change between the two periods for the second subject (control group) is then subtracted from the change for the first subject (treatment group). If a permanent difference between these two subjects exists in both periods, then the subtraction will remove the bias from simply comparing these two subjects in the second period or from comparing the before and after values for the treatment group.

To make things concrete, let us use Georgia's HOPE scholarship as an example. Georgia's HOPE scholarship program, initiated in 1993, provides merit-based

scholarships for students attending in-state colleges and also includes grants to students entering technical schools. Cornwell, Mustard, and Sridhar (2006) examine the impact of this state sponsored program on freshmen enrollment in Georgia. Although the full model used in their study is complicated, the idea is not. Let us suppose the enrollment in Georgia in year 1992 (the year before the implementation of the HOPE program) is "a" and that in year 1993 is "b". The difference "b–a" is likely to be a biased estimator for the effect of HOPE program because we do not know what the enrollment level in Georgia in 1993 would have been if Georgia had not adopted the HOPE program. To estimate the time trend, one could use the enrollment trend in a comparable state. For example, in Florida, the enrollment in 1992 is "c" and in 1993 is "d". Consequently, "(b–a)–(d–c)" could be a good estimator for the effect of the HOPE program, provided that the enrollment in Georgia would have followed the same time trend as that in Florida if there had been no HOPE program.

A couple of important assumptions are built into the DD strategy. First, it is based on the assumption of time-invariant group level heterogeneity. In the above HOPE scholarship example, the estimation of a time trend by using the enrollment data in Florida depends on the assumption that no other time-varying factors have affected the enrollment change after controlling for the time-varying factors in the model. Second, the time effect is group-invariant. That means, no group-specific factors other than the policy of interest have led to different time trends across groups. In the above HOPE scholarship example, the time trend computed based on Florida data is used to substitute the time trend for Georgia.

The DD technique has numerous applications in higher education research, especially when the data arise from natural experiments, i.e., when some exogenous events (e.g., the adoption of an intervention program, institutional and state level policy changes) occur to some groups but not to others. In terms of research design, the natural experiment is similar to experimental design except that in a natural experiment the treatment group is not randomly assigned.

When there are important time-varying variables that may affect the outcome, one could use regression models to control for these covariates. A typical DD model controlling for covariates looks like:

$$y = \beta_0 + \beta_1 dT + \beta_2 d2 + \beta_3 dT \times d2 + Z\gamma + u \tag{32}$$

where y is the outcome variable of interest, $d2$ is a dummy variable for the second time period, dT is a dummy variable for the treatment group, and $dT\times$d2 is the interaction terms between the two dummies, Z represents all time-varying covariates that might have affected the outcome variable, and u is the usual error term. Equation (32) is essentially a fixed effects model with an extra interaction term in the model. The interaction term can be interpreted as usual, i.e., the additional time effect for the treatment group, which is exactly the effect of treatment. Without covariates in the model, the estimate of β_3 is the familiar DD estimator:

$$\hat{\beta}_3 = (\bar{y}_{T,2} - \bar{y}_{T,1}) - (\bar{y}_{C,2} - \bar{y}_{C,1}) \tag{33}$$

With covariates in the regression model, the estimator takes a more complicated form, but its interpretation holds. The advantage of this regression approach is that one can control for potential differences between the treatment and control groups. In addition, it is easier to calculate standard errors (including heteroscedasticity-robust standard errors) and conduct hypothesis testing.

The logic of DD can be applied to more complicated cases. Consider the following scenario. State *A* implements a financial aid program that is targeted to minority (or low SES) student population to increase their college persistence rates. In this case, the treatment group is straightforward: the minority students in state *A*. How about the control group? One possibility is to use the majority student population in state *A* as a control. This would control for the trend of student persistence in state *A*, however, it cannot account for factors that might affect the student persistence rate of minority students, such as changes in financial aid policies at the federal or regional compact level. Alternatively, one could use the minority students in a comparable state (state *B*) as the control group. Of course, this would not account for state-specific effect on minority students in state *A*. A more robust analysis than using either of these two approaches can be obtained by using control groups in both treatment and comparable states. Let us use *A* (treatment state) and *B* (control state) to denote states, 1 and 2 to denote before and after periods, and *M* (minority students) and *W* (majority students) to denote student groups, then the expanded version of Equation (32) is:

$$\begin{aligned} y = {} & \beta_0 + \beta_1 dA + \beta_2 d2 + \beta_3 dM + \beta_4 dA \times d2 + \beta_5 dA \times dM + \beta_6 d2 \times dM \\ & + \beta_7 dA \times d2 \times dM + Z\gamma + u \end{aligned} \tag{34}$$

Without covariates in the model, the estimate of β_7 is:

$$\hat{\beta}_7 = [(\bar{y}_{A,M,2} - \bar{y}_{A,M,1}) - (\bar{y}_{A,W,2} - \bar{y}_{A,W,1})] - [(\bar{y}_{B,M,2} - \bar{y}_{B,M,1}) - (\bar{y}_{B,W,2} - \bar{y}_{B,W,1})]$$

It is natural to call it DDD estimator. Again, it is a fixed effects model control for state fixed effects, time fixed effects, minority students fixed effects, and all second order and third order interaction terms of these dummies.

The DD technique can be readily extended to more than two time periods. Instead of having one time dummy variable in the model, a full set of time dummies, each representing a different time period, can be included in the model. The interaction term, however, only consists of the treatment group dummy and the time dummy for after policy periods. One implicit assumption of this approach is that the policy has the same effect in each year after policy implementation. If the effect varies by year, one might want to add in more interaction terms to obtain the policy effect in different time periods.

Recent work in this area argues that in the case of multiple treatment and control groups, the estimation is complicated by the potential unobserved group/time specific effects that are correlated with the group/time interaction dummy. Bertrand,

Duflo, and Mullainathan (2004) and Hansen (2007) suggest that statistical inference based on DD estimator in the case of multiple groups and time periods should use the cluster-robust covariance. Hansen (2007) further suggests that when the group/time effects are serially correlated and possibly heteroscedastic, feasible GLS should be used.

Random-Coefficient Models

Up to this point, we have focused on omitted variables that are either individual- or time-specific. Another approach to panel data models is to start with the most restrictive model in Equation (5), where all intercepts and slopes are assumed to be identical across individuals and across time. This restriction can be relaxed by allowing intercepts and slopes to vary across individuals and over time. The most general form can be written as:

$$y_{it} = \beta_{it} + \beta_{it} x_{it} + \varepsilon_{it} \tag{35}$$

Equation (35) is not particularly interesting because it has $2 \times N \times T$ parameters (a total of $(k+1) \times N \times T$ parameters if we have k explanatory variables) in this model while we only have $N \times T$ observations. And between the two extremes of Equations (5) and (35) there exists a spectrum of panel data models depending on how intercepts and slopes vary across individuals and over time. The trick is to allow the intercepts and slopes to vary, but in a manageable way.

For example, one possibility is to allow the intercept in Equation (5) to vary:

$$\begin{aligned} y_{it} &= \beta_{0i} + \beta_1 x_{it} + \varepsilon_{it} \\ \beta_{0i} &= \beta_{00} + u_{0i} \end{aligned} \tag{36}$$

That is, intercepts differ across individuals but not over time. Equation (36) can also be written as:

$$y_{it} = \beta_{00} + u_{0i} + \beta_1 x_{it} + \varepsilon_{it} \tag{37}$$

This is our familiar set-up of panel data models in Equation (7). We could also allow slopes in Equation (5) to differ across individuals but not over time:

$$\begin{aligned} y_{it} &= \beta_0 + \beta_{1i} x_{it} + \varepsilon_{it} \\ \beta_{1i} &= \beta_{10} + u_{1i} \end{aligned} \tag{38}$$

Or we can allow both the intercepts and slopes to vary across individuals but not over time:

$$\begin{aligned} y_{it} &= \beta_{0i} + \beta_{1i} x_{it} + \varepsilon_{it} \\ \beta_{0i} &= \beta_{00} + u_{0i} \\ \beta_{1i} &= \beta_{10} + u_{1i} \end{aligned} \tag{39}$$

When β_{0i} and β_{1i} are treated as fixed constants, we can either run separate regressions for each individual, or in case when covariance's among different individuals are not zero, we can stack the $N \times T$ observations in the form of Zellner's (1962) seemingly unrelated regression model and estimate this model by using GLS. When β_{0i} and β_{1i} are treated as fixed, we usually refer to Equation (37) as fixed-coefficient model. The advantage of the fixed-coefficient model is that it allows arbitrary correlations between the parameters and explanatory variables. When β_{0i} and β_{1i} are treated as random, in particular, when one assumes that individual-specific components in the intercepts and slopes (i.e., u_{0i} and u_{1i}) are orthogonal to explanatory variables in the model, then both elements can be estimated as part of the error structure, leading to efficient GLS estimation. When β_{0i} and β_{1i} are treated as random, we usually refer to Equation (39) as random-coefficient model.

Sometimes researchers are interested in understanding how variation in intercepts and slopes are related to individual characteristics. That is, instead of assuming that intercepts and slopes are random draws, we model them as functions of some individual characteristics. For example, Equation (39) can be expanded into:

$$\begin{aligned} y_{it} &= \beta_{0i} + \beta_{1i} x_{it} + \varepsilon_{it} \\ \beta_{0i} &= \beta_{00} + \gamma_0 z_i + u_{0i} \\ \beta_{1i} &= \beta_{10} + \gamma_1 z_i + u_{1i} \end{aligned} \tag{40}$$

A special case of Equation (40) is Mundlack's (1978a, 1978b) formulation. Mundlack criticizes the random effects model and random-coefficients models on the ground that the individual specific effects may be correlated with explanatory variables in the model. He proposes auxiliary regression where the individual-specific effects are functions of individual's explanatory variables, and in particular the time averages of explanatory variables.

Equation (40) is very similar to Multi-Level Modeling (MLM) often estimated by the Hierarchical Linear Modeling (HLM) software. Unlike random-coefficient models that were developed under the panel data framework, MLM was motivated by the nested data structure in many fields of study in social sciences. Nested data structure is very common in higher education research. Students are nested within departments, which are nested within schools/colleges, which are nested within states, etc. In terms of data structure, MLM usually deals with cross-sectional nested (or hierarchical) data. Consequently, we have variables describing individuals and higher order units. In a nutshell, MLM aims at explaining the variation in the lower-level effects by examining variation exists at higher levels. The classical 2-level MLM model discussed in Bryk and Raudenbush (1992, pp. 12–14) is very much like the random-coefficient model except for a couple of minor differences such as dimensions of data and variable centering.

Empirical Examples

Does Nonresident Tuition Affect Nonresident Enrollment?

The Policy Question

Zhang (2007) examines the effect of nonresident tuition on nonresident enrollment at public institutions. The analysis is conducted at the national, state, and institutional level. This empirical example builds on the institutional level analysis and illustrates model comparison and selection in panel analysis. In particular, this example is chosen to illustrate how cross-section analysis differs from panel analysis. The question whether nonresident tuition affect nonresident enrollment can be answered by using cross-sectional, time-series, or panel data. However, the interpretation of results from these different empirical strategies is often different. For example, in a cross-sectional setting with multiple institutions at one time point, the relationship between nonresident tuition and nonresident enrollment is interpreted as a cross-sectional phenomenon. That is, do institutions that charge higher nonresident tuition enroll more nonresident students? The answer is probably yes given the relationship between nonresident tuition rates and institutional prestige/quality. In a time-series setting with one institution observed at multiple time points, the relationship is interpreted as how nonresident enrollment varies with nonresident tuition at that particular institution. The answer to this question is probably more helpful to administrators and policymakers who want to know how the nonresident tuition rate will affect the nonresident enrollment at their institutions. In a panel data setting with multiple institutions observed at multiple time points, the interpretation of the relationship is similar to that in a time-series setting, except that in the panel data setting the relationship is averaged over a number of institutions.

Nonresident students at public colleges and universities benefit these institutions in a number of ways: tuition revenue, student diversity and quality, to name a few. Because nonresident tuition rates are about 2.5 times that of resident tuition (Zhang, 2007), nonresident tuition revenue has increasingly become a potential revenue source that administrators at public institutions monitor closely in a time of reduced state funding for public institutions. One strategy is to provide a tuition discount or financial aid especially in the form of merit-based financial aid to nonresident students to boost nonresident enrollment. The key to this strategy is to know how nonresident enrollment responds to changes in nonresident tuition rates.

Literature

The analysis of nonresident enrollment generally falls under the broad topic of student demand for higher education. Early studies such as Ostheimer (1953) and Campbell and Siegel (1967) find that college enrollment is a function of tuition and fees, state per capita income, educational attainment, and the geographical proximity of higher education institutions to the population. Two important reviews have synthesized the results from these studies. Leslie and Brinkman (1987) synthesize

25 studies conducted between 1967 and 1985 and calculate the average student price responsiveness coefficient (SPRC). The SPRC is the change in college participation rate of 18–24-year-olds for every $100 increase in tuition prices. Note that the SPRC used in Leslie and Brinkman (1987) is a different measure than the price elasticity which is a more commonly used term in economics and defined as the enrollment change (in percent) due to a one percent change in tuition rates. For these studies, the SPRC ranges from –0.2 to –2.4, with a modal response of –0.6. That is, for every $100 increase in tuition, the college participation rate of 18–24-year-olds drops by 0.6%, which can be converted to an elasticity coefficient of –0.62 based on an average tuition of $3,420 and a participation rate of 33% in 1982. The downward-sloping demand curve for higher education has been confirmed by Heller (1997) who synthesizes studies conducted after Leslie and Brinkman's survey (1987). Heller finds SPRCs between –0.5 and –1.0.

Whereas studies on overall student demand are many, the literature on nonresident student demand is relatively thin. Regarding the latter, because of the substantial institutional heterogeneity, cross-sectional analysis could lead to severe bias. (This will become clear in the data analysis section below.) As a result, nonresident student demand studies typically examine a single institution or a state to examine how nonresident enrollment responds to changes in nonresident tuition rates. For example, Workman (1978) uses enrollment data from a single university over years and estimates a model in which the number of nonresident students from a state at that university was a function of both the nonresident tuition at that university and the resident tuition that these students would have paid in their home state. Noorbakhsh and Culp (2000) use data from Pennsylvania over a 12-year period and estimate a demand equation in which the number of nonresidents enrolled in Pennsylvania's public 4-year institutions is a function of the system nonresident tuition, resident tuition rate charged by 4-year public institutions in Pennsylvania's neighboring states, and the median household income in the neighboring states. This study reveals an estimated elasticity for nonresident enrollment of –1.15 and –1.87 depending on measures of price used in their empirical models. Curs and Singell (2002) adopt a different strategy. They use detailed student-level data from the University of Oregon and estimate separate equations for applicants and enrollees. They find an individual level elasticity estimate for applications within the range of –1.0 and –1.5, which is much larger than the elasticity for enrollees.

Data and Methods

According to standard demand theory, the nonresident enrollment at a public institution is determined by three major factors: the nonresident tuition and fees at the institution, the alternative tuition and fees faced by potential nonresident students, and family income:

$$\ln(NRE_i) = \gamma_0 + \gamma_1 \ln(NRT_i) + \gamma_2 \ln(NST_i) + \gamma_3 \ln(NRI_i) + u_i \qquad (41)$$

where NRE_i represents the nonresident enrollment at public institution i. IPEDS Enrollment Survey reports the number of first-time, first year students by their state of residence at each institution. Aggregating over states (except for the state where institution i is located) yields the total number of first-time, first-year nonresident enrollment.

NRT_i represents the nonresident tuition rates at institution i. The theory holds that when the nonresident tuition and fees at an institution are high, the nonresident enrollment will be low. That is, γ_1 is expected to be negative. In a log-linear equation as in (41), the coefficients can be interpreted as elasticities, which relate the percentage change in the number of nonresident students to the percentage change in nonresident tuition and fees or family income. If the estimated coefficients are negative with a magnitude larger than one, the demand is said to be elastic. In this case, raising nonresident tuition and fees would not increase the revenue generated by enrolling additional nonresident students because the nonresident enrollment would decrease by a larger percentage than the increase in nonresident tuition. On the other hand, an increase in nonresident tuition and fees would increase nonresident tuition revenue when the demand is inelastic, i.e., the magnitude of those estimated coefficients is less than unitary.

The second price factor (NST_t) to consider in a demand equation is the alternative tuition rates those potential nonresident students are facing. That is, if they decide not to attend out-of-state institutions, what are the alternative tuition and fees? Possibilities are many. For convenience, this analysis uses the resident tuition and fees charged by public institutions in students' home state. Demand theory holds that when the resident tuition and fees are high, the demand for out-of-state college education becomes high. That is, γ_2 is expected to be positive. Clearly, the magnitude of estimated elasticities has important policy implications for setting appropriate resident tuition levels. For example, an increase in resident tuition and fees at a state institution might result in fewer resident students attending in-state public institutions.

Finally, NRI_i represents the median household income of potential nonresident students for institution i. As long as college education is a normal good, an increase in family income would increase the demand for a college education. In other words, γ_3 is expected to be positive. This coefficient is often interpreted as an income elasticity which measures the percentage change in quantity demanded relative to the percentage change in family income.

The estimation of Equation (41) using a cross-sectional sample of institutions at a single point in time is likely to suffer from omitted variable bias. Besides price and income factors in the model, many others factors affect students' choice of colleges. These factors may include institutional prestige, geographical location, academic programs, economic conditions, and labor markets for college graduates. Take institutional prestige as an example. Nonresident tuition rates at prestigious public institutions such as Michigan, Wisconsin, Berkeley, and UCLA are about the same as their private elite counterparts; still, they enroll a large proportion of nonresident students, resulting in a positive association between nonresident tuition rates and nonresident enrollment. For simplicity, all these factors are lumped together in an institution specific term a_i:

$$\ln(NRE_i) = \gamma_0 + \gamma_1 \ln(NRT_i) + \gamma_2 \ln(NST_i) + \gamma_3 \ln(NRI_i) + a_i + u_i \quad (42)$$

Unfortunately, the institutional specific effect a_i in Equation (42) cannot be estimated separately from the error term u_i in a cross-sectional sample. There are several ways to address this problem. For example, one could control for all confounding factors in the model. The burden is again on the researcher to argue that there are no important confounding factors omitted from the expanded model. Instrumental variable approach is another strategy; however, good instrumental variables are usually hard to find. Panel data models provide another way to resolve the problem. Although there are many potential institutional factors that may affect students' choice of college, these factors are likely to be quite stable for a specific institution over time. So assuming a_i is constant over time, we have:

$$\ln(NRE_{it}) = \gamma_0 + \gamma_1 \ln(NRT_{it}) + \gamma_2 \ln(NST_{it}) + \gamma_3 \ln(NRI_{it}) + a_i + u_{it} \quad (43)$$

Results

Table 4 reports regression results from pooled OLS, fixed effects, and random effects models. The first column, which is based on pooled OLS, does not assume institutional specific effects (i.e., all a_i are zero). The second column fixed effects model assumes non-zero institutional specific effects that are estimated as fixed effects, while the last column random effects model assumes that institutional specific effects are uncorrelated with independent variables. The pooled OLS yields drastically different results from the two panel data models. The estimated price elasticity of nonresident enrollment is approaching unity. That is, a 1% increase in nonresident tuition rates at an institution is associated with an almost 1% increase in nonresident enrollment. This result, although at odds with what standard demand theory would suggest, actually makes sense if it is interpreted as association across institutions. That is, institutions that are able to charge high nonresident tuition rates are usually prestigious institutions that attract a large number of nonresident students. In other words, the estimated positive association in part reflects relationship between nonresident tuition rates and institutional characteristics and

Table 4 A demand model for nonresident enrollment at institutional level (*t*-value in parentheses)

	Pooled	Fixed effects	Random effects
Log nonresident tuition and fees	0.9818	–0.1995	–0.1251
	(15.34)	(–3.40)	(–2.94)
Log resident tuition and fees	–1.3332	0.2613	0.1802
	(–11.33)	(3.89)	(3.12)
Log median family income	2.1997	1.8714	1.8169
	(6.50)	(12.02)	(11.91)
No. observations	4973	4973	4973
R-squared	0.0555	0.9265	Chi2 = 388.46

between institutional characteristics and nonresident enrollment. The rejection of all institutional effects a_i being zero with an F-statistics of 114.88 is not surprising given the dramatic difference in the estimated effects of those three variables in the model.

The second column, after taking institutional fixed effects into consideration, yields elasticity coefficients with the expected directions. The price elasticity of nonresident enrollment with regard to nonresident tuition and fees is estimated at –0.20, an elasticity coefficient similar to that found by McHugh and Morgan (1984). The estimate for cross-price elasticity suggests that a 1% increase in resident tuition and fees in neighboring states is associated with a 0.26% increase in nonresident enrollment at an institution. A 1% increase in median household income in neighboring states is associated with a 1.87% increase in nonresident enrollment at an institution.

The next step is to test whether institutional-specific effects a_i are uncorrelated with independent variables in the model. If so, random effects models are more efficient. A Hausman specification test between the fixed effects model (the second column) and the random effects model (the third column) leads to the rejection of the random effects model. These two tests suggest that fixed effects models are preferred in this sample.

It is interesting to see how the price elasticity differs across different types of institutions. Table 5 reports separate fixed effects models by Carnegie categories. The estimated price elasticity for doctoral and research universities is negative but not statistically significant. One possibility is that these institutions are in such high demand that an increase in nonresident tuition and fees would not significantly reduce the enrollment. In contrast, the estimated (own) price elasticity for master's universities is negative and larger in magnitude, suggesting greater student responsiveness to changes in nonresident tuition and fees at these institutions. For both doctoral/research and master's universities, an increase in family income is correlated with an increase in nonresident enrollment at these institutions. Finally, the empirical model does not seem to explain the rate of nonresident enrollment at baccalaureate colleges; all coefficients of that analysis are not statistically significant.

Table 5 A demand model for nonresident enrollment by Carnegie classification (*t*-value in parentheses)

	Doctoral/research	Master's	Baccalaureate
Log nonresident tuition and fees	–0.1074	–0.3367	0.0154
	(–0.90)	(–4.58)	(0.14)
Log resident tuition and fees	0.2152	0.3166	0.2816
	(1.87)	(3.42)	(1.59)
Log median family income	1.9342	2.1904	0.5649
	(7.70)	(10.23)	(1.15)
No. institutions	160	261	79
No. observations	1652	2590	731
R-squared	0.9149	0.9022	0.9046

Table 6 A demand model for nonresident enrollment by institutional selectivity (*t*-value in parentheses)

	Highly competitive	Competitive	Less competitive
Log nonresident tuition and fees	–0.0040	–0.2641	–0.2528
	(–0.03)	(–3.38)	(–3.37)
Log resident tuition and fees	0.1334	0.1410	0.4841
	(0.85)	(1.48)	(4.69)
Log median family income	2.5489	2.2484	1.1155
	(6.80)	(11.06)	(3.99)
No. institutions	89	212	199
No. observations	911	2164	1898
R-squared	0.9267	0.9212	0.9159

Economic theories suggest that selectivity is an important factor to consider. Selective institutions, by definition, usually have a far larger number of qualified applicants than the desired enrollment level. As a result, even with an increase in their price, these institutions are probably still able to attract enough qualified applicants although their number might decrease. In contrast, less selective institutions could be more influenced by the change in the number of qualified applicants due to price increases. To test these hypotheses, we divided all public institutions in our final sample into highly competitive, competitive, and less competitive institutions based on Barron's index. Results in Table 6 indicate that the nonresident enrollment at highly competitive public institutions is less affected by the price than at the other two categories of institutions, confirming the hypothesis that student enrollment at selective institutions is less price-elastic than at less selective institutions.

Summary

Results of this empirical example suggest that lowering nonresident tuition rates or providing tuition discounts for all nonresident students does not appear to be an effective strategy in general. On average, price elasticity for nonresident enrollment at public institutions is inelastic, suggesting that a reduction in nonresident tuition rate or an increase in financial aid for nonresident students would likely decrease the tuition revenues generated from enrolling nonresident students. Moreover, because public institutions have only limited discretion in setting nonresident enrollment levels, even if a reduction in tuition level led to a large increase in nonresident student demand, public institutions are less likely to benefit financially from it. Of course, they could benefit in other aspects such as the quality of nonresident enrollment.

This finding does not, however, preclude better-designed and better-targeted tuition incentive programs for nonresident applicants. For example, if the demand is elastic for certain groups of students but is inelastic on average, a targeted financial aid or tuition discount program for these students could increase their enrollment significantly and yield more tuition revenues. Ehrenberg and Sherman (1984) examined students' propensity for matriculation and their price elasticities for different

groups of applicants at a selective private university and, based on this information, designed an optimal financial aid policy that maximizes the quality of an entering cohort, given a fixed amount of financial resources. Such institutional research is necessary before it is possible to determine efficient and effective tuition and financial aid policies for nonresident students at public institutions.

This example demonstrates how estimates based on cross-sectional samples could be severely biased when individual heterogeneity is not taken into account. Estimates based on between-unit variation should also be interpreted as such. For example, the positive association between nonresident tuition and nonresident enrollment across institutions should be interpreted as a between-unit phenomenon. Using between-unit estimates for policymaking at individual institutions could be misleading. Increasing nonresident tuition rates in the hope of increasing nonresident enrollment does not sound like a good idea, as one could easily tell in this dramatic example. However, in many circumstances when theories are not strong, the true relationship is not all that clear, or the bias is not as severe, it is attempting to use these estimates for policy purposes.

Does Merit Aid Stem Brain Drain?

The Policy Question

Zhang and Ness (2009) use college enrollment and migration data to test the brain drain hypothesis of state-sponsored merit aid programs. That is, do merit-aid programs stanch the emigration of the "best and brightest" students to other students. We find that in the aggregate and on average, the implementation of state-wide merit-based aid increases total freshmen enrollment in merit-aid states and most importantly boosts resident college enrollment in these states significantly. These increases are a function of both increased total enrollment from these merit-aid states and reduced emigration from these states. In this empirical example, we use one of the merit-aid states, Florida, as an example to illustrate the difference-in-differences technique. In addition, the focus on one state enables us to delve into the effect of state merit-based aid programs on different categories of students, including for example the total enrollment in a state, total enrollment from a state, resident enrollment, nonresident enrollment, and number of students who migrate to other states. Each of these enrollment variables has important policy implications depending on specific policy goals of the merit-based aid programs.

In the past 15 years 14 states have adopted statewide scholarship programs that are awarded on the basis of academic merit as opposed to the students' financial need. A common slogan of state merit aid programs has been to retain the state's "best and brightest" students to attend college in-state in the hope that they will enter the state's workforce after graduation. Surprisingly, few studies have considered the extent to which state merit aid programs alleviate the "brain drain." One single-state study (Cornwell, Mustard, & Sridhar, 2006) finds evidence that Georgia did indeed reduce the brain drain due to the HOPE Scholarship program. Still, few studies exist that empirically test these effects in other states.

Data and Methods

In this example, we use Florida as the empirical context to illustrate the use of difference-in-differences technique and to examine the substantive question about how merit-based financial aid programs have affected college student migration. The IPEDS Enrollment Survey collects data on the state of residence of first-time, first-year students in even-numbered years before 2000 and every year since then. In each year for which data are available, each institution reports its enrollment of first-time, first-year students by state of residence (all 50 states, the District of Columbia, U.S. territories, and foreign countries). We only include 50 states in our analysis. In addition, we only include 4-year institutions in this study for several reasons. First, this study focuses on student migration, the vast majority of which happens at 4-year institutions, since students attending 2-year institutions do so overwhelmingly in-state. Second, due to the nature of state merit-aid programs, one would expect that enrollment changes would mainly occur in 4-year institutions. Finally, for practical reasons, the enrollment and migration data are more complete at 4-year colleges and universities than at 2-year colleges. Thus, missing data problems in the latter would cause analytic problems when institutional data are aggregated across institutional types within states.

To facilitate our discussion, the following notation is used: "a" is the number of first-time, first year students; "*i*" represents home state (i.e., the state where students are residents); "*j*" represents host state (i.e., the state where students attend college); and "*k*" denotes institutions. So a_{ijkt} is the number of students from state *i* who attend institution *k* in state *j* in year *t*. After aggregating a_{ijkt} over k (i.e., institutions within each state), we compute the number of students from state *i* who attend colleges in state *j* in year *t*, i.e., $a_{ijt} = \sum_{k} a_{ijkt}$. Using a_{ijt}, we further define the following five enrollment variables:

(i) $a_{.jt} = \sum_{i=1}^{50} a_{ijt}$: total college enrollment in state *j* in year *t*;
(ii) a_{iit}(or a_{jjt}): resident student enrollment in state *i* (or *j*) in year *t* when $i = j$ in a_{ijt};
(iii) $a_{.jt} - a_{jjt}$: nonresident student enrollment in state *j* in year *t*;
(iv) $a_{i.t} = \sum_{j=1}^{50} a_{ijt}$: total college enrollment from state *j* in year *t*;
(v) $a_{i.t} - a_{iit}$: number of residents from state *i* who attend colleges in states other than state *i* in year *t*;

Each of the above variables has important policy implications depending on specific policy goals of the merit-based aid. For example, if the policy goal is to increase college enrollment in a state, regardless of where students come from, then the first variable is the one that policymakers need to focus on. Conversely, if merit-based aid is intended to promote resident student enrollment *and* to reduce the number of resident students who migrate to other states (i.e., to reduce brain drain), then both variables 2 and 5 should be examined. Variable 3 and 4 have interesting policy

implications, too. For example, if the policy goal is to increase nonresident enrollment in a state (e.g., due to diversity, quality, and tuition revenue considerations), then the third variable is the key variable to consider. Finally, if state policymakers want to increase the college enrollment of their residents, regardless of where they might attend colleges, then variable 4 is the correct measure.

In particular, variables 2 and 5 measure the brain drain in absolute terms, that is, the number of students who attend colleges in their home state and elsewhere. Because it is possible that these two variables change in the same direction, we further construct the following variable to measure the relative severity of any brain drain.

(vi) $\frac{a_{i.t}-a_{iit}}{a_{i.t}}$: the proportion of residents from state i who attend colleges in states other than state i in year t.

To test for the impact of merit aid in Florida in 1997, we need to compare the enrollment before and after the policy change. As in any policy evaluation study like this, the most difficult task is to construct a "counterfactual," (i.e., what would have happened if there had been no merit aid program). In this analysis, we use comparable states to account for general factors that might have contributed to the enrollment change in Florida. These general factors might include, for example, business cycle and changes in the cost and return of college education. Assuming that these general factors will have similar impacts on college enrollment in Florida and other comparable states, we are able to substitute the changes in college enrollment in other states for that in Florida if there had been no policy change. This difference-in-difference method has been widely employed to study the impact of Georgia's HOPE Scholarship (e.g., Dynarski, 2000; Cornwell, Mustard, & Sridhar, 2006; Long, 2004). In addition, we use multiple regression to control for salient variables that might have contributed to the change in college enrollment in Florida over time, particularly before and after the implementation of merit-based aid in 1997. These control variables include the number of high school graduates, state per capita income, and state unemployment rate in Florida. Formally, we use the following OLS regression:

$$y_{it} = \alpha + \beta(FL^{*}post) + \gamma_i state_i + \theta_t year_t + Z_{it}'\xi + \varepsilon_{it} \tag{44}$$

where y_{it} is our dependent variables (i.e., variables i–vi) in state i in year t; FL is a dummy variable for Florida (i.e., $FL = 1$ if Florida, $FL = 0$ if other states); $post$ is a dummy variable which indicates the implementation of the merit-based aid in Florida (i.e., $post = 1$ if >=1997, $post = 0$ otherwise); $state_i$ is a set of dummy variables representing states (i.e., γ_i is state fixed effects); $year_t$ is a set of dummy variables representing years (i.e., θ_t is year fixed effects); Z_{it} includes a set of covariates in state i in year t (i.e., high school graduates, state per capita income, and state unemployment rate), and finally ε_{it} is the error term. The estimate of the interaction term between Florida and post dummy provides the difference in the differences estimate between Florida and other comparable states before and after the adoption of merit aid after controlling for covariates in the model. It is important to note here

that in order for the interaction term to generate DD estimates, it is necessary to include both state and year fixed effects in the model.

In this analysis, we include 6 years of data both before and after the adoption of merit-based aid program in 1997. Due to the availability of enrollment data in IPEDS, we include enrollment data in 1992, 1994, and 1996 as the before policy period, and 1998, 2000, 2001, 2002, and 2003 as the after policy period. Because there is no single best definition of comparable states, we follow the suggestion of Meyer (1995) and use multiple comparison groups (e.g., Berry & Berry, 2007; Doyle, 2006; Hearn & Griswold, 1994; Zhang, 2007). They include a national group which consists of all other states except Florida and other merit-aid states, states with similar proportions of out-migration students as Florida before the policy adoption, and regional compact which consists of all other Southern Regional Education Board (SREB) states. So the final panel data set includes multiple states (Florida and other comparable states) observed over a 12-year period.

Results

Equation (44) is estimated using the 6 enrollment measures as dependent variables. In addition, three different comparison groups are used to check the robustness of our results. Results are reported in Table 7. Because our primary interest in on the effect of merit-based aid on college enrollment, only the coefficient of *Florida∗post* is reported in these tables; all other coefficients including those for state fixed effects, year fixed effects, and other covariates are suppressed.

Column (1) in Table 7 reports the effect of merit-based aid programs on total 4-year college freshmen enrollment in Florida. The positive effect of merit-based aid programs on total college enrollment is reflected in the positive and significant averages based on states that have not adopted similar merit-based aid program (row 1), states with similar proportion of out-migration students (row 2), and states within

Table 7 The impact of merit-based aid on college enrollment at 4-year institutions (*t*-value in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
National group	0.192	0.224	0.086	0.110	–0.193	–0.079
	(4.27)	(4.23)	(1.32)	(3.06)	(–4.49)	(–5.27)
Similar emigration	0.260	0.271	0.194	0.132	–0.221	–0.090
	(6.84)	(6.16)	(4.51)	(5.74)	(–6.50)	(–5.62)
Regional compact	0.168	0.191	0.075	0.128	–0.143	–0.068
	(4.00)	(3.47)	(1.07)	(3.20)	(–2.92)	(–5.23)

(1): Total college enrollment in a state
(2): Resident student enrollment in a state
(3): Nonresident student enrollment in a state (i.e., in-migration)
(4): Total college enrollment from a state
(5): Number of residents from a state who attend colleges in other states (i.e., out-migration)
(6): The proportion of residents from a state who attend colleges in other states.

the same regional compact (row 3). Depending on which comparison group is used, the estimated effect of merit-based aid increases total college enrollment in Florida by 18–30% [to obtain percent changes the coefficients reported in Table 7 are transformed using exp(b)–1]. These results confirm the commonly held assumption that merit-based aid programs increase college enrollments.

Changes in total college enrollment in a state could be from two sources: resident and nonresident enrollment. Columns (2) and (3) report the impact of merit-based aid programs on resident and nonresident enrollment separately. Given the target of merit-based aid, one would expect that the program would have a positive effect mainly on resident enrollment but not necessarily on nonresident enrollment in Florida, although it is possible that in the long run the merit-aid program might improve the student quality (or institutional prestige), attracting more students from other states. Results in Column (2) indicate that the positive impact of merit-based aid on total college enrollment is mainly through its positive impact on resident enrollment. Not surprisingly, the estimated effects in Column (2) are larger than those in Column (1). Depending on the comparison group used, the estimated effect of merit-based aid increases resident enrollment in Florida by 21–31%.

Whereas the effect of merit-based aid on resident enrollment is straightforward, its impact on nonresident enrollment is less pronounced. Although nonresident students are not eligible for state merit-based aid, the program might have an impact on nonresident enrollment in the following ways. First, due to capacity constraints, an increase in the number of resident students in a state might result in fewer seats for nonresident students, reducing enrollments of the latter. On the other hand, it is possible that a merit aid program might improve institutional quality (or rankings) and nonresident students might be attracted to these institutions. Results in Column (3) indicate that the introduction of a merit-based aid program in Florida has a positive but generally insignificant effect on nonresident freshmen enrollment, with the exception that when states with a similar proportion of out-migration students are used as the comparison group, the estimated effect is positive and significant.

From a state policymaking perspective, it is important to examine the impact of merit-aid programs on total college enrollment of state residents, including both those who stay in their home state for college, and individuals who leave their home state for colleges in other states. From a social perspective, this is a crucial question because the merit-based aid program could be a zero-sum game if all it does is to retain students in their home states without increasing the total college enrollment from a state, although this outcome could still benefit a state if students attending home state institutions are more likely to remain in their home states after college. Results in Column (4) indicate that although the introduction of a merit-based aid program has a positive effect on total college enrollment in Florida, the estimated effect in (4) is much smaller than the effect on total college enrollment in (1) or resident college enrollment in Florida (in column 2), suggesting that part of the increase in the resident enrollment results from a reduction in students leaving Florida. For example, the merit-based aid increases college enrollment of Florida's residents by 11–14% depending on the comparison group used (see column 4).

Given the large effect of a merit-based aid program on resident freshmen enrollment and much smaller effect on total college enrollment, it is straightforward that fewer students from Florida are attending colleges and universities in other states. This is confirmed by results in Column (5). Based on a national comparison group, the introduction of merit aid program has decreased the number of students from Florida who attend out-of-state colleges and universities by nearly 18%. Results based on states with similar out-migration pattern and regional compacts are very similar.

The reduction in brain drain is clear in view of the increase in the number of resident freshmen enrollment (Column 2) and the decrease in the number of out-migration students (Column 5). To precisely quantify this reduction, we use the proportion of out-migration students as the dependent variable and the impact of merit-based aid is estimated using the same difference in difference technique. Results in Column (6) suggest that the introduction of merit-based aid has reduced the proportion of out-migration students by 7–8% points.

In Zhang and Ness (2009), we also replicate part of Table 7 separately for Research and Doctoral institutions and non-Research and Doctoral institutions. The purpose of this exercise is to determine which types of institutions have experienced the largest increase (or reduction) in student enrollment. Our results based on 14 merit-aid states indicate that the observed results as in Table 7 are mainly driven by enrollment at Research and Doctoral institutions. The impact on enrollment at non-Research and Doctoral institutions has been minimal and statistically insignificant in most states. That is, the increase in resident enrollment has mainly occurred at Research and Doctoral institutions at merit-aid states; and the decrease in out-migration enrollment has mainly happened at Research and Doctoral institutions at other states. These results are consistent with the notion that merit-based aid programs have been successful in retaining the best and brightest students in their home states.

Summary

In this example, we use college enrollment and migration data in Florida to test the brain drain hypothesis. Results suggest that state merit aid programs do indeed reduce the migration of the "best and brightest" students to other states. The establishment of state-wide merit-based aid in Florida increases total freshmen enrollment (an income effect) and most importantly boosts resident college enrollment and reduces the number of students who leave to attend colleges outside of Florida (a substitution effect) Overall, people are purchasing more college education and they are also more likely to choose colleges in Florida than elsewhere.

Concluding Remarks

Many questions we examine in higher education policy studies are causal in nature, i.e., whether a policy change affects outcomes. Conceptually, comparing outcomes with and without the policy change for the same subject provides the ideal design

to evaluate its effect. The inability of observing outcomes in both "states" creates the fundamental problem in making inferences about educational policies. Experimental design addresses this problem by creating a statistical counterfactual for the treatment group. Unfortunately, experimental studies are quite rare in higher education. Recent work on program evaluation and policy studies has focused on individual heterogeneity based on both observables and unobservables and devised a range of statistical methods aimed at establishing causal relationships using observational data. Yet the use of these more advanced methods is still in its nascent stage in higher education policy studies. The primary goal of this chapter is to encourage researchers to exploit the power of these methods and capitalize on the rich data sources we have in higher education. This chapter was not intended to be a comprehensive treatment of the panel data literature rather, the focus was on the most basic panel data models and I also provided references to the literature where additional information can be obtained. Empirical examples were used to illustrate the power of panel data models and their variations in addressing a variety of interesting topics in higher education policy studies. We hope this effort is worthwhile.

The use of panel data models represents a unique opportunity to address the problem due to individual heterogeneity. After all, one cannot have a much better counterfactual than the subject itself. Yet, one still has to be mindful that there are tradeoffs in creating a statistical counterfactual by using observational data. Understanding these assumptions is the key to the proper use of these methods and to the interpretation and generalization of empirical results. For example, in the fixed effects model, time-invariant individual heterogeneity is eliminated by the within transformation; however, it is still vulnerable to biases due to omitted variables that are time variant and that are correlated with the main policy variables in the model. Other approaches such as instrumental variables are more appropriate in those circumstances.

In concluding this chapter, we want to reiterate the potential bias of our approach. Our focus is on obtaining unbiased and consistent estimates for important policy variables in higher education research. This is the right approach if obtaining correct estimates is of primary importance. In so doing, however, we have thrown away much interesting and usable variation. Other methodological approaches such as MLM may be more helpful in modeling variations across different levels. Future research in this area should focus on similarities and differences among methods developed in different disciplines. This is crucial for higher education as a field of study.

A word on statistical packages on panel data models will conclude this chapter. Commonly used statistical packages in educational research including Stata, SAS, SPSS (now PASW), and Limdep provide procedures that can estimate panel data models conveniently. Stata has the `xt` series of commands that are specialized in analyzing panel data. In SAS, panel data models can be handled by `tscsreg` and `panel` procedures. The Limdep `regress` command with the `panel` subcommand also estimates panel data model conveniently. Finally, SPSS does not have specialized procedures to estimate panel data models; rather, they are handled through the generalized linear models (`genlin`) procedure. Personally, we find Stata convenient to use. It provides many specialized procedures for different

panel data models. For example, `xtreg` provides convenient ways to estimate fixed and random effects models; `xtmixed` and `xtgls` can deal with more complex error structures. Dynamic panel data model can be estimated through `xtabond` procedure. Stata (2007) and Allison (2009) are useful reference books on using Stata for panel data analysis. Stata also provide procedures to estimate common models such as limited dependent variable models and stochastic frontier models for panel data. Many data arrangement and processing tools such as `reshape`, `xi`, and `egen` provide additional convenience and flexibility when dealing with panel data in Stata.

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Enlarging Our Understanding of Glass Ceiling Effects with Social Closure Theory in Higher Education

Jerlando F. L. Jackson and Raul A. Leon

As we witness demographic shifts that shape the future of our nation, both empirical and practice-based examinations are needed to understand the implications of this transformation (Moore, 1995). Women and people of color have dramatically transformed the country's economy by entering sectors of the U.S. workforce in the late 1960s and early 1970s (e.g., the armed forces) that were previously dominated by White men (Winborne, 2007). This growth continues and employment data in the United States illustrate that women are nearing a balanced representation in the workforce and people of color have increased their presence across several employment sectors (e.g., business) (Toossi, 2005). These shifting demographics have profoundly altered the image of the U.S. workforce and will continue to transform the country. For instance, according to the Hudson Institute, people of color represent 16% of the workforce today, but it is predicted that the growth will surpass the 30% mark by 2020 (California Diversity Council, 2005). With regards to women, their impact is also significant, as they comprise approximately 47% of the total workforce (Winborne, 2007).

As the representation of these two groups continues to grow, other populations have also increased their presence in today's U.S. workforce. These groups include persons with disabilities, members of the gay and lesbian community, people with different religious affiliation, and senior citizens among others (Williams & Wade-Golden, 2008). Overall, this increased representation by other groups has enlarged our notion of diversity in society. In particular, diversity as a workforce challenge has evolved from its general conception in terms of labor force composition, to a subject where deeper challenges that affect workforce dynamics must be considered, such as impediments for these diverse groups with regards to ascending to senior-level positions.

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The employment sector or social domain that is central to these workforce challenges is higher education. Like churches, institutions of higher education in many ways serve as a compass for moral development and character in the United States (Thelin, 2004). With few exceptions, institutions of higher education have embedded in their mission statements responsibility for the development of the moral character of its graduates (Morphew & Hartley, 2006). In addition to being charged with enhancing moral development, which is linked to principles of difference and diversity, these institutions also have a societal charge to supply the workforce with competent workers (Grubb, 1997). Subsequently, institutions of higher education are equally held accountable to expand and absorb the growth of societal diversity on their respective campuses. In general, conversations about diversity on college campuses are narrowly focused on students, ignoring the need to enhance diversity among the higher education workforce as well (Jackson, 2001, 2004a). In turn, less attention has been placed on the diversification of senior-level positions (e.g., deans and provosts).

Without question, diversity is seen as one of the most critical issues facing higher education in the twenty-first century (Hurtado & Dey, 1997; Tierney, 1997). For that reason, creating work environments that are conducive for the professional growth of diverse individuals and the organization itself becomes a concern that must be addressed. While the initial challenges to expanding workforce diversity[1] is numeric representation of diverse groups, it is imperative not to interpret this goal as disconnected from comprehensive efforts for continuous improvement within the organizational context (Hurtado, Milem, Clayton-Pederson, & Allen, 1999). We acknowledge that a central concern for any efforts to move toward workforce diversity is the challenge of workplace discrimination.[2] Decades of research (e.g., Cohn & Fossett, 1995; Tomaskavic-Devey & Skaggs, 2002; Wilson, 2005) have conceded that human capital deficits may account for workplace outcome differences. However, when human capital controls are in place, income deficits, employment disparities, and inequalities in promotion and authority still remain. Roscigno, Garcia, and Bobbitt-Zeher (2007) note that inequalities in employment typically infer discrimination as a key causal mechanism. Therefore, some attention must be given to the role of the place of employment and employers in workplace outcome differences. That is, some employers hold biased views, based on stereotypes, that inform skewed hiring, promotion, and firing decisions formally known as detrimental employer biases (Moss & Tilly, 2001; Pager, 2003).

In this chapter, we narrow our focus to glass ceiling effects which is a form of workplace discrimination linked specifically to senior-level position attainment. We begin with an analysis of the glass ceiling effects literature that moves away from replicating the loosely coupled nature of higher education research to explore other employment sectors (i.e., business sector and the armed forces). Next, we present original data analysis and a synopsis of prior research on workforce diversity challenges in higher education. We then turn to social closure theory as a valuable framework for sense-making regarding glass ceiling effects, in addition to understanding the need for organization ownership for glass ceiling effects. The research questions explored herein are: (a) what can we learn about workplace discrimination

from glass ceiling effects research; (b) what can higher education learn from other employment sectors confronting glass ceiling effects; (c) do data on the national landscape of senior-level positions[3] support notions of disparities for people of color and women; and (d) how does social closure theory advance our understanding of glass ceiling effects?

Conceptualizing Glass Ceiling Effects as a Form of Workplace Discrimination Across Three Employment Sectors

As noted by other scholars (e.g., Cotter, Hermsen, Ovadia, & Vanneman, 2001; Maume, 2004) a glass ceiling occurs when discrimination increases in severity with movement up the occupational hierarchy. As a result, inequality grows over the course of a person's career. A glass ceiling is also apparent when racial and gender inequality is observed after controlling for productivity-relevant factors. These aforementioned studies provide confirming evidence that the glass ceiling is a unique form of inequality, and that bias against women and people of color may be more severe later in the career than at labor market entry.

Cotter et al. (2001) proposed a four-prong empirical test to measure for the existence of a glass ceiling. These four criteria inform our conceptualization of glass ceiling effects and give structure to the current inquiry. In fact, Cotter et al.'s (2001) work formed the basis of other studies seeking to understand glass ceiling effects as well (e.g., Maume, 2004). First, a glass ceiling must represent a gender or racial difference that is not explained by other job-relevant characteristics of the employee. Second, a glass ceiling effect is greater at higher levels of an outcome rather than lower levels. Third, glass ceiling effects reside in the chances of advancement into higher levels, not merely the proportion of individuals currently at those higher levels. Lastly, a disparity represents differences in advancement and opportunity that increase over the course of a career.

Concerned with issues such as workplace discrimination, a glass ceiling is perceived as a barrier or a set of impediments to career advancement for women and people of color (Baxter & Wright, 2000; Morrison, White, & Von Velsor, 1987). The term glass ceiling was originally coined in the *Wall Street Journal* (Hymowitz & Schellhardt, 1986) and over the last two decades it has been widely defined as "a barrier so subtle that it is transparent, yet so strong that it prevents women and minorities from moving up in the management hierarchy" (Morrison & Von Glinow, 1990, p. 200).

Since the 1980s, a large body of research emerging from various employment sectors of the economy has contributed to the understanding of this phenomenon. Research sponsored by the United States Federal Government (Glass Ceiling Commission, 1995a, 1995b; Powell & Butterfield, 1994), the business sector (Morrison & Von Glinow, 1990; Morrison et al., 1987; Robinson & Dechant, 1997; Winborne, 2007), armed forces (Baldwin, 1996a, 1996b; Office of the Under Secretary of Defense Personnel and Readiness, 2002), and higher education

(Chliwniak, 1997; David & Woodword, 1998; Johnsrud, 1991) has examined the roots of this problem, and described the types of effects associated with the glass ceiling. This research has cultivated a growing interest, illustrating that examining the glass ceiling is a challenging task, and dealing with its effects presents a greater obstacle. This section provides a review of the literature on the glass ceiling across three employment sectors (i.e., business sector, armed forces, and higher education).

Business as an Employment Sector

As an outcome of the civil rights movement, Title VII of the 1964 Civil Rights Act, made it illegal for organizations to engage in employment practices that discriminated against employees on the basis of race, color, religion, sex, and national origin (age and disability were legislated after 1964) (Kochan et al., 2003). However, nearly three decades later, the U.S. Department of Labor introduced its glass ceiling initiative in 1991. This initiative provided the foundation for the creation of the Glass Ceiling Commission, which focused on exploring the workforce composition in the United States' business sector (Glass Ceiling Commission, 1995b).

The Federal Glass Ceiling Commission gathered information at the management level in the private sector on historically underrepresented groups including: women, African Americans/Blacks, American Indians, Asians/Pacific Islanders, and Hispanics. These data demonstrated that over the past 30 years, great progress has been made, providing large numbers of individuals from diverse groups with the opportunity to participate in the business sector of our society. However, the report also acknowledged that there was still a great deal to do with regards to barriers hindering access to senior-level positions for diverse groups (Glass Ceiling Commission, 1995a). Following this recommendation, businesses started to recognize that managing diversity is a step that organizations must take in order to succeed in today's market. Today, one could observe a "war for talent" where companies not only must seek the best candidates available, but also face the need to identify talent in different forms and reap benefits from this diversity (Caudron, 1998; Kochan et al., 2003).

Today's companies need to learn how to use diversity to drive business growth with valuable benefits such as increased marketplace understanding, greater creativity, higher quality team problem-solving, improved leadership effectiveness, and better global relationships (Robinson & Dechant, 1997). Likewise, they must recognize that managing diversity is also a cost saving strategy that when appropriately implemented will avoid legal actions, high employee turnover, and negative consumer image (Robinson & Dechant, 1997). As stated by Winborne (2007), businesses that "successfully embrace diversity by taking advantage of all the talent that exists in their available pool will be ahead of their competition. And those that successfully manage the diversity within their workplace are at an even greater competitive advantage" (p. 4). However, neither the economic imperatives nor practices adopted in the business sector have deterred companies from finding more tangible

and compelling priorities that win out in the short run when compared to diversity initiatives (Robinson & Dechant, 1997).

Consequently, business as an employment sector is at a place where resources have been invested in this sector to mitigate glass ceiling effects since the 1980, but companies still struggle to incorporate diversity as a core aspect of their organization, reproducing a critical mistake that depicts diversity as an impediment rather than a valuable input (Johnston & Packer, 1987). Therefore, it is imperative to explore what is happening to women and people of color in this context, particularly considering that some believe that the business sector sets the tone for other employment sectors in terms of workforce diversity (Coleman, 1998).

Illustrating the level of complexity that the business sector encounters when developing workforce environments that welcome people of color, it must be emphasized that despite the fact that all groups face challenges in the current labor market, African Americans/Blacks and Hispanics are worst off when regarding labor disparities, and are still more likely to be unemployed when compared to any other group (U.S. Department of Labor, 2008). Likewise, they only account for 5% of all corporate officer positions in Fortune 500 companies (Catalyst, 2000b). The 2007 U.S. Department of Labor report, *Labor Force Characteristics by Race and Ethnicity*, utilizes data from the Current Population Survey (CPS) to provide valuable information examining the status of women and people of color in the labor force. The report makes evident that these two groups continue to achieve educational gains, and are slowly transitioning into high-skilled occupations with higher salaries; however, their overall representation in management and professional occupations—the highest-paying categories—is still below the proportions for Whites.

In 2007, labor data showed that 27.1% of African Americans/Blacks and 17.8% of Hispanics worked in manager and professional occupations, a much lower figure compared to their White (36.1%) counterparts. In considering non-management level positions, the percentage of African Americans/Blacks and Hispanics in service occupations, a sector defined by lower paying jobs tells a different story, is disproportionately high. Only 15.5% of Whites held such positions, compared with 23.3% of African Americans/Blacks and 24.1% of Hispanics (see Table 1).

These disparities in representation are also reflected in a salary gap for full-time wage and salary workers for African Americans/Blacks and Hispanics. Despite educational progress and a movement toward higher-paying occupations, the earnings of these two groups remain significantly below their White and Asian/Pacific Islanders counterparts (U.S. Department of Labor, 2008) (see Appendix). White men reported median weekly earnings of $716, compared to $569 for African Americans/Blacks and $503 for Hispanics (U.S. Department of Labor, 2008). Likewise, these disparities persist at the level of managerial, professional, and service occupations.

The U.S. Department of Labor report highlights a similar outcome when data are categorized by gender. In this particular case, approximately 22% of African American/Black men and 14% of Hispanic men worked in management, professional, and related occupations, while 33% of White men were employed in these

Table 1 Proportional representation by occupation level in the business sector

	2007	
	Manager and professional (%)	Service (%)
Race/ethnicity		
African American/Black	27.1	23.3
Hispanic	17.8	24.1
Asian/Pacific Islander	48.1	16.0
White	36.1	15.5
Gender		
Male	32.7	13.2
Female	38.6	20.4

Source: U.S. Department of Labor (2008, Table 14).

positions. Considering service occupations, 12% of White males held these positions, while 14% of Asian/Pacific Islander men, 19% of African American/Black men, and 20% of Hispanics comprised the largest groups.

When data from the U.S. Department of Labor report are analyzed for the female population, White women are better represented in higher paying positions when compared to women of color. In 2007, 40% of White women worked in manager and professional occupations, while only 31% of African American/Black women, and 23% of Hispanic women served in these positions. As is the case with the male population, Asian/Pacific Islander women fared better than all groups and constituted 47%. The story repeats in the service occupations with females of color comprising the largest group. In the service category, 27% of African American/Black women and 31% Hispanic women work in these positions, but only 19% of White and Asian/Pacific Islander women are employed in service type jobs.

Data in Table 1 highlights two key outcomes that warrant further discussion. First, it shows that Asians/Pacific Islanders deviate from a pattern of low representation for people of color in managerial and professional occupations and also shows that this group is earning higher salaries. In the business sector, Asians/Pacific Islanders do fairly well and in some cases better than Whites. For instance, nearly 48.1% of Asians/Pacific Islanders work in managerial and professional occupations, the largest representation among all groups when categorized by race and ethnicity. This particularity also takes place in the service occupation category, but here only 16% of Asians are employed, a comparable figure to the percentage of Whites (15%). As far as median weekly earnings, it is reported that this group earns $830, the highest figure for all groups (U.S. Department of Labor, 2008). This exception in the business sector is comparable to evidence cited for career success of Asian/Pacific Islander faculty in higher education (Lee, 2002).

Second, when considering gender, a larger percentage of women are employed in managerial and professional occupations when compared to males. In 2007, approximately 38.6% of women worked in these positions compared to 32.7% for males. This represents progress; however, disparities continue to persist at the top levels of the organizational hierarchy. This is manifested by low representation of women in

corporate officer positions. In alignment with notions of glass ceiling effects, disparities appear to get more severe as individuals move up the occupational hierarchy. Catalyst (2000b) shows that only 13% of women held corporate officer positions in Fortune 500 companies. As Thomas and Gabarro (1999) note, diverse groups not only typically face much more difficulty in early stages of their careers to secure promotions than their White colleagues, but also must be better prepared than their colleagues if they expect to reach corporate officer levels.

Considering glass ceiling effects more directly, *Passport to Opportunity: U.S. Women in Global Business* provides a comprehensive overview of barriers associated with this phenomenon (Catalyst, 2000a). This study affirms that women face greater challenges to entering the pool of qualified candidates, suffer from a lack of mentorship, and must deal with tightly coupled male networks in order to move up in the organizational hierarchy. In addition, lack of recruitment initiatives, few opportunities for advancing, and minimum access to information, among other challenges constitute major concerns when referring to the glass ceiling and to the status of these populations in this employment sector (Castro, 1997). For that reason, when exploring the glass ceiling, one must truly assess the impact of organizational environments on women and people of color, and must recognize the invisible and pervasive nature of this phenomenon.

Moving beyond the barriers associated with glass ceiling effects, two factors must be highlighted in the business sector. First, it is argued that the presence of a glass ceiling has in fact encouraged women and people of color to pursue other routes and create their own businesses in order to gain access to leadership positions. This reaction is attributed to continuous discrimination in the formal labor market (Weiler & Bernasek, 2001), where women and people of color "are expected to play by [W]hite male rules in order to get ahead or even to be accepted in a corporate culture" (Glass Ceiling Commission, 1995b, p. 41). As pointed out by the Center for Women's Business Research (2008), women-owned firms show extraordinary growth representing 40% of all firms. As of 2008, 10.1 million women-owned firms employ 13 million people and generate nearly $2 trillion in annual revenues. Hispanic-owned businesses grew at three times the national rate for all companies from 1997 to 2002, representing 1.6 million businesses according to a report from the Census Bureau (Ohlemacher, 2006). The implications of these statistics are out of the scope of this chapter, but it is undeniable that the progress of women and racial/ethnic groups and the connection to the glass ceiling ought to be considered.

The Armed Forces as an Employment Sector

Over the past two decades, the armed forces have been viewed by some as a model for the American labor force for equal opportunity practices, mainly referring to pay and benefits (Evertson & Nesbitt, 2004). However, for women and people of color in this employment sector, numerical representational disparities are apparent at all ranks, and worsen as one explores the hierarchy structure at top levels. Since the late 1940s, the representation of women in the armed forces has "increased from less than one percent to approximately 16% of the total force population, with the

Air Force displaying the largest proportion, 17%, while the Marine Corps has the smallest representation at 6%" (Evertson & Nesbitt, 2004, p. 1). However, despite this growth, low representation is accompanied by low rates of promotion, where the small numbers of women promoted as percentages of total promoted indicate the presence of a glass ceiling (Baldwin, 1996b).

One of the main reasons cited to explain this phenomenon of low representation at senior-level positions[4] is the fact that until the 1990s, women were not allowed to participate on fly combat missions or serve on combat vessels at sea. Because of these impediments, they were also excluded from direct ground combat, which comprises 33% of the Army's positions and is the branch from which most generals come (Baldwin, 1996a). Considering these circumstances, it appears logical to think that advancing to senior-leadership roles was implicitly out of the picture for women in some fields within the armed forces. However, one must not ignore the culture of discrimination in the armed forces, where practices that extend beyond mere regulations have prevented women from accessing certain ranks and have limited the progress of women.

Evertson and Nesbitt (2004) note that men are not particularly comfortable when working around women, especially when situated in leadership positions. Cases are cited in their study where male officers continuously refuse to share responsibilities with female officers, or to even directly communicate with them. They also note that as part of the discrimination practices common in the armed forces, the behavior of one individual is generalized to the whole population (e.g., all other women in the armed forces). This attitude can be attributed in part to the power of "good old boys" networks that still play a major role on the rates of promotion of female officers, forcing women to continuously prove themselves regardless of their rank or experience, reinforcing credibility before being accepted by male groups.

As stated by Evertson and Nesbitt (2004), slower progression through the ranks and a lack of representation above the rank of Captain (03) is a common denominator for women in the armed forces. Everston and Nesbitt suggest that this lack of representation is equivalent to what occurs to the female population in other sectors of the workforce, where their representation is reduced above middle management positions. To support this claim, Table 2 illustrates the percentage of women serving in the armed forces at each level of the officer ranking system (0–1 to 0–10) and provides valuable insights to understand the status of women in this employment sector (Office of the Under Secretary of Defense Personnel and Readiness, 2002). As this table indicates, women are outnumbering males at the lower levels of the officer ranking system (i.e., Company Grade (01–03)). However, as one progresses through the armed forces, men have a higher representation at the Field Grade (04–06) and the General Officer (07–010) ranks.

For people of color, their experiences resemble those of women, where discrimination practices and a hostile environment defines their experiences of many officers of color. Adams (1997) cites the case of the Marine Corps as an organization with a "racially troubled" reputation. Although Adams found that this organization has continuously attempted to change these perceptions by focusing on minority concerns and emphasizing minority officer achievements and opportunities, its

Table 2 Commissioned officer representation by race/ethnicity and gender (2004)

Armed forces	01–03 (Company grade) (%)	04–06 (Field grade) (%)	07–010 (General officer) (%)
Army			
White	57.2	41.2	0.5
African American	60.1	39.6	0.3
Hispanic	68.6	31.2	0.1
Male	57.3	41.3	0.5
Female	66.8	33.1	0.0
Navy ∗			
White	56.2	43.4	0.5
African American	71.9	28.4	0.2
Hispanic	78.0	21.9	0.1
Male	58.4	41.1	0.4
Female	62.7	37.2	0.1
Air force			
White	56.0	43.6	0.4
African American	60.0	39.6	0.3
Hispanic	55.0	45.0	0.0
Male	55.3	44.3	0.5
Female	67.4	32.5	0.1
Marine corps			
White	61.2	38.2	0.6
African American	74.0	25.8	0.3
Hispanic	79.9	20.0	0.0
Male	62.7	36.9	0.5
Female	79.5	20.4	0.1

*The equivalent officer groupings in the Navy for pay grade are: junior grade, mid-grade and flag
Source: U.S. Department of Defense, *Population Representation in the Military Services, FY2002* (2004, Tables 4 and 48).

reputation appears to reflect a larger problem affecting the entire armed forces. Corroborating this concern, many White officers still believe that people of color have "weak academic and military educational backgrounds" and they are promoted only because of preferential treatment or quotas, rather than merit or ability (Office of the Under Secretary of Defense Personnel and Readiness, 2002, p. 83). These assumptions are based in part on the perception that historically Black colleges provide a lower quality education. However, HBCUs are a major source of African Americans/Blacks that attain officer ranks, especially in the Army. As a result, their contributions must not be overlooked, especially when 43% of all 706 officer commissions awarded to African Americans/Blacks were earned by HBCU graduates (Office of the Under Secretary of Defense Personnel and Readiness, 2002.)

Illustrating the negative effect of a discriminatory and hostile environment, a CBS News (2008) report highlighted that despite the fact that 60 years have passed since President Truman desegregated the military in 1948:

> Only one of the 38 four-star generals or admirals serving as of May [2008] was [B]lack. And just 10 [B]lack men have ever gained four-star rank - five in the Army, four in the Air Force and one in the Navy (n.p.).

These statistics are alarming and contribute to building a case where the low representation in senior-level positions in the armed forces signals the presence of a glass ceiling. Likewise, the proportion of Whites in pay grades 0–4 and above is consistently greater than those for people of color of the same gender in an officer ranking system (0–1 to 0–010) (Office of the Under Secretary of Defense Personnel and Readiness, 2002). Table 2 presents an overview of these disparities across the armed forces and illustrates that African Americans/Blacks outnumber White officers at the lower end of the ranking system (Company Grade (01–03)) in all branches of the armed forces, but this trend is reversed as officers advance through the ranks. For Hispanics, a similar outcome is presented for the Army, the Navy, and the Marine Corps. However, in the Air Force, Whites outnumber Hispanics at the Company Grade (01–03) by one percentage point, and Hispanics outnumber Whites by 1.4% and at the Field Grade (04–06) rank. However, at the General Officer level, the representation of Whites is consistent with the presence of a glass ceiling for people of color.

Higher Education as an Employment Sector

Employment data in the United States illustrates an increased presence of diverse groups in the workforce today (Toossi, 2005). However, this increased presence does not necessarily guarantee that doors will open for diverse groups to advance to senior-level positions, and some scholars stress that the workforce environment in higher education is still less receptive than other employment sectors of the economy (Bain & Cummings, 2000; Burbridge, 1994). While our chapter narrows it's inquiry of senior-level positions in higher education to academic leadership positions, we do include literature and relevant findings on senior-level faculty in order to help contextualize the challenge in higher education. Namely, Trower and Chait (2002) state that despite 30 years of affirmative action, full-time faculty in the country at recognized universities remains largely White and male, and they suggested that institutions must not ignore what hides beneath the surface, embedded in the core of each organization, where unwelcoming environments are nourished by practices of discrimination and the views of a dominant majority.

Regarding the status of women in the higher education workforce, the percentage of women in full-time faculty position reached 36% in 1998, an increase of 13 percentage points since the 1970s (Trower & Chait, 2002). These statistics confirm that in terms of professional standing, women are slowly moving through the ranks of colleges and universities (Ards, Brintnall, & Woodward, 1997; Johnsrud, 1991). Despite this substantial gain, differences persist with women representing only 24%

of all full professors, and "the gap between percentage of tenured men and the percentage of tenured women has not changed in 30 years" (Trower & Chait, 2002, n.p.).

Another aspect relevant to the status of women in higher education is that in addition to an overrepresentation of women at the lower academic ranks, they tend to advance in the faculty track in certain types of institutions (Jennifer, 2005). Women are more likely to gain full-time faculty status in public 2-year colleges and liberal arts colleges with a 44 and 37% representation respectively. However, they are less likely to attain this status in public and private doctoral universities. Only 25% of full-time faculty in public doctoral granting institutions are women, and this low representation is mirrored with 23% in private doctoral granting institutions. As in the business sector, a gap in compensation is also evident for women at the institutional level. On average, women earn $4,400 less than their male counterparts in 2-year colleges, and $8,350 less in doctoral-granting institutions for faculty with a full professor status (Trower & Chait, 2002).

At the presidential level, Corrigan (2002) cites *The American College President Report* issued by the American Council on Education (ACE) to reveal two troubling facts in relation to the representation of women. First, women hold 40% of all faculty and senior staff positions, but only 21.1% of all college presidents are women. Their representation in the president positions at baccalaureate institutions is 18.7 and 25% in 2-year colleges (Jennifer, 2005). Second, males constitute 80% of college and university presidents, 83% of business officers, and 75% of academic deans. Therefore, these aforementioned data represent a small part of a larger concern, where women are not only underrepresented at the presidential rank but face a work environment that obstructs their development as professionals (Chliwniak, 1997). Morley (2006) attempts to uncover these abstract and nebulous forms of gender discrimination through the use of the conceptual framework of micropolitics.[5] The glass ceiling encompasses many of these forms of discrimination, and acknowledging this reality becomes a key aspect of understanding how these practices are reflected in the low levels of representation of women and people of color in the academy. It is further argued that policy reforms with a national scope do not always target what occurs at the level of individual or group experiences (Morley, 2006). Therefore, forms of gender discrimination sometimes represented by "sarcasm, jokes, exclusions and throwaway remarks" (p. 544) are indeed, "notoriously difficult to disrupt via policy interventions such as gender mainstreaming and equality of opportunities" (p. 541).

For women, this becomes a serious issue, particularly considering that the percentage of advanced degrees received by this group has steadily increased during the last three decades. Women received 57% of master's degrees and 44% of doctoral degrees in the year 2000 (Trower & Chait, 2002). However, they are still underrepresented at the apex of higher education institutions and studies (e.g. Cotter et al., 2001; Curtis, 2005; Riger, Stokes, Raja, & Sullivan, 1997) reveal gaps in salary, overt forms of discrimination, and the presence of women with executive positions in less prestigious institutions, signaling the presence of a glass ceiling for this group.

Regarding the presence of people of color in the higher education workforce, Jackson and O'Callaghan (2009) state that the exploration of glass ceiling effects in higher education is a relatively young and growing area of research. However, there is evidence that concludes that race is the most significant explanation for persistent differences in rank among faculty, and suggests the presence of a glass ceiling for these populations at the senior-level ranks (Ards et al., 1997; Jackson, 2004b; Jackson & Daniels, 2007). In Fall 2001, faculty of color made up approximately 15% of all faculty in higher education, with Asian/Pacific Islander faculty representing 6.5% of this group, followed by African American/Black faculty with 5.4%, and Hispanic faculty with a 3.1% representation (Jennifer, 2005).

Similar to the status of women in academe, people of color are also better represented at the lower levels of faculty positions. For instance, 24% of all African American/Black and 25% of all Hispanic full-time faculty are employed at the instructor and/or lecturer level, while only 17% of all White faculty held these positions. In this case, it is necessary to point out that a lower percentage of Asian/Pacific Islander faculty (13%) are employed at this level. However, at the other end of the academic hierarchy, only 10.2% of all faculty with full professor status are people of color, with a 5.2% representation of Asian/Pacific Islander faculty, followed by a 3.1% representation of African American/Black faculty, and a 1.9% figure for Hispanic faculty. This lack of representation has certainly become a persistent phenomenon for people of color, where disparities are reflected in the fact that 91% of full-time professors at research universities are White (Trower & Chait, 2002). Likewise, as evidenced by the proportion of African American/Black faculty at predominantly White institutions today, their representation is practically the same as in 1979, and they are less likely to obtain full professor status or tenure when compared to White faculty (Bradburn, Sikora, & Zimbler, 2002).

These statistics highlight the fact that people of color continue to be largely employed in faculty positions below the assistant professor category. As mentioned by Trower and Chait (2002), this can be attributed to the presence of a glass ceiling, and a comparison can be made between what is happening to people of color in higher education with the current status of people of color in the business sector and armed forces, where Hispanics and African Americans/Blacks in particular continue to struggle and face barriers when attempting to reach leadership positions within these employment sectors. In higher education, these two groups face tremendous challenges, and the glass ceiling is more pervasive at the levels of executive, administrative, and managerial titles, where Whites hold the overwhelming majority, representing 83% of these positions (Jennifer, 2005). In 2004, the total number of president posts was 3,896 and White presidents held 86.3% of these positions (Jennifer, 2005). Data published by the American Council of Education shows that this trend continues, and in 2006, African Americans/Blacks held 5.8% of all presidencies, Hispanics accounted for 4.6%, Asians/Pacific Islanders held 0.9%, and American Indians and Multiracial presidents made up 0.7 and 1.5% respectively (Ryu, 2008).

Overall, 13.6% of all college presidencies are held by people of color (King & Gomez, 2007). However, Corrigan (2002) suggests that a deeper interpretation must accompany these statistics, because the total percentage of presidents of color

includes presidents in historically Black colleges and universities and Hispanic Serving Institutions (HSIs). This clarification ought to be considered because "virtually all of the HBCUs are headed by African–Americans and more than one-third of Hispanic-serving institutions (HIS) are headed by Hispanics" (Jennifer, 2005, p. 20). As such, it must not be ignored that leadership roles are perceived and judged on the type of institutions that one leads, and as Jackson and O'Callaghan (2009) argue, if women and people of color tend to secure senior-level positions in less prestigious 4-year institutions, a careful interpretation must take place in order to truly understand what occurs at the top of the higher education hierarchy. Jennifer (2005) refers to the concentration of people of color in 2 year institutions and draws attention to the fact that in 2004, 39% of African American/Black presidents, and 44% of Hispanic presidents served in 2-year institutions. However, only 36% of White presidents served in 2-year institutions. In 4-year institutions, the opposite occurs with 64% of White presidents holding this post, but only 60.9% of African Americans, and 55.6% of all Hispanic presidents serving in these institutions.

Overall, these figures support Jennifer's (2005) claim. However, it is necessary to clarify that this interpretation must be set in the appropriate context to understand what is occurring in higher education. First, it is undeniable that White males still hold the largest share of president posts in higher education. However, it must not be ignored that some progress has been made for people of color in senior-level positions, and certain groups fair better in specific types of institutions. For instance, presidents of color are slightly better represented in public institutions when compared with their private counterparts. In 2006, approximately 15% of presidents in public institutions were people of color, but only 8% held this position in private institutions (Ryu, 2008). The opposite occurs for White and Asian presidents, who are better represented in private institutions. Table 3 offers a summary of these data for the period between 1995 and 2005.

However, what is of particular concern is the fact that few people of color lead prestigious institutions (Harvey, 1999), and this literature review suggests that organizations dealing with glass ceiling effects could benefit from examining this phenomenon across three different sectors in order to find responses to their own predicaments. As the field of higher education continues to address glass ceiling effects, understanding how organizations can reduce and hopefully eliminate the glass ceiling is a priority. To better understand how organizational arrangements can be shaped by workplace discrimination in such ways that they become embedded in the nature of organizations, this chapter provided an overview of a selected form of workplace discrimination (i.e., glass ceiling effects) across two employment sectors beyond higher education. Through this approach, we offered scholars and practitioners a heuristic tool to build upon when examining other forms of workplace discrimination embedded across colleges and universities. Glass ceiling effects were selected because as previously noted by Jackson and O'Callaghan (2009), the exploration of this specific type of discrimination is a relatively young and growing area of research and there is no doubt that higher education can immensely benefit from the experiences of other employment sectors attempting to move toward workforce diversity, while confronting workplace discrimination challenges.

Table 3 College and university presidents by institutional type, race/ethnicity, and gender: 1995 and 2005

	1995				2005			
	Private	Public	2-year	4-year	Private	Public	2-year	4-year
Race/ethnicity								
African American/Black	62	109	57	114	86	125	70	141
Hispanic	8	51	31	27	23	68	48	42
Asian/Pacific Islander	21	14	10	25	32	13	11	34
White	1,426	1,049	875	1,594	1,581	1,147	953	1,763
Gender								
Male	1,697	1,243	1,156	1,777	1,733	1,135	1,025	1,832
Female	381	217	258	339	423	385	391	414

Note: Figures include presidents of regionally accredited, degree-granting institutions in the United States or its outlying areas (e.g., Puerto Rico). The term president is defined within the American Council on Education′s ART Corporate Database as the president, chancellor, superintendent, executive director, campus dean, etc., including interim/acting president heading regionally accredited institutions, branches, and affiliates.
Source: American Council on Education database. Data compiled in June 2006.

The Workforce Diversity Challenge in Higher Education: A National Portrait of Senior-Level Academic Leadership Positions

Jennifer (2005) reminds us that higher education is one of the largest employment sectors in the U.S. economy. In Fall 2001, 3,083,353 including full-time and part-time individuals were employed by colleges and universities across the nation. Considering the size of this employment sector, it appears rational to expect that an increasingly diverse society will, of course, be reflected in increasingly diverse colleges and universities (Blimling, Whitt, & Associates, 1999). Unfortunately, this is not the reality for many institutions and there is evidence of a great concern among campus leaders dealing with issues that refer to campus climate and diversity (Hurtado et al., 1999). However, diversity as a challenge is not a recent one, as higher education leaders have attempted to address issues involving campus climate for many years (Hurtado, 1992; Kezar, 2008).

The pathways or trajectories to academic leadership positions are seldom discussed in the literature or in open forums (Gmelch, 2003). For most faculty academic leadership positions are an “after thought” and not an aspiration, because assuming administrative positions is seen as changing careers (Moore, 1983; Moore & Sagaria, 1982). However, some view the work of the academy (university’s business) as the work of the intellect, thus believing that faculty and administrators share the same work and career (Martin, 1988). This idea is embodied by the notion of the “first among equals” concept and that administrators should come from the ranks of faculty (Montez, Wolverton, & Gmelch, 2003).

The administration of higher education institutions can be broken down into at least three specialty areas: (a) academic affairs (i.e., academic leadership positions);

(b) student affairs; and (c) administrative affairs (Sagaria, 1988). Academic affairs or academic leadership positions include positions such as: president, academic deans, vice president or provost of research, and department chairs. Student affairs positions include: vice president for student affairs, dean of students, and director of financial aid. Administrative affairs encompass positions such as vice president for finance, director of alumni affairs, and the director of computer services. Career mobility differs among the three specialty areas (Moore & Sagaria, 1982); however, the focus of this chapter is on the area of academic leadership positions which are typically held by faculty.

The journey to academic leadership generally requires successfully navigating three significant hurdles (Gmelch, 2003). First, one would have to successfully obtain a terminal (e.g., Ph.D.) or professional (J. D.) degree that serves as the entry card to apply and secure a faculty position. Second, the person would have to successfully move through the faculty ranks, which would include tenure and promotion to associate then full professor. Third, once a full member of the faculty, one would have to assume key leadership opportunities (e.g., department chair and associate dean) to develop a skill set and experiences that would warrant senior leadership roles (Montez et al., 2003). It is critical to note that our intent is not to suggest that all faculty want to pursue academic leadership positions, but rather to showcase that the ones that do assume them had a successful career as a full-time faculty member. In turn, there is a supply link to the pool of eligible candidates for senior-level academic leadership positions to the pool of senior faculty. Therefore, challenges and impediments to diversifying the faculty ranks significantly influences the pool of candidates for senior-level academic leadership positions.

This section explores the national landscape for senior-level academic leadership[6] positions in higher education by using data from the 1993 and 1999 National Study of Postsecondary Faculty (NSOPF) conducted by the National Center for Education Statistics (NCES). While these data were collected in the 1990s, they are the most recent national level data available to explore this special category of leadership positions. The NSOPF surveys are a nationally representative sample of institutions and faculty (including academic leaders) employed at colleges and universities, and thus present a rich resource for examining trends in senior-level academic leadership positions. To provide clarity and to respond to data limitations, analyses were delimited in the following ways: (a) data present a snap shot in 1993 and 1999[7]; (b) only academic leadership positions at the dean's level and above are examined; (c) institutions are delimited to 4 year institutions; (d) only racial/ethic and gender diversity is considered in this analysis; and (e) only full-time positions are included in analysis.

The following tables show the differences in the representation by race/ethnicity and gender in senior-level academic leadership positions from 1993 to 1999. In general, the findings show that a small percentage of people of color and women hold senior-level academic leadership positions in higher education. Concurrently, the representation of people of color and women in senior-level academic leadership positions has decreased over this time period. While there were overall decreases for both people of color and women, there was variation by institutional type with regard to representation.

Representation Across All Institutions

According to NSOPF data, the percentage representation of full-time senior-level academic leadership decreased slightly between 1993 and 1999 (see Table 4). The percentage of African Americans/Blacks holding senior-level academic leadership positions decreased from 7.7 to 5.9%. The percentage of Asian/Pacific Islanders holding senior-level academic leadership positions decreased from 1.8 to 1.3%. The percentage of Whites holding senior-level academic leadership positions decreased from 89.2 to 88.8%. In contrast, Hispanics in senior-level academic leadership positions slightly increased from 1.4 to 3.2%. Regarding gender, males increased from 72.3 to 75.1% in senior-level academic leadership. While females decreased from 27.7 to 24.9%.

Table 4 Distribution of total full-time senior-level academic leadership positions at 4 year institutions

	1999 (%)	1993 (%)
Race/ethnicity		
African American/Black	7.7	5.9
Hispanic	1.4	3.2
Asian/Pacific Islander	1.8	1.3
White	89.2	88.8
Gender		
Male	72.3	75.1
Female	27.7	24.9

Note: Calculations of senior-level academic leadership positions included titles at the dean's level and above. Employment counts were based on the number for each year: 6,466 in 1993, and 7,006 in 1999.

Representation in Different Types of Institutions

The representation of people of color and women in senior-level academic leadership positions varied in terms of institutional type. Table 5 shows the percentage representation of people of color and women holding senior-level academic leadership positions at public and private year institutions. African Americans/Blacks' representation in senior-level academic leadership positions decreased in public institutions and increased in private institutions. Hispanics' representation in senior-level academic leadership positions increased in public institutions and increased in private institutions. Asian/Pacific Islanders' representation in senior-level academic leadership positions increased in public institutions and increased in private institutions. Whites' representation in senior-level academic leadership positions increased in public institutions and decreased in private institutions. Regarding gender, male's representation in senior-level academic leadership positions increased in public institutions and increased in private institutions. Female's representation

Table 5 Distribution of total full-time senior-level academic leadership positions by public and private 4 year institutions

	1993		1999	
	Public (%)	Private (%)	Public (%)	Private (%)
Race/Ethnicity				
African American/Black	9.1	5.2	4.9	6.9
Hispanic	0.8	2.4	1.8	4.8
Asian/Pacific Islander	1.4	2.5	1.1	1.6
White	88.7	90.0	91.8	85.7
Gender				
Male	71.9	72.9	73.6	76.6
Female	28.1	27.1	26.4	23.4

Note: Calculations of senior-level academic leadership positions included titles at the dean's level and above. Employment counts were based on the number for each year: 6,466 in 1993, and 7,006 in 1999.

in senior-level academic leadership positions decreased in public institutions and increased in private institutions.

Table 6 shows the percent representation of senior-level academic leadership positions by Carnegie Classification in 1993 and 1999. The representation of African Americans/Blacks in senior-level academic leadership positions decreased at Research institutions, decreased at Doctoral institutions,

Table 6 Distribution of total full-time senior-level academic leadership positions by Carnegie Classification at 4 year institutions

	1999				1993			
	Research (%)	Doctoral (%)	Comp (%)	Liberal Arts (%)	Research (%)	Doctoral (%)	Comp (%)	Liberal arts (%)
Race/ethnicity								
African American /Black	7.7	4.8	12.7	4.6	4.8	4.4	6.7	8.4
Hispanic	0.3	0.4	2.5	1.0	1.7	1.1	7.4	1.7
Asian /Pacific Islander	4.5	0.4	1.3	0.0	0.0	1.1	3.1	1.0
White	87.5	94.4	83.4	94.3	92.8	93.4	82.8	85.8
Gender								
Male	78.7	77.2	70.9	72.0	70.6	65.5	76.9	76.3
Female	21.3	22.8	29.1	28.0	29.4	34.5	23.1	23.7

Note: Calculations of senior-level academic leadership positions included titles at the dean's level and above. Employment counts were based on the number for each year: 6,466 in 1993, and 7,006 in 1999.

decreased at Comprehensive institutions, and increased at Liberal Arts institutions. The representation of Hispanics in senior-level academic leadership positions increased at Research institutions, increased at Doctoral institutions, increased at Comprehensive institutions, and increased at Liberal Arts institutions. The representation of Asian/Pacific Islanders in senior-level academic leadership positions decreased at Research institutions, increased at Doctoral institutions, increased at Comprehensive institutions, and increased at Liberal Arts institutions. The representation of Whites in senior-level academic leadership positions increased at Research institutions, decreased at Doctoral institutions, decreased at Comprehensive institutions, and decreased at Liberal Arts institutions. Regarding gender, the representation of males in senior-level academic leadership positions decreased at Research institutions, decreased at Doctoral institutions, increased at Comprehensive institutions, and increased at Liberal Arts institutions. The representation of females in senior-level academic leadership positions increased at Research institutions, increased at Doctoral institutions, decreased at Comprehensive institutions, and decreased at Liberal Arts institutions.

These data support previous arguments that people of color and women experience disparities in senior-level academic leadership positions in higher education. While there was one occurrence where the representation of senior-level academic leadership positions by race/ethnicity surpassed 10% (i.e., African Americans/Blacks at Comprehensive institutions in 1993), in general their representation was very low. When considering gender, representation in senior-level academic leadership positions ranged from 21.3 to 34.5%. In concert with these data, scholars (e.g., Bain & Cummings, 2000; Burbridge, 1994) have documented that the environment in higher education is still less receptive than other sectors of the economy for diverse groups, especially for women and people of color. Universities cannot afford to ignore this issue, as previously underrepresented populations continue to grow and advance among the ranks of the higher education workforce. Therefore, strategies must be developed to adequately recruit and retain these diverse groups. While the concept of workforce diversity has evolved, workplace discrimination is a significant challenge that impedes progress.

As Phillips (2002) notes, workforce development issues are on the top of agendas for most organizations and this prioritization needs to take place in higher education, where careful inclusive planning must account for all characteristics portrayed by diverse individuals. Additionally, attention to how these characteristics take new shapes when displayed within working and organizational settings is warranted. To achieve these objectives, higher education must understand and address specific forms of workplace discrimination that have been documented across the literature (e.g., disparate impact and underutilization). In doing so, a challenge arises as these forms of discrimination may not always present themselves as an isolated phenomenon or appear in a secluded context. Therefore, comprehending their singular effects at the individual and organizational level of analysis is a significant challenge, but necessary in order to facilitate our quest to adequately respond to workforce diversity issues.

If we are to overcome workplace discrimination and disparities, we need to employ an analytical framework to explore and understand the problem. For the most part, previous theorists and researchers have used human capital to explain differential outcomes in education and work-related scenarios. Human capital refers to knowledge, attitudes, and skills that are developed and valued primarily for their economic productive potential (Baptiste, 2001). Human capital has two fundamental assumptions: (a) there is an unqualified causal effect of human capital on economic productivity; and (b) differences in workers' earnings are due entirely to differences in their capital investments (e.g., education and experiences) (Sweetland, 1996).

Previous research has found that an investment in education increases an individual's income after controlling for important variables (e.g., cost of schooling, ability, and family background) (Carnevale & Desrochers, 2003; Cohn & Hughes, 1994; Psacharopoulos, 1984). In addition, some human capital theorists (e.g., Becker, 1993; Schultz, 1981) have used education as the prime human capital investment for empirical analysis. Becker (1992) further argued that differential investments in education alone explain the income disparities that exist between ethnic groups in the United States. Further, he drew the same conclusion when examining disparities by gender and social class. As such, in higher education literature, an individual's status and rewards in the academic labor market has been linked to his or her investment in themselves (e.g., type of education, professional experiences, and mobility) (Perna, 2001a, 2001b). While previous frameworks and research have been useful in identifying individual level strategies for mitigating differential work outcomes, our purpose is to offer a different analytical framework to explore glass ceiling effects.

Social Closure Theory as an Analytical Framework for Glass Ceiling Effects

Data from the analysis of the national landscape of senior-level academic leadership positions in higher education by race/ethnicity and gender show an overall decrease in the representation of people of color and women. However, when considering representation by institutional type, there were cases where small incremental changes had occurred. For the most part, previous examinations of glass ceiling effects have relied on individual-level characteristics (e.g., human capital), but this chapter proposes a narrative that focuses on organizational responsibilities. To continue the focus solely on individual characteristics suggest that the small incremental changes identified in the previous section will mitigate glass ceiling effects over time. Therefore, this chapter offers an alternative by proposing the use of social closure theory to explore the role of organizations in the elimination of glass ceiling effects.

The concept of social closure provides the analytical framework for the current chapter. Best described as the "process of subordination whereby one group monopolizes advantages by closing off opportunities to another group of outsiders beneath it" (Murphy, 1988, p. 8), social closure theory provides that a group of individuals actively invests in retaining positions of power and control for their own cohort

(Roscigno, Mong, Byron, & Tester, 2007). Social closure also emphasizes that it is the exclusionary practices themselves that create segregation, both within organizations and individual jobs (Burrage & Rolf, 1990). Some have noted that these practices appear deliberate, and produce and perpetuate advantages for the dominant groups (Tomaskovic-Devey, 1993). Put differently, social closure occurs when "opportunities are closed to outsiders and reserved only for members of our own group" (Tomaskovic-Devey & Stainback, 2007, p. 56). Social closure is as much about protecting opportunities for the majority as it is about denying opportunities to others (Roscigno, Garcia, et al., 2007). Researchers (e.g., Tomaskovic-Devey & Stainback, 2007; Parkin, 1974) have noted that a shared ethnicity, nationality, race, and gender may form the basis of dominant group membership and in this sense social closure is similar to other forms of discriminatory practices. Similarly, social closure is also subsequently reinforced by the benefits and assets accrued by the members of that group through the exclusion of others (Murphy, 1984; Weber, Henderson, & Parsons, 1947).

Indeed, scholars have noted that social closure "suggests that status groups create and preserve their identity and advantages by reserving certain opportunities for members of the group" (Tomaskovic-Devey, 1993, p. 46). Since exclusion appears to be the preferred practice for retaining the hegemony of the dominant group, one implication of this theory is that White males benefit most from exclusionary practices (Weeden, 2002). While increased demand for access to senior-level jobs by diverse groups is certainly a pressure for organizational change, the tendency of large, bureaucratic organizations (e.g., educational and governmental institutions) is to remain static (Cohen & March, 1974; Tierney, 1997; Weick, 1976). Social closure processes generally sort diverse groups or non-members into jobs that are less desirable (e.g., non-tenure track and entry level administrative positions) (Roscigno, Garcia, et al., 2007). Organizations are inherently conservative entities in that they tend to simply reproduce and reinforce past behaviors rather than respond to the needs of their employees (Burrage & Rolf, 1990; Murphy, 1984). However, social closure assumes that social boundaries and segregation are "less clearly demarcated where the cost to dominant groups is low or nonexistent" (Tomaskovic-Devey & Stainback, 2007, p. 57), thus creating the potential for only incremental, longitudinal change.

Advancing the Notion of Organizational Ownership of Glass Ceiling Effects

Social closure provides a valuable theoretical and conceptual framework to interpret and synthesize prior and future research on workplace discrimination in general and glass ceiling effects in particular. As a construct, it directs us toward a process through which stratification hierarchies are both defined and maintained. Most importantly, social closure theory helps to guide the discourse regarding the question of who is better suited to address glass ceiling effects—the individuals who are subjected to them or the organizations that created them. That said, it pushes

us to closely examine organizational responsibilities associated with glass ceiling effects and the role of key organizational actors (i.e., gatekeepers) in the process. More succinctly, social closure theory invites organizations to confront historical and contemporary practices that fueled the creation and continuation of glass ceiling effects. Likewise, it encourages the movement beyond consideration of individual characteristics, to investigate the agency of key actors (Roscigno, Mong, et al., 2007). Namely, elucidating gate keeping actors operating in organizational contexts creating workplace discrimination (Roscigno, Garcia, et al., 2007).

Most current strategies to address glass ceiling effects require individual efforts to ensure appropriate accrual of capital (e.g., human and social), which in turn results in varied individual outcomes. Regarding this approach, Tamaskavic-Devey, Thomas, and Johnson (2005) assert: "[i]t seems unlikely that we will ever advance knowledge of discrimination mechanisms with data collected in a human capital or status-attainment framework" (p. 85). Roscigno, Garcia, et al. (2007) concur, stating: "[a] solitary focus on human capital simply overlooks the role of inequality in institutional processes generally, and closure enacted by institutional and dominant group actors that reifies existing stratification hierarchies—factors beyond the control of any given individual" (p. 18). In contrast, appropriately responding to social closure requires organizations to own workplace discrimination, which in turn could potentially yield group-level success because attention is given to organizational impediments. By using the word own, we mean that organizations should take responsibility for the creation of glass ceiling effects and workplace discrimination by developing solutions for them.

Social closure theory emphasizes the role of key actors in the creation and perpetuation of workplace discrimination (Roscigno, Garcia, et al., 2007). For example, the theory highlights that gate keepers have significant discretion in the workplace. Therefore, much freedom and latitude is provided to create workplace conditions based on personal preferences with little to no supervision. This exercised discretion takes place not only during the course of hiring or mobility, but in the day-to-day monitoring process. Within this context, diverse groups are generally viewed as being policed more closely.

The linkage of job stratification and social closure has been previously established in the literature (e.g., Roscigno, Garcia, et al., 2007; Wilson, 2005). For example, Tomaskavic-Devey and Stainback (2007) state "[u]nder a social closure model, we would expect desirable jobs to integrate more slowly, if at all, as dominant groups attempt to continue to maintain their monopoly over the most desirable jobs, even as they lose the ability to control all jobs" (p. 57). However, when access to senior-level positions by diverse groups is gained, this is referred to as bottom-up ascription (Elliott & Smith, 2001; Smith & Elliott, 2002). Bottom-up ascription is when diverse groups obtain senior-level positions designed to supervise other diverse groups. When changes in status hierarchies occur not in the context of bottom-up ascription, it is because social closure pressures are weaker when the dominant group has less incentive to exclude (e.g., low wage, low prestige, and declining opportunities) (Redskin & Roos, 1990).

The use of social closure theory shows great promise for advancing knowledge in higher education regarding workplace discrimination in general and glass ceiling effects in particular because it promotes organizational ownership of the problem. This ownership is most likely best achieved through the development and implementation of a diversity management plan. Diversity management is proactive attention and effort on behalf of key decision makers to effectively respond to the challenges associated with diverse workplaces (Marquis, Lim, Scott, Harrell, & Kavanagh, 2008). One of these critical challenges posed by diversity in the workplace is to eliminate barriers to senior-level positions that could be related to group identity factors, such as gender and race (e.g., glass ceiling effects).

In response to a report that detailed significant changes in labor market demographics titled *Workforce 2000* (Johnston & Packer, 1987), diversity management as a philosophy emerged in the 1980s. The philosophy is based on the understanding that the U.S. workforce is continuing to grow more diverse with regards to factors such as sex, age, background, race/ethnicity, and ability. In turn, some intentional efforts will be needed to fully utilize these new talents. The philosophy is also built on the notion that a poor job of managing diversity creates a competitive disadvantage (Cox, 1993). A well designed diversity management plan is necessary to provide a productive work environment for diverse groups. According to the diversity management literature (e.g., Morrison, 1992), the most cited rationale to place special interest on diversity is to improve organizational performance. It is this body of work that also argues the diverse working groups are more innovative, flexible, and productive (Fernandez, 1991).

Organizations that establish diversity management frameworks will be able to address workplace discrimination, especially glass ceiling effects. Cox and Smolinski (1994) state that the goals of managing diversity include: (a) create a climate in where all members can realize their full potential of organizational contribution and personal achievement; (b) capitalize on the potential benefits of diversity while minimizing the potential barriers to effectiveness posed by diversity; and (c) create a climate in which people with fundamental differences in culture can work together with maximum effectiveness. Organizations with a diversity management plan are more likely to attract and retain individuals who want to work in a diverse workplace (Woods & Sciarini, 1995). Consequences associated with not managing diversity include ambiguity, low morale, confusion and communication problems, and conflict and tension (Chevrier, 2003). Institutions of higher education could take major steps toward addressing workplace discrimination and mitigating glass ceiling effects by developing and implementing diversity management strategies that focus on retention and advancement, in addition to recruitment.

Examining glass ceiling effects in light of social closure invites the following conceptual and empirical considerations for higher education:

- *Protection vs. Exclusion*. Social closure conceptually clarifies that the action of some organizational key actors is focused on protecting desirable jobs, with no consideration of the role of exclusion. That is, these individuals give little to no thought regarding the groups excluded, but rather solely focus on protecting the

benefits of their membership group. This conceptual difference permits these key actors to focus on the "good" of their action and ignore the "bad."

- *From Individual to Organizational*. Social closure shifts the focus from individual to organizational responsibility regarding workplace discrimination in general and glass ceiling effects in particular. Current frameworks (e.g., human capital) used to explain workplace discrimination suggest that women and people of color are missing "job relevant factors" that prevent upward mobility that could be obtained through appropriate experiences and education. Social closure argues that organizations should assume the responsibility of corrective measures to create the work conditions that would support upward career mobility for women and people of color.
- *Retention and Advancement*. Social closure invites institutions of higher education to enlarge the scope of their diversity plans. The emphasis of most of these plans is on the process of recruitment for diverse groups, which is a very critical set in the quest to diversify higher education. However, social closure directs attention to equally detailing a plan of action for creating a conducive work environment that supports the retention and career advancement for diverse groups. Therefore, arguing that organizations should equally focus on "keeping and nurturing" their diverse talents.
- *From Conceptual to Empirical*. While social closure is a very insightful framework, it is not easily modeled or specified for empirical inquiries. However, the multidimensional nature of the framework could fuel a robust inquiry in higher education. A line of inquiry informed by social closure would enhance the current knowledge base on workplace discrimination by anchoring a focus in organizational responsibilities.

Conclusion

From a review of the research on glass ceiling effects across employment sectors, it is evident that organizations not only face challenges recruiting diverse groups to increase representation, but also retaining and promoting of these groups (Jackson, 2001). Almost 15 years have passed since Bar & Associates (1993) noted that the barriers for the retention and advancement of qualified administrators in higher education include: lack of professional identity, struggle to find a career path, increased competition within and outside the academic world, working conditions, and compensation as factors that must not be ignored. But today, diversity policies and practices that attempt to bring these qualified leaders from previously underrepresented groups into higher education still face many of the same problems. In addition, newly identified diverse groups (e.g., gay and lesbian persons) are now faced with similar barriers and higher education must commit to identify strategies to solve these perennial challenges.

Expecting that a single set of recommendations will solve all problems for diverse groups in higher education in the United States is unrealistic. However, becoming aware of practices that have a positive impact on workforce diversity is an asset that must not be undervalued. Understanding how workplace discrimination is

embedded in daily activities becomes a fundamental step when approaching workforce diversity. That is, by analyzing these barriers from different angles, we are able to identify unique characteristics defining the experiences of diverse groups in institutions of higher education. The path ahead is indeed demanding, but as individuals and organizations become aware of areas where progress is feasible, we move closer to reducing and hopefully eradicating discrimination in higher education in an effort to move toward workforce diversity.

Notes

1. Workforce diversity refers to policies and practices that seek to include people within a workforce who are considered to be different from those in the dominant group.
2. Workplace discrimination occur when an employee suffers unfavorable or unfair treatment due to their race, gender, religion, national origin, disabled or veteran status, or other legally protected characteristics.
3. In the context of this manuscript, senior-level includes academic leadership positions at the dean's level and above.
4. These positions refer to the General Officer (07–010) rank in the officer ranking system.
5. "Micropolitics focus on the ways in which power is relayed in everyday practices. It discloses the subterranean conflicts, competitions and minutiae of social relations and describes how power is relayed through seemingly trivial incidents and transactions" (Morley, 2006, p. 543).
6. Academic leadership roles are positions where faculty have assumed institutional positions committed to administrative functions (e.g., department chair, dean, and vice president of academic affairs).
7. NSOFP included the principal activity variable that permits the delineation of academic leadership positions in 1993 and 1999, but excluded the variable in the 1988 and 2004 editions.

Appendix: Business Sector Median Weekly Earnings by Race/Ethnicity and Gender

Business sector	Manager and professional median weekly earnings	
Race/ethnicity	Males ($)	Females ($)
White	1,211	868
African American	899	740
Hispanic	985	744
Asian	1,342	978
Business sector	Service median weekly earnings	
Race/ethnicity	Males ($)	Females ($)
White	526	403
African American	490	412
Hispanic	414	362
Asian	505	442

Source: U.S. Department of Labor (2008, Table 14).

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Cultural Perspectives of Academia: Toward a Model of Cultural Complexity

Ryan E. Smerek

Introduction

Throughout the past 20 years cultural analysis has flourished as a means of studying higher education organizations (Cameron & Ettington, 1988; Kuh & Whitt, 1988; Masland, 1985; Peterson, Cameron, Jones, Mets, & Ettington, 1986; Peterson, Cameron, Knapp, Spencer, & White, 1991; Peterson & Spencer, 1990, 1993; Silver, 2003; Smart, 2003; Smart & St. John, 1996; Smart, Kuh, & Tierney, 1997). Not only has it been of interest to organizational scholars but also to administrators for its potential to improve administrative action (Austin, 1990; Chaffee & Tierney, 1988; Dill, 1982; Tierney, 1988). Ultimately, cultural analysis is important because it can lead to insightful interpretations of organizations, management, and working life. A cultural perspective offers powerful ways to understand deep-level, partly non-conscious sets of meanings, ideas, and symbols.

Cultural analysis of higher education organizations began in the 1960s (Clark, 1963a; Clark & Trow, 1966), and in a novel insight at the time, Riesman and Jencks say, "to the extent that a college is a subculture, with its own idiosyncratic customs and concerns, an anthropologist can study it in much the same way that he studies a primitive tribe or modern community" (1962, p. 104). However, it was not until the late 1980s that a cultural perspective rapidly expanded (Allaire & Firsirotu, 1984; Barley, Meyer, & Gash, 1988; Denison, 1990; Weick, 1985). To some degree the interest in culture was a secondary wave from its prominence in the early 1980s in business organizations. Culture came to be seen by business managers as the key to Japan's economic success (Ouchi & Jaeger, 1978; Ouchi & Wilkens, 1985; Pettigrew, 2000). It was also seen by organizational scholars as a new perspective for those tired of sterile, scientific methods to understanding organizations (Alvesson, 1993; Ashkanasy, Wilderom, & Peterson, 2000; Jelinek, Smircich, & Hirsch, 1983; Schein, 1996; Smircich, 1983). The key books in the early 1980s that propelled the subject onto center stage were Ouchi's *Theory Z* (1981), where he

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describes the holistic concern for the physical and psychological well-being of the employee—an approach he saw among Japanese companies. Additionally, *In Search of Excellence* (1982) by Peters and Waterman and *Corporate Cultures* (1982) by Deal and Kennedy played prominent roles in the perspective's ascendancy.

In higher education organizations, culture is formed through many complex influences both in the organization and as the result of the environment. Within the organization, culture is the result of an organization's unique history (Clark, 1970, 1972), its leadership (Schein, 1983, 1984, 1985, 1990, 1992), and critical events (Pettigrew, 1979). Culture is also shaped by subcultures (Van Maanen & Barley, 1984, 1985), including at the broadest level the subcultures of faculty and administration. Within these groups, faculty have disciplinary identities (Becher, 1981, 1989, 1994; Lee, 2004; Välimaa, 1998), and administrators are subdivided into functional groupings. In sum, as complex organizations there are many forces that shape the culture of colleges and universities. As Gregory states:

> The small-homogenous-society metaphor is often inappropriate to those organizations that are large, internally differentiated, rapidly changing, and only command part-time commitment from members. Such organizations more nearly resemble the complex society of which they are a part. . . Societies, and many organizations, can more correctly be viewed in terms of multiple, cross-cutting cultural contexts changing through time, rather than as a stable, bounded, homogenous culture (1983, p. 365).

Understanding the "multiple, cross-cutting cultural contexts" in which people operate helps us better understand the complexity of higher education organizations and improve administrative action.

With an amalgam of research studies of colleges and universities, the recent development of a meta-theoretical perspective has helped classify the assumptions and frameworks from which scholars approach the study of organizations (Martin, 1992, 2002; Martin & Frost, 1996; Martin & Meyerson, 1988). The three perspectives developed by Martin and colleagues are integration, differentiation, and fragmentation. The integration perspective assumes consistency, organization-wide consensus, and clarity. Deviations from integration are considered regrettable shortfalls from an integrated ideal. Conversely, the differentiation perspective assumes that culture is manifested by differences among subunits, and that consensus only occurs in subcultures. This perspective can be clearly seen in Clark's book *Academic Life: Small Worlds, Different Worlds* (1987). The third perspective, fragmentation, assumes that culture can best be described by ambiguity in an organization. Consensus from a fragmentation perspective is transient and issue-specific. Research from this perspective notes the pervasiveness of unclear goals and the lack of clarity in determining whether outcomes have been reached.

With an extensive number of culture frameworks and studies, the main question guiding this chapter is: *What are the relative strengths and weaknesses of the various approaches to studying culture in colleges and universities?* Three perspectives will be used to classify the literature—integration, differentiation, and fragmentation—which offer heuristic value but should not overemphasize categorical thinking. Most studies have components of all three perspectives but usually stress one approach to

a lesser or greater degree, creating a continuum. In order to understand the culture literature about administrators and faculty in higher education, I first review the three perspectives that help classify the research. Then empirical findings and conceptual models of organizational culture from each perspective are reviewed.

Integration, Differentiation, and Fragmentation Perspectives of Culture

The three perspectives of integration, differentiation, and fragmentation have helped classify culture studies in an area that defies easy conceptualization (Mumby, 1994). The classification scheme has primarily been articulated by Martin (1992, 2002) who says the perspectives emerged inductively from the literature. The first perspective, integration, is the most widely-used perspective and flourished in the 1980s. Studies from this perspective tend to focus on homogeneity, harmony, and a unified culture with the unit-of-analysis being the organization (Martin & Frost, 1996). Some of the earlier exemplars of this perspective were managerially-oriented and written for a popular audience (Deal & Kennedy, 1982; Ouchi, 1981; Peters & Waterman, 1982). The integration perspective assumes that culture is what people share and that consensus can be found. It stresses actions which are consistent among employees, the shared meanings of stories and jargon, and the internally consistent ideology of an organization, such as the policies and practices that reinforce a company-wide concern for people in a Theory Z culture (Ouchi, 1981).

Integration studies tend to be criticized on both conceptual and methodological grounds (Siehl & Martin, 1990; Smircich & Calas, 1987; Wilderom, Glunk, & Masloswski, 2000). These include (1) overlooking conflict, (2) not including data which contradicts the shared conception of culture, (3) extrapolating from a relatively small sample of employees, (4) oversimplifying from a superficial, short-term interaction with the organization, and (5) overstating managerial influence in changing the culture. The strength of integration studies is the clarity of insight which can lead to focused action. These studies can alleviate "the anxieties associated with ignorance and confusion" (Martin, 1992, p. 59).

The differentiation perspective, on the other hand, seeks to penetrate what many researchers consider is a façade presented to outsiders. From a differentiation perspective, consensus and clarity occur only within a subculture; there is little organization-wide consensus; and less influence is attributed to the leader of the organization in comparison to integration studies. Researchers from this approach observe subcultural conflicts, power, and differences between stated attitudes and actual behaviors. With a pluralist sensitivity to differences "an organizational culture is not unitary; it is a *nexus* where environmental influences intersect, creating a nested, overlapping set of subcultures within a permeable organizational boundary" (Martin & Frost, 1996, p. 604). Most of the sources of cultural content come from non-leader sources such as occupational influences, demographics, or national contexts. With this emphasis, differentiation studies show how subcultures reflect

collectives in the larger society (Louis, 1983; Martin, Frost, & O'Neill, 2006). Clark (1983) best illustrates this nexus approach by describing how academics simultaneously belong to the culture of a discipline, enterprise, profession-at-large, and national system of higher education.

It is important to explain that the differentiation perspective, which emphasizes clarity within subcultures, is not simply the integration perspective, writ small. No study portrays each perspective in its ideal type, but each study stresses different phenomenon. Therefore, to categorize a research study, one must look at what phenomena are foreground and background. In differentiation studies, multiple subcultures are described and differences between them are stressed, while in integration studies, organization-wide consensus is stressed and subcultural differences are of secondary importance.

The third perspective of fragmentation highlights ambiguity and that objectives are often unclear, means to those objectives are not specified, and success is unknown—a perspective that mirrors the description of colleges and universities as "organized anarchies" (Cohen & March, 1974). From this perspective consensus is issue-specific and transient. There are short-term affinities among individuals that are quickly replaced by a different pattern of affinities as new issues arise (Martin & Frost, 1996). Subcultures are thus fleeting, issue-specific coalitions that fragment and re-form as time passes.

In a higher education context, ambiguity may rest with individuals who have competing logics as both a faculty member and administrator (Etzioni, 1964). Furthermore, faculty members live with the ongoing demands of teaching, research, and service (Boyer, 1990; Wright, 2005). Thus, culture in a higher education context may be more plausibly explained by a world of unclear goals and irresolvable time-conflicts and tensions, with no clearly-defined unitary culture.

In sum, the central focus of studies from the fragmentation perspective is ambiguity. Ambiguity includes "multiple, contradictory meanings that are simultaneously true and false, paradoxes, ironies, and irreconcilable tensions" (Martin, 2002, p. 110). This focus on ambiguity, however, challenges a central tenant of many organizational culture studies—that culture is *shared.* Researchers from an integration perspective would say ambiguity is not culture; it is the absence of culture. For example, Schein claims that "if things are ambiguous, then by definition, that group does not have a culture" (1991, p. 248). This debate portrays the different viewpoints researchers take to studying culture—if one is searching for a clearly-defined unitary logic (integration), or seeking to explain, to the best of one's abilities, the jungle we often find ourselves in (fragmentation).

Although studies seldom fit easily into a perspective, Martin (2002) approximates that 80% of cultural studies work tacitly from one of the three perspectives and another 10% combine two or three perspectives. Table 1 offers a synopsis of the three approaches.

Martin (1992, 2002) argues that researchers should take all three perspectives of culture—an integrated, differentiated, *and* fragmented view. The assumption is that there are some aspects of a cohesive culture that bind organizational actors, but at the same time there are factions, subcultures, and occupations that differentiate units

Table 1 Summary of the three perspective framework

	Integration	Differentiation	Fragmentation
Orientation to consensus	Organization-wide consensus	Subcultural consensus	Multiplicity of views
Treatment of ambiguity	Excludes ambiguity	Channels ambiguity outside subcultures	Acknowledges ambiguity
Primary focus of study	Harmony	Conflict/differences	Ambiguity, irony, paradox, and the multiple interpretations that do not coalesce into collective-wide consensus

Source: Adapted from Table 4.1 in Martin (2002), Table 1 in Martin and Meyerson (1988), and Table 1.1 in Martin (1992).

of an organization. Yet, there is also ambiguity and shifting alliances and unclear goals. Martin's intent in proposing a meta-theory is to surpass more narrow theories to move to higher levels of abstraction than a single approach. By being attentive to all three perspectives one can be aware of the interpretive framework that is imposed on the process of collecting and analyzing cultural data.

The Integration Perspective

With an understanding of the multiple approaches to culture research, the next section reviews higher education studies that are primarily from the integration perspective. The main question addressed in this section is: What major conceptual models and research findings have explained the culture of colleges and universities from an integration perspective? These descriptions and models focus on what makes an organization distinct from others and considers culture as the shared meanings and assumptions at the organization level-of-analysis.

Organizational Saga

One of the earliest and most-cited studies of higher education is Burton Clark's *The Distinctive College: Antioch, Reed & Swarthmore* (1970). In this study of three small, liberal arts colleges, Clark outlines the "organizational saga" of these colleges which he defines as a "unified set of publicly expressed beliefs about the formal group that (a) is rooted in history, (b) claims unique accomplishment, and (c) is held with sentiment by the group" (1972, p. 179). This story of special performance emerges not in a few months but over decades and creates allegiance among members to a unified sense of special purpose. Clark's concept of the organizational saga was a precursor to mainstream culture studies and played a role in the emergence of the study of organizational culture in the late 1970s and early 1980s (Clark, 2000).

The concept of organizational saga focuses our attention on the analytical importance of historical inquiry. Clark describes "the delights of studying historical records year by year, even week by week, especially to dig out what key actors did at crucial times" (Clark, 2000, p. 10). Clark's approach directs our attention to developmental historical analysis by examining the genesis of the character of a college.

Integration Perspective Case Studies

Further expanding our knowledge of culture in colleges and universities, Chaffee and Tierney (1988) conducted seven case studies with an aim to "foster [among readers] a more acute self-assessment of organizational culture" (1988, p. vii). In accordance with the managerial emphasis of the integration perspective, they consider culture analysis to be a tool to help administrators implement decisions by garnering the support of constituencies. With a goal of bringing the dimensions and dynamics of culture to the consciousness of leaders, Chaffee and Tierney (1988) provide a conceptual model for readers to compare and contrast the culture of their seven case studies of colleges and universities.

Depicted in Fig. 1, their model includes three dimensions—structure, enacted environment, and values—and three themes—time, space, and communication. *Structure* refers to the ways in which an organization accomplishes its activities. It includes governance mechanisms and the formalized roles of each worker. The

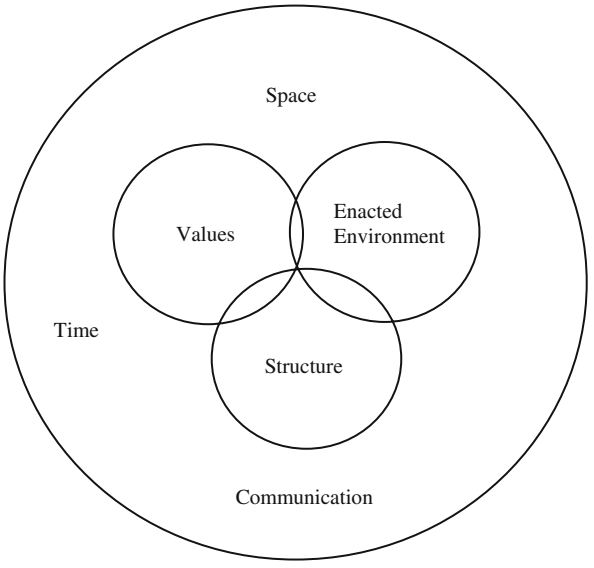


Fig. 1 Chaffee and Tierney's (1988) model of organizational culture
Source: Fig. 2.1 from Chaffee & Tierney (1988, p. 19)

enacted environment is the context of events, demands, and constraints in which an organization finds itself. They label the environment as "enacted" because they consider the portions of the environment that come to the attention of members of the organization, not the environment that may exist regardless of what is noticed. *Values* are beliefs, norms, and priorities. Coming from an integration perspective they are interested in the extent to which values are congruent among individuals and subgroups. They propose that it is the role of leaders to make structures, enacted environments, and values congruent. Among the three themes: *time* refers to the history and tradition of the organization; *space* is the physical layout of the college; and *communication* is the way members perceive and interpret their world.

Using one of the seven case studies, Tierney (1988) provides an additional framework to diagnose culture. With the goal of helping leaders implement decisions by having a full, nuanced understanding of the organization's culture, his perspective demonstrates the integration approach. He does not focus on conflict or irresolvable tensions and instead states that "a central goal of understanding organizational culture is to minimize conflict and help foster the development of shared goals" (p. 5). His framework outlines six dimensions of culture and diagnostic questions for each dimension. He stipulates that we should look at an organization as a traditional anthropologist would study a clan or village (Table 2).

The framework demonstrates the use of culture as an "umbrella concept" (Hirsch & Levin, 1999) where the six concepts of the framework are identified under the umbrella of culture. In this case, Tierney (1988) labels decision-making

Table 2 Tierney's (1988) framework of organizational culture

Environment	How does the organization define its environment?
	What is the attitude toward the environment? (Hostility? Friendship?)
Mission	How is it defined?
	How is it articulated?
	Is it used as a basis for decisions?
	How much agreement is there?
Socialization	How do new members become socialized?
	How is it articulated?
	What do we need to know to survive/excel in this organization?
Information	What constitutes information?
	Who has it?
	How is it disseminated?
Strategy	How are decisions arrived at?
	Which strategy is used?
	Who makes decisions?
	What is the penalty for bad decisions?
Leadership	What does the organization expect from its leaders?
	Who are the leaders?
	Are there formal and informal leaders?

Source: Table 1 from Tierney (1988, p. 8).

as part of strategy which is also a part of culture. Throughout the article, Tierney uses culture to describe nearly every aspect of organizational life, without linking the interpretations to deeper assumptions as found in Schein (1992).

In further demonstrating the integration approach, Sporn (1996) completed a case study of the federal university of economics and business administration in Austria, a university which enrolls 20,000 students. Although she approaches her research from an integration perspective, she finds differentiation and fragmentation. She begins by noting how colleges and universities are complex, have ambiguous goals, unclear techniques, and professionals with a strong desire for autonomy and freedom. She says the complexity and resulting fragmentation of universities is a "common problem" (p. 43). She argues that there are new demands that make culture strength and collective unity important for strategically adapting to the environment. She states that, "because many universities are a conglomerate of autonomous subunits with loose links and a high degree of specialization in the disciplines, overall integration at the broadest level is needed" (p. 43). She advises that universities involve a diverse and large number of members into a strategic planning effort to trigger a higher degree of identification for a more unified institution. "The challenge is to integrate all activities of the subcultures so that they can be used for diverse management purposes on a comprehensive level" (p. 48). This argument derives from the business literature on the managerial value of creating a "strong culture" (Saffold, 1988), with little heed for the scholarly value of a fragmented organization.

In her study, Sporn (1996) uses a mixed methods approach and her results show ambiguity and differentiation. She says:

> The values and beliefs concerning the mission and aims of the University activities are divergent; there are no general guidelines on how to manage teaching and research; the concept of the University as a whole barely exists and has no meaning for the University members; and depending on the hierarchical position within the University, professors, assistant professors, and administrators form subcultures. The values of these subcultures differ significantly (p. 51).

Along her two dimensions of strong vs. weak culture and internal vs. external orientation she finds the University culture is weak (i.e. not integrated) and *both* internally *and* externally oriented (i.e. ambiguously fragmented). Given her empirical findings, however, she argues for greater integration of the subcultures drawing heavily upon the arguments of Dill (1982).

Dill's (1982) conceptualization of culture emphasizes the managerial orientation of the integration perspective. His notion of culture could be described as work life that is infused with meaning. He describes the decline of culture in academia and how administrators should nurture culture and manage meaning. His view is that culture can be manipulated to improve organizational effectiveness and create a healthier organizational climate. This view either ignores divisiveness and conflict or labels them as indicators of ineffectiveness.

Dill's argument is that the survival of academic institutions depends on the adoption of the management tools developed in the business sector. He says these management tools were adopted by U.S. managers from Japan because of Japan's

superior economic performance in the late 1970s. His writing is an example of the integration perspective because he argues for academics to be more identified with their college or university rather than their discipline. He calls the identification with a discipline rather than an organization as a "loss of meaning." To overcome this loss of meaning he argues for a focus on symbolic management which nurtures the symbolic life of academic organizations such as myths and rituals (Pfeffer, 1981; Smircich & Morgan, 1982). This argument is further expressed by Sporn (1996) who argues that an integrated culture enables the university to deal with uncertainty and complexity in a more adequate fashion.

Bartell (2003) continues this argument by discussing the alignment of culture that is needed to effectively adapt to internationalization. He views universities as complex, with a high degree of differentiation, multiplicity of units and standards, and autonomy of professors. He argues that these characteristics hinder the change process. Instead, he says cultural strength would improve organizational functioning by facilitating a university's adaptation to internationalization. The author uses his experience as the founding director of an international exchange program, and his main argument is that "increased social integration of the variety of subcultures of the different units and a unified culture can then convey meaning and identification with the objectives and strategies of internationalization" (2003, p. 67).

Hartley (2003) also describes the harmony and unity that is a hallmark of an integration perspective. Using an ethnographic approach at several colleges, he discusses the process of renewal they underwent. He says that "over time, a majority of institutional members came to embrace the new vision. Relationships between estranged individuals were restored; and ultimately, efforts to realize the new mission led to a stronger organizational culture and more satisfying institutional life than had been in place before" (2003, p. 77). He says the political model is incomplete because it focuses on "enduring differences among coalition members in values, beliefs, information, interests, and perceptions of reality" (Bolman & Deal, 1997, p. 163). His data reveal a persistent theme of shared ideals and values.

The Competing Values Framework

One of the most widely-used conceptual models of culture in higher education is the competing values framework (Cameron & Quinn, 1999; Quinn & Rohrbaugh, 1983). The model posits that organizations can be one of four types—a clan, market, adhocracy, or hierarchy—and the research is linked with a functionalist concern for organizational effectiveness. Within the competing values model the *clan* culture emphasizes shared values and goals, participation, and a sense of family. A *market* culture emphasizes competition, environmental interaction, and customer orientation. An *adhocracy* emphasizes entrepreneurship, creativity, and adaptability, while a *hierarchy* has many rules and regulations, clear lines of authority, and is concerned with efficiency (Cameron & Ettington, 1988). Figure 2 outlines the major dimensions of the competing values framework.

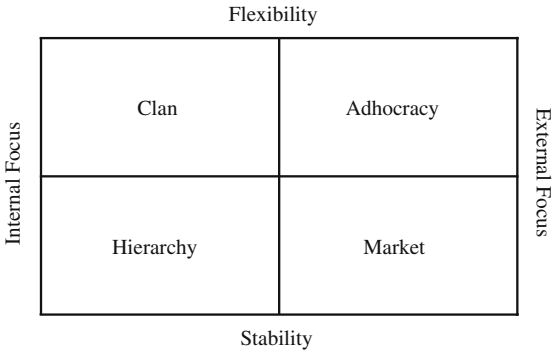


Fig. 2 The basic typology of the competing values framework

Survey respondents allocate points between descriptions of the four types to reveal a dominant culture. Distributing points highlights the relative strength of *competing* values among flexibility and stability and internal versus external orientation. This typology has been widely-used in higher education and is a clear example of the integration perspective. The authors are explicit about their assumptions as they say:

> The power of culture from our point of view lies in its ability to bring people together, to overcome fragmentation and ambiguity that characterize the external environment, and to lead organizations toward extraordinary success when their competitors struggle. That is, this book is biased toward the *integration* approach to culture because it is in the integration perspective that culture derives its power (Cameron & Quinn, 1999, p. 54).

Research using the competing values model on a sample of 334 colleges and universities has been widely published (Cameron & Ettington, 1988; Cameron & Freeman, 1991; Fjortoft & Smart, 1994; Smart & St. John, 1996; Zammuto & Krakower, 1991). The national survey of 334 colleges and universities was conducted from 1984 to 1985 at the National Center for Higher Education Management Systems. Among the 3,406 respondents of faculty, administrators, and trustees, Cameron and Ettington (1988) find that the type of culture has a strong association with effectiveness. Of the nine dimensions of effectiveness (Cameron, 1978), clan cultures score highest on four measures, adhocracies score highest on another four, while market cultures score highest on the remaining dimension.

In using the competing values framework, Smart and St. John (1996) come to the conclusion that "some culture types have a stronger positive relationship with traditional measures of the organizational effectiveness of colleges and universities than other culture types, but irrespective of the specific culture type, it is critically important that the culture be 'strong' in order to achieve maximum effectiveness" (p. 220). They define strong cultures as those in which there is congruence between espoused beliefs and actual practices, whereas weak cultures are characterized by incongruence between espoused beliefs and actual practices. This is one formulation of what a "strong" culture is and the authors recognized that the literature is replete with alternative definitions.

The competing values framework has also been used for studies focusing on community colleges (Smart & Hamm, 1993a, 1993b; Smart et al., 1997). Most recently Smart (2003) examined all full-time faculty and administrators in a statewide system of 14 community colleges. Completed surveys were obtained from 1,423 full-time faculty and administrative staff, and the research shows that as the level of cultural complexity increases, organizational effectiveness improves. Cultural complexity is defined as a campus that has several means above the entire sample mean in more than one of the four types. Organizational effectiveness is formulated by additional survey questions that assess Cameron's nine dimensions of higher education effectiveness (1978).

The strength of the competing values model is that it allows researchers to compare across organizations and generalize about culture with high sample sizes. The tradeoff, however, is that we lose the uniqueness and complexity of culture in each organization. The authors are explicit in their decision to "sacrifice analytic depth for comparative breadth" (Cameron & Freeman, 1991, p. 31). With its focus on organization-wide consensus, the differing views of faculty, admissions officers, financial affairs, and academic administrators are aggregated into one unified perception, and the unique texture of work-life is lost. The authors are explicit in their etic approach, which is counter to most studies of organizational culture. They assert that "underlying assumptions related to organizational culture are more likely to emerge from questions that ask respondents to react to already-constructed descriptions of organizations than from questions asking respondents to generate the descriptions themselves" (Cameron & Freeman, 1991, p. 32).

Another tradeoff of the competing values framework is that it may report clarity when none exists. Of the 334 colleges and universities reported in Cameron and Ettington (1988), the average number of responses per organization was around ten people. If nine of the people equally allocate 100 points among the four typologies (25 to each quadrant) and the tenth person is mixed and gives the adhocracy description slightly more points, the college is classified as an adhocracy. Nevertheless, in many circumstances, one of the descriptions of the four culture types may highly resonate with organization members and thus the survey gives researchers a useful diagnosis.

The research also takes an objective view of culture. As Martin states, the objective view treats culture "as a 'thing' 'out there' that can be objectively perceived and measured, the same way, by anyone who views it" (Martin, 2002, p. 34). Cameron and Quinn (1999) state the "most appropriate frameworks should be based on empirical evidence, should capture accurately the reality being described (i.e., be valid)" (p. 29). Yet, they say the value of the framework is in its ability to help participants socially construct their culture (Berger & Luckmann, 1967). In the words of Cameron and Quinn (1999), they say:

> The framework provides a way for organizations to discuss and interpret key elements of organizational culture that can foster change and improvement. A major problem in many organizations facing the need to change their cultures is that no language exists, no key elements or dimensions have been identified, and no common perspective is available to help the conversation even get started. Change doesn't occur because it is difficult to know what

> to talk about and what to focus on. In our experience, this framework provides an intuitively appealing and easily interpretable way to foster the process of culture change (p. 17).

Therefore, while the research using the competing values framework gives us valuable comparative data it also helps organizational members construct the reality of their culture.

Finally, in a study of a small, private Midwestern university (SPMU), Adkinson (2005) uses the competing values framework and combines it with Martin's (1992, 2002) three-perspective theory. Her motivation was to "appropriately complicate the organizational culture assessment inventory to allow for greater insight and a more comprehensive interpretation of cultural phenomenon" (2005, p. 91). The survey was given to all 278 administrators, faculty, and staff with a response rate of 74% ($N = 207$). The overall culture of SPMU was high on clan and hierarchy, proving the integration approach. She used subgroups of gender and employment level (e.g. leadership, faculty, or staff) to test the differentiation perspective, and found many differences between the subgroups on the means of the four typologies. She also finds significant fragmentation based on the difference between a respondent's assessment of the current culture and the preferred culture of the future.

Thus, the author finds support for all three perspectives. Martin would argue this quantitative "test" of the three perspectives trivializes the theory (2002). In the end, however, Adkinson says "the integration bias of the competing values framework as originally conceived appears to oversimplify the complex construct of organizational culture" (2005, p. 89). Overall, the competing values framework has offered organizations a powerful vocabulary to discuss and change their culture, but the research lacks the depth of analysis which is characteristic of most culture studies—a tradeoff that researchers in this area consciously accept.

Schein's Three Levels of Culture

A framework that aids depth of analysis and is drawn from an integration perspective, is Schein's three levels of organizational culture (1985, 1992). It is widely-cited in the higher education literature (Kuh & Whitt, 1988; Peterson & Spencer, 1990), and forms the conceptual basis for many studies of culture, such as researching how faculty values effect their beliefs about post-tenure review (O'Meira, 2004). The three levels of culture Schein distinguishes are artifacts, espoused values, and basic underlying assumptions. He defines culture as:

> The pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (1984, p. 3).

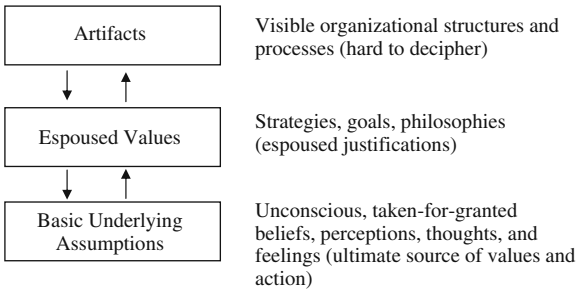


Fig. 3 Schein's three levels of organizational culture Source: Schein (1992, p. 17)

Schein advocates working from direct experience with an organization and relies heavily on inductive intuition in describing an organization's culture. He considers his research to be "clinical" because he learns about an organization's culture as a consultant helping an organization deal with specific issues (Schein, 2000). Figure 3 illustrates Schein's three levels of culture.

Of Schein's three levels, artifacts are what we can see, hear, and feel when we encounter an organization. They are hard to decipher without understanding the deeper levels of an organization's culture such as a group's underlying assumptions. Examples of artifacts are architecture, language, manners of address, a published list of values, myths and stories told about the organization (1992, p. 17).[1] At a deeper level of analysis, an organization's culture is its espoused values which are hypotheses about how to integrate as a group or adapt to the environment. If an espoused value proves to aid the group's functioning and survival it slowly transforms into an underlying assumption. Likewise, if an espoused value aids the organization in becoming a cohesive group by reducing the anxiety of unstable relationships, this value becomes a basic assumption. It is no longer debated or questioned. It becomes the only way to behave and "members will find behavior based on any other premise inconceivable" (1992, p. 22). The third level of culture, basic assumptions, actually guides behavior and tells group members how to perceive, think about, and feel about problems and issues.

The strength of Schein's model is the depth of analysis it activates because its focus on shared, taken-for-granted assumptions. These include an understanding of a group's view of time, human nature, and relationship to its environment. However, his model is criticized for trivializing symbols and artifacts (Trice & Beyer, 1993). Generally speaking, Schein believes the causal arrows move from underlying assumptions toward espoused values and artifacts. He gives less credence to symbols and artifacts creating meaning through their interpretation (Denison, 2001; Hatch, 1993; Trice & Beyer, 1984).

Schein's framework is particularly useful if an organization has a strong culture. Schein says, "The 'strength' or 'amount' of culture can be defined in terms of (1) the homogeneity and stability of group membership and (2) the length and intensity of shared experiences of the group. If a stable group has had a long, varied, intense history (i.e. if it has had to cope with many difficult survival problems and has

succeeded), it will have a strong and highly differentiated culture" (1984, p. 7). Likewise, in a higher education context, Clark (1983) outlines several determinants of the strength of organization-level culture. These include:

> Organizational scale, with smaller units better able to forge unifying ideologies than larger ones; organizational integration, with interdependent parts more inclined than autonomous ones to share a self-definition; organizational age, with historical depth producing a larger storehouse of lore; organizational struggle, with dramatic events of birth or transformation producing more heroic symbols than an uneventful institutional life; and, especially, the competitiveness of the larger organizational setting, with competition for survival and status generating claims of uniqueness and a sense of common struggle (Clark, 1983, p. 81).

Thus, the degree to which a college or university meets these criteria for a "strong" culture is the extent to which the integration perspective is most useful. If a college or university has had an intense history, then underlying assumptions that are distinct to the organization will be most readily discernible, such as Clark's organizational saga (1970, 1972). Furthermore, smaller institutions with relatively interdependent components are more likely to have an organization-wide culture. These criteria are not often met among large research universities making a differentiation and fragmentation perspective more explanatory.

The Differentiation Perspective

After reviewing the studies primarily from an integration perspective, this section reviews the differentiation approach. The main question guiding this section is: What major conceptual models and research findings have explained the culture of colleges and universities from a differentiated perspective? This approach focuses on subgroups and the occupational subcultures that horizontally link organizations. This perspective views the members of colleges and universities as "professors" or "administrators" rather than "employees," as is primarily done in the organizational behavior literature from an integration perspective (Trice, 1993; Van Maanen & Barley, 1984). From this perspective there is more utility in viewing behavior through an occupational rather than organizational lens. Ouchi and Wilkens (1985) say, "Those who study occupational cultures argue passionately that any attempt to describe the culture of a firm without its many occupational subcultures is superficial, simpleminded, and cheap" (p. 479). The view of faculty as an occupational subculture is heavily supported by their common socialization experiences (Lortie, 1968; Tierney, 1997; Trice & Beyer, 1993; Van Maanen & Schein, 1979).

To understand occupational subgroups and a differentiation perspective, the concept of subcultures is first reviewed (Trice & Beyer, 1993; Van Maanen & Barley, 1985). Then, different studies of faculty subcultures and the dueling occupational subcultures of faculty and administration in a professional bureaucracy are examined (Etzioni, 1964; Mintzberg, 1979). Among differentiation studies, it has been proposed that there are two types (Alvesson, 2002)—those that simply describe subcultural differences based on functional or occupational assignments, and those that focus on power differentials between groups. The higher education literature has

mainly focused on the former, although power differentials as a result of administrative and professional authority have also been studied by sociologists (Clark, 1983, 1987; Etzioni, 1964; Freidson, 1973).

The Concept of Subcultures

Van Maanen and Barley (1985) outline four characteristics of subcultures. An organizational subculture is defined as:

> A subset of an organization's members who interact regularly with one another, identify themselves as a distinct group within the organization, share a set of problems commonly defined to be the problems of all, and routinely take action on the basis of collective understandings unique to the group (1985, p. 38).

From Van Maanen & Barley's (1985) reading of the literature, it is difficult to justify empirically that organizations bear unitary and unique cultures, and that the utility of culture as a means of analysis may be lost at the organization level-of-analysis.

Trice and Beyer (1993) also stress the concept of subcultures in their comprehensive book *The Cultures of Work Organizations.* They focus on occupational subcultures because they find them to be a prominent part of work life but absent from most cultural analyses. They also highlight the differences that give rise to a multitude of subcultures (Trice & Beyer, 1995). Similar to Van Maanen and Barley (1985) they see certain social conditions that are likely to give rise to subcultures. These include: differential interaction caused by the division of labor, shared experiences as people interact over time in a common context, and similar personality characteristics (Trice & Beyer, 1993). These conditions are likely to give rise to social cohesion, characterized by strong norms that govern behavior.

Disciplinary Subcultures and the Academic Profession

Clark (1963a) and Gouldner (1957, 1958) make some of the earliest contributions to understanding faculty as subcultures. Gouldner (1957) depicts faculty as cosmopolitans and locals. Cosmopolitans are marked by their commitment to their specialized role skills, outer reference group orientation, and low loyalty to their employing organization. Locals, on the other hand, are highly committed to their employing organization, likely to use an inner reference group for orientation, and not highly committed to obtaining specialized role skills. Using Gouldner's distinction, Clark (1963a) outlines three dimensions along which faculty diverge: cosmopolitan-local, pure-applied, and humanistic-scientific. Given these orientations, he describes four groups of faculty members: (1) "teachers" who have a high degree of identification with the institution and are committed to pure study; (2) "scholar-researchers" who have low institutional identification and high commitment to pure study; (3) "demonstrators" who identify with the institution and are committed to applied work; and (4) "consultants" who are interested in applied work and not identified

with the institution (Clark, 1963a). With his fourfold typology, Clark found little integration among professors. As early as 1963 he says:

> The concept of academic community is a myth of considerable value in most colleges and universities, but is not to be taken seriously as a description of the actual state of affairs in most places now and in the foreseeable future. In fact, the concept of federation seems more appropriate to many universities, composed as they are of a large number of quasi-autonomous professional schools, colleges and departments. Within the federation, held together by a loose bureaucratic structure, many nations and tribes live their own ways. Men of the sociological tribe rarely visit the land of the physicist and have little idea of what they do over there. If the sociologist were to step into the building occupied by the English department, they would encounter the cold stares if not the slingshots of the hostile natives (pp. 53–54).

Along with early studies of faculty culture, the effect of the epistemological character of a discipline was examined by Lodahl and Gordon's (1972) who compared the functioning of graduate departments based on whether the discipline had high paradigm development, such as physics and chemistry, or whether the discipline had low paradigm development, such as sociology and political science. In high paradigm fields there is more agreement about which problems need investigation, what methods are appropriate, and which findings are "proven." With a shared vocabulary and accumulated findings, high paradigm fields shape the culture of academic departments by leading to less conflict, facilitating collaboration between graduate students and professors, and improving professor's receptivity of research assistance from graduate students (Lodahl & Gordon, 1972).

After this early work describing faculty subcultures by Clark (1963a) and the influence of paradigm development on graduate departments by Lodahl and Gordon (1972), there was little advancement in using cultural analysis to examine disciplines until the work of Becher (1989, 1994) and Becher and Trowler (2001). His work was primarily a response to the over simplification he found in Snow's (1959) descriptions of two cultures in the scientific world (Becher, 1984). Snow (1959) observed the intellectual life of western society as split between two polar groups. At one pole were the humanists and the other the physical scientists. Snow states that humanists believe that basic truths lie in the great literature and that scientists are shallowly optimistic and unaware of man's condition. Scientists, on the other hand, seek truth that extends scientific knowledge through discovery and accuse literary intellectuals of creating a climate which discourages social hope. Becher, trained as a philosopher, seeks to "dispel the crude and damaging dichotomy of C. P. Snow's (1959) *Two Cultures*" (1981, p. 122).

Additionally, Becher studied disciplines as cultural phenomenon because he was inspired by anthropologist Clifford Geertz, who says:

> To see that to set out to deconstruct Yeat's imagery, absorb oneself in black holes, or measure the effect of schooling on economic achievement is not just to take up a technical task but to take on a cultural frame that defines a great part of one's life, that an ethnography of modern thought begins to seem an imperative project (1983, p. 155).

Becher originally chose to study six disciplines: physics, history, biology (only botany and zoology), sociology, mechanical engineering, and law. He conducted 126

interviews across these disciplines in 1980 and set out to produce an ethnographic account of each. He would later add mathematics, education, chemistry, language and literature, pharmacy, and geography. In searching for the causes of disciplinary cultures, he finds that they derive in part from the epistemological characteristics in which the discipline is engaged. For example, discovery is a central notion of physics while in engineering the central notion is invention. Another large difference he found among disciplines was variance in the "steady accretion of knowledge by building on previous work, as against the continuing reinterpretation of a more or less stable body of ideas" (1981, p. 112). For example, the discipline of physics was found to be more cumulative while history was more reiterative. He also found the role of ideology to be negligible in biology, physics, and engineering because "the ultimate test is evidential, depending on the way things are rather than on what is believed" (1981, p. 112).

In Becher's work, he sought to use disciplines as the unit-of-analysis, although his findings suggest there is little clarity within the culture of a discipline. He says:

> Nearly all those interviewed were at pains to emphasize that their disciplines, even if unified, were far from being homogenous entities. Some went out of their way to draw attention to the complexity and variety of the approaches adopted, and the lack of any simple rubric to describe the activity in which they were engaged (1981, p. 115).

Becher's observations suggest that individual disciplines are far from monolithic. In fact, despite his attempt to define and contrast disciplinary cultures, he found he was "drawn inexorably into a recognition of various subcultures within each discipline, and even into a separate classification of those subcultures which cut across disciplinary boundaries" (1984, p. 177). He eventually found himself forced to abandon the academic discipline as the unit-of-analysis (1990). He found, in the end, it was more meaningful to talk about identifiable and coherent properties of an area of inquiry within a discipline.

By changing his emphasis he found patterns of similarity and differences among subspecialties that cut across disciplinary boundaries. For example, he found academics who seek simplicity and others who embrace complexity. Most physicist would readily agree that simple laws govern the world, while historians "share the world-view that things are always more complex than they seem" (Becher, 1984, p. 187). Similarly, Becher found some academics who found their task to be one of finding "recurrent patterns and to explain their interconnection in terms of demonstrable laws. For others, the world of intellectual exploration is characterized by its diversity; its phenomena are not in their nature subject to direct and repetitive causal connections of any such kind" (1984, p. 187).

In Becher's later writings he proposes a classification scheme for the disciplines that draws upon Biglan's (1973) original nomenclature of hard vs. soft and pure vs. applied. Table 3 outlines Becher's explanatory framework for disciplinary cultures which highlights the influence of the nature of knowledge on disciplinary cultures.

Becher's classification scheme and study offer a rich portrait of the academic world. The limitation, however, is that it may engender the tendency to think in pure

Table 3 Becher's explanatory framework of differences among academics

Grouping	Example	Nature of knowledge	Disciplinary culture
Hard-pure	Physics	Knowledge is cumulative; problems can be subdivided into smaller segments and tackled piecemeal; the outcome of inquiry is discovery	Competitive; politically well-organized; high publication rate
Soft-pure	History	Work can traverse grounds already explored; concerned with particularities and comprehending complexity; the end product of scholarship is an understanding or re-interpretation	Individualistic, pluralistic, loosely structured; low publication rate
Hard-applied	Engineering	Work has some practical end in view; concerned with ways of mastering the physical world; the outcome is a product or technique	Dominated by professional values
Soft-applied	Education	Dependent on soft-pure knowledge for improving professional practice; aim is at understanding and mastering the human world	Outward looking; uncertain in status; dominated by intellectual fashions

Source: Adapted from Becher (1987, Table 6.2).

forms. His classifications of disciplines as pure-applied and hard-soft describe an ideal form that oversimplifies the mixed breed of orientations he also describes.

Becher ends with the irresolvable tension of whether it is better to view the academic profession in its diversity or in its unity. As a unitary entity he finds the academic profession is marked by autonomy, obsessive commitment to one's work, a high degree of job satisfaction, and a common dislike of grading students. As a metaphor for explaining the tension of viewing the diversity or unity of the profession he uses a satellite image of the earth. He says we can view the world at the level of (a) continents and oceans, (b) mountains, forests, and rivers, or (c) cars, roads and houses. He is quick to note that academic disciplines can be analyzed at any level-of-analysis. Specialization occurs in each of them; physics can be broken down into optics, mechanics, fluids, particle physics, and so on. Ultimately, one's view depends on the ontological priority placed on universals or particulars (Becher, 1987; Berlin, 1953). In sum, Becher's work derives from a differentiation perspective, but his conclusions lend support to a fragmented academic world, as he says that research groups "are not only impermanent and constantly changing, but also tend themselves to fragment into smaller and smaller units as the march of specialization proceeds" (1990, p. 343).

Along with Becher's work on disciplinary subcultures, Clark (1985, 1987, 1989) completed an extensive study of academic life. In 1984, the research team conducted

a total of 172 interviews at sixteen institutions—from top research universities to community colleges—in the disciplines of physics, biology, political science, English, medicine, and business. In Clark's (1987) published account of the study he says his motivation to research the "significant differences" in academia was a response to Talcott Parsons and Gerald Platt's *The American University* (1973) in which Clark says "too much of the flux, perversity, and sheer dirtiness of real life is left out" (1987, p. 287). His thesis is to look at the variety in academic life, and he finds much more differentiation than integration.

Clark finds widely varying beliefs, both across types of institutions and areas of study. For example, among the leading research universities, the discipline is front and center, while among liberal arts colleges and community colleges, professors show a greater emphasis on teaching. The two strongest determinants of culture were type of institution—research university, liberal arts college, or community college—and discipline. He finds little identification with institutions themselves. For example, it was less important to know that someone is a faculty member at the University of Michigan or Regis College (both in the sample) than it is to know that a faculty member is in the physics department in a research university. If a faculty member did identify with the institution, they were more likely to be professors at the top of the institutional hierarchy. Overall, subcultures proved to be a powerful phenomenon in everyday life. Clark's (1987) thesis emphasized differentiation and the empirical materials confirmed widely varying beliefs and little support for unique organizational cultures among academic institutions.

At the same time, however, Clark (1987, 1989) asks what integrates the profession. Faculty members in the study also gave formulations of what professors have in common. These include: generating knowledge, striving for understanding, disdain for the crime of plagiarism, academic freedom, and personal autonomy. But, he says, "we had to scrap to find values that might still be widely shared" (1989, p. 7). Those values that were shared had widely different meanings in different contexts. For example, academic freedom, while being a shared value, has widely different meanings in research universities than community colleges. Clark's conclusion is that integration occurs through the bit-by-bit overlap of narrow specialties. This mirrors Campbell's (1969) notion of the fish-scale model of omniscience, where the specialties in the social sciences overlap like fish scales to create collective competence and breadth.

Toma (1997) extends the faculty culture literature by studying paradigm cultures within the discipline of law. He defines paradigms as "belief systems about reality, truth, objectivity, and method that cut across disciplinary boundaries" (1997, p. 681). This notion of paradigm closely resembles Schein's notion of culture as shared, basic assumptions (1985). Toma uses a social science-based typology of paradigms to classify legal scholars as realist, critical, or interpretive (Guba & Lincoln, 1994). Interviewing twenty-two legal scholars at three institutions, he finds that a scholar's paradigm shapes several aspects of academic life, including: (1) the questions they decide to pursue; (2) audiences to which they write; (3) methods and models they employ; (4) standards that others apply to judge their work; (5) reward systems under which they operate; (6) access they have to influence decision

makers; and (7) pressures or personal rewards attendant to advancing causes (Toma, 1997, p. 690).

Toma's approach of adding paradigm inquiry as the fundamental unit-of-analysis is a great advancement to the faculty culture literature. It overcomes the setbacks that Becher (1989) found when using disciplines as the unit-of-analysis. Becher eventually began to recognize subcultures within each discipline and then altered his frameworks to cut across disciplinary boundaries. Toma's (1997) exploratory study builds upon this finding and describes the academic life of scholars within alternative paradigms. The approach also moves beyond objective criteria for determining cultural participation, such as having a job title, being employed by an organization, or being a citizen of a nation (Martin, 2002). The boundary drawing process is more complex with groupings being socially constructed. This corresponds with Van Maanen and Barley's appeal for "research strategies open to the discovery of socially meaningful work groups and methodologies that resonate to the inner cleavages of work worlds" (1984, p. 298).

Conflict between Administrative and Professional Subcultures

While the first type of differentiation study is based on functional or occupational groups, the second focuses on vertical differentiation which leads to analyses of power and conflict among subcultures (Alvesson, 2002). In the higher education literature, administrative subgroups have produced the least amount of research in comparison to students and faculty (Kuh & Whitt, 1988). These administrative subgroups include: librarians, admission officers, financial operations, human resources, information technology, student affairs staff, and so on. Some of these functional groups may have similar cultures with those found in non-academic organizations. For example, information technology professionals are likely to exhibit similar attitudes and values as those in business organizations (Gregory, 1983).

In describing the conflicting tendencies of administrative and professional staff, Etzioni (1964) outlines the conflict built into the structure of professional organizations. Etzioni's work predates the cultural perspective, but it is closely related with its descriptions of roles—or the behaviors expected from people in particular positions. Etzioni describes how administrative authority derives from hierarchy while professional authority derives from the expertise of knowledge.[2] What makes colleges and universities distinct is that professionals carry out the main activities in deciding what research to undertake and to some extent what to teach. Administrators, however, are in charge of secondary activities; "they administer *means* to the major activities carried out by professionals" (Etzioni, 1964, p. 81).[3] This leaves two sets of conflicting orientations in a professional organization: the administrator, who is oriented toward efficiency, the practical concerns of staffing, and allocating limited funds; and the professional, who is orientated toward developing, disseminating, and teaching a knowledge area. These role orientations could be described as subcultures within colleges and universities; their decoupling is further noted by Weick (1976) who states, "The typical coupling mechanisms of

authority of office and logic of the task do not operate in educational organizations" (p. 17).

Lunsford (1968) further elaborates the competing ideologies of faculty and administration, describing the prejudices of faculty regarding their counterparts' competence. He observes that many faculty think administrators should be "caretakers" by providing the conditions that academics need for their work and "that the only academics who turn to administration are those who were not fully 'competent' in their scholarly work or those who are motivated by desires for personal power and prestige" (1968, p. 6). Administrators, on the other hand, use several techniques in establishing a legitimate basis for their authority. These include: acting as if there is no separation between them and faculty, such as making appeals to teamwork; building myths of rational decision-making by implying the existence of "shared goals;" and claiming informal knowledge of the attitudes of constituents which allows administrators to predict the success of policy decisions (Lunsford, 1968).

Two case studies written from a differentiation perspective illuminate the conflicting orientations of administrators and faculty as subcultures (Feldman, 1987; Swenk, 1999). Feldman (1987) finds administrative authority succumbs to professional authority when a law school dean is forced to resign because of faculty dissatisfaction. Feldman says, "given the fact that the faculty members were primarily oriented toward autonomous activity and the dean was primarily oriented toward administrating an organization, a conflict existed which required resolution" (1987, p. 97). The clash of administrative and occupational interests shows the primacy of collegiality in a professional organization; when goodwill deteriorates between the dean and faculty it eventually leads to a change in the administrative hierarchy. Mintzberg describes this dynamic in his description of colleges and universities as professional bureaucracies (1979). He says, "The professional administrator keeps his power only as long as the professionals perceive him to be serving their interests effectively. . . that power can easily be overwhelmed by the *collective* power of the professionals [italics in original]" (p. 363).

In a similar case study of the cultural differences between faculty and administrators, Swenk (1999) outlines a case study of a failed strategic plan. She finds strategic planning often fails because of the inconsistencies between academic culture and the rational-based/business processes underlying it. In the university she studied, the campus administration did not "recognize the faculty's interest in the process of how a decision is arrived at as much as the content of the decision (i.e. emphasis on collegiality, thoroughness, carefulness, and expert-based review)" (1999, p. 11). She found that in faculty culture change tends to be slower and more deliberate. In this case, the faculty thought the administration did not adequately study and deliberate the opening of a new education school, delaying the implementation of the strategic plan for nearly a decade. Similar to Feldman (1987), the author finds severe limitations to administrative authority. While engaging in the business-based approach of strategic planning, administrators could not mandate activities or count on their positional authority to ensure participation in the process.

Both the conceptual descriptions and case studies clearly illustrate the competing subcultures of administration and faculty in colleges and universities. Thus, while organization-wide consensus among faculty and administration can occur, more

likely one will find competing subcultures between these groups. This makes these subgroups an important part of any cultural analysis of colleges and universities.

The Fragmentation Perspective

In comparison to integration and differentiation, the fragmentation perspective has been used relatively less among higher education scholars. Of the three perspectives it is the most difficult to articulate because it focuses on ambiguity which is, by definition, hard to conceptualize. Most prominent among the studies of higher education from a fragmentation perspective is Cohen and March's *Leadership and Ambiguity* (1974) in which they set forth the assumptions and limitations of eight metaphors of a college or university. In their research of college presidents, they found that perceptive presidents thought current metaphors of leadership fit poorly with reality. They conclude that none of the models "seem to capture fully the character of higher educational institutions and their governance" (p. 79). Therefore, Cohen and March argue for a view of organizations as:

> Sets of procedures through which organizational participants arrive at an interpretation of what they are doing and what they have done while doing it. From this point of view, an organization is a collection of choices looking for problems, issues and feelings looking for decision situations in which they might be aired, solutions looking for issues to which they might be the answer, and decision makers looking for work (p. 81).

This "organized anarchy" is characterized by uncertain goals, a familiar but unclear technology (teaching and learning), and inadequate knowledge about who is attending to what. Most issues have low salience for most people which leads to erratic participation in decision-making. The metaphor of colleges and universities as "organized anarchies" is interesting because it challenges assumptions (Davis, 1971, 1986; Thomas & Tymon, 1982), such as the prevalence of agreed-upon goals, a clear technology, and stable levels of participation among employees.

The metaphor (or theory) of "organized anarchy" has not been tested in the usual sense, but nevertheless it resonates with researchers and practitioners (Lindblom, 1987; Weick, 1989), perhaps because it represents a more plausible portrait of everyday lived experience. Also, the idea of "organized anarchies," along with the garbage can theory of decision-making (Cohen, March, & Olsen, 1974), contradicts widely-held assumptions about the integrated ideal of a collegial community and rational models of organizational choice.[4] This makes for a good theory, as Weick states:

> A good theory is a plausible theory, and a theory is judged to be more plausible and of higher quality if it is interesting rather than obvious, irrelevant or absurd, obvious in novel ways, a source of unexpected connections, high in narrative rationality, aesthetically pleasing, or correspondent with presumed realities (1989, p. 517).

The description of colleges and universities as "organized anarchies" meets these criteria, offering a portrait which describes an ambiguous world with shifting alliances. It is far from an integrated ideal and corresponds with the observation of Robert Maynard Hutchins, the president of the University of Chicago from 1929

to 1945, who said that "whatever their protestations to the contrary, [academic communities] really prefer anarchy to any form of government" (1956, p. 174).

Weick (1983) also gives a description of the culture of higher education from the fragmentation perspective—one marked by an irresolvable tension of cohesion versus accuracy. Weick says a differentiated structure emerges in colleges and universities because one of the dominant activities is research—an often isolated, individualized activity. This differentiated structure improves the effectiveness of producing valid knowledge. Weick says, "Differentiated structures are well designed to sense and represent a referent situation such as a problem, an experiment, a text, or a symptom" (1983, p. 257). Thus, high differentiation facilitates validity in research; the greater number of independent elements contributes less distortion. For example, "Such objects as a contour gage with more sensors (Weick, 1979), boundary people with less similarity, a palette with more colors, film of finer grain, all represent vehicles that improve the accuracy of representations" (1983, p. 258). The tradeoff of obtaining this accuracy is that the more differentiated a group becomes the greater danger of people not sharing or preserving knowledge.

The weakness of the functional utility of differentiation for knowledge production is the consideration that new knowledge can be generated among interdisciplinary research teams and collaboration among scholars. However, cohesive cultures can lead to similarity in thought that cannot accurately sense the complexity of the natural and social world. Therefore, the culture of higher education is one that should not be completely integrated (Kunda, 1992; Nemeth & Staw, 1989; O'Reilly & Chatman, 1996) or completely differentiated. Instead, it can best be described as a tension between the two.

In another study from the fragmentation perspective, Silver (2003) interviewed 221 people at five universities about their perceptions of innovations in teaching and learning. Culture was not the main focus of the research, but it emerged as an important area of analysis. His results, however, strongly support the fragmentation perspective and the salience of disciplinary cultures. He found "the great majority of interviewees found it difficult to respond to questions that were directed explicitly at a 'culture' of their university" (2003, p. 161). There was an absence of shared norms, assumptions and values that were clearly associated with the institution itself. When people did describe a culture it was one of change and constant flux, not indicating stable, underlying assumptions prevalent in most studies of culture. He reports, "If they could see a culture at all, it was change itself, often instability" (2003, p. 162).

In conclusion, Silver (2003) questions the usefulness of culture to examine colleges and universities. He says, "Applying the concept to universities is more difficult than applying it to more 'closed' or 'total institutions' whose population may be relatively homogenous" (p. 166). He argues that an integrated view of culture is not applicable to colleges and universities because members are primarily beholden to their disciplines and have no unified conception of the organization. These three studies (Cohen & March, 1974; Silver, 2003; Weick, 1983) represent the ambiguity, change, and irresolvable tensions which exhibit the fragmentation perspective. They offer a powerful contrast to the ideal of the integration

perspective, but perhaps less clarity for administrators looking to improve the functioning of colleges and universities.

In a study that equally stresses each perspective—integration, differentiation, and fragmentation—Harman (1989) describes the culture of the University of Melbourne. Inspiration for the study came from Clark's (1983) description of higher education as the culture of the enterprise, profession, discipline, and national system, as well as Becher (1989) and Geertz's (1983) ethnographic look at academic disciplines. With 104 interviews of the academic staff, the author describes the organization-wide culture through the unique history of the University of Melbourne. From a differentiation approach, the author describes the subculture of the academic profession with its unfettered quest for truth; the commitment to the transmission and creation of new knowledge; and the values of science. From a fragmentation perspective, the professional schools are described as exhibiting a precarious balance between academic and professional values which create a "culturally ambivalent bond" for many faculty members. The irresolvable tensions described depicts culture from the fragmentation perspective:

> Theoretical vied with practical interests in both teaching programmes and research interest, discipline-directedness ran counter to vocationally-geared orientations, intrinsic interests opposed professional relevance, specialisms vied with commitment to overall teaching programmes, liberal opposed social and vocational goals, and academic autonomy contested externally imposed control from outside professional groups (1989, p. 48).

This description illustrates Martin and Frost's (1996) articulation of the fragmentation perspective when they say, "Culture is no longer a clearing in a jungle of meaninglessness. Now, culture is the jungle itself" (p. 609). Harman says there is no homogenous academic culture at the University of Melbourne; members of the academic profession are involved with more than one level of culture, including their discipline, subspecialty, and organization. Harman says "If the University of Melbourne is any indicator, then the real university reflects not one, unifying culture but clusters of subcultures, some which harmonize with one another and some of which clearly do not" (1989, p. 51).

Harman's study demonstrates how several international scholars (Becher, 1989; Harman, 1989; Välimaa, 1998) were less influenced by the US-centered literature on high-performing, business organizations (Ouchi, 1981; Peters & Waterman, 1982). While the popular business press permeated the higher education literature in the US—with the notable exception of Clark (1983, 1987)—the work by several international scholars (Becher, 1989; Harman, 1989; Välimaa, 1998) resulted in more nuanced interpretations of colleges and universities as cultural entities.

Conceptualizations of Higher Education Organizations and the Perspectives

This section, along with the empirical findings reviewed in the previous sections, helps answer the overarching question of the strengths and weaknesses of the

various cultural perspectives. Each of the theoretical perspectives has generated an impressive body of empirical support. To some degree, however, studies from each perspective exhibit a methodological tautology; they define culture in a certain way and then find what they are looking for (Martin, Frost, & O'Neill, 2006). Nevertheless, given the metaphors and models of governance that most resonate with scholars and practitioners and the reported findings there are reasons to favor one perspective over another. The thesis of this chapter is that the differentiation and fragmentation perspectives have more explanatory power, in-line with the conceptualizations of colleges and universities as loosely-coupled systems (Weick, 1976), professional bureaucracies (Mintzberg, 1979), and multiversities (Kerr, 1963). To fully support this thesis, each of these conceptualizations is briefly reviewed.

Loosely-Coupled Systems

Loosely-coupled systems are defined as systems in which elements are responsive, yet retain evidence of separateness and identity (Weick, 1976). Loose coupling describes the contradictory concepts of connection and autonomy (Orton & Weick, 1990). In a university, this structure allows for novel solutions to local problems and meets professional needs for autonomy (Weick, 1982b). The first empirical grounding of loose coupling was among subunits in educational organizations (Weick, 1976), and several streams of research have used the term (Orton & Weick, 1990). Some argue for the tighter coupling of organizational units (Lutz, 1982), others that loose-coupling effects a university's adaptability (Rubin, 1979). At the level-of-analysis the term is often used, loose coupling is a differentiated structure at the organization-level resulting from the complexity of the environment (Clark, 1983, 1993; Lawrence & Lorsch, 1967; Orton & Weick, 1990).

The increasing complexity of the environment is noted by Clark (1993, 1995) who describes how the higher education system is becoming more diversified and diffused. He observes that higher education systems slide from elite to mass participation, opening to a greater diversity of clienteles from more segments of the population. In order to match the greater diversity of inputs from the environment, organizations increase their capabilities to match their environment (Lawrence & Lorsch, 1967). Loosely-coupled systems are able to sense deviations in environments more quickly and thus make corrective actions sooner (Weick, 1982b). Likewise, Clark (1993) notes that when knowledge environments become more complex, universities adapt to study this environment. For example, this never ending differentiation is promoted by such research as "the improvement of fisheries in Alaska, oil plant management in southern Norway, and computer services in the cities of northern Italy. The fascinations of specialized research, pure and applied, steadily deepen" (1993, p. 264). Comparatively, Clark (1996) argues that the long-term trend from simple to complex knowledge is a more important differentiation force than the trend from elite to mass participation in higher education.

Weick (1979) describes the need for differentiation because of complex environments as the need for requisite variety (Ashby, 1962), where organizational

effectiveness depends on the match between organizational and environmental complexity. Colleges and universities are dealing with complex environments, handling everything from chemistry to zoology. This mandates a complex, loosely-coupled system. As Buckley (1968) states, "The variety within a system must be at least as great as the environmental variety against which it is attempting to regulate itself" (p. 495). Thus, developing and disseminating knowledge covering the entire physical and social world *requires* differentiation and loose coupling. It is an effective response to a differentiated environment, and a primary reason there is greater explanatory power in the differentiated perspective.

Professional Bureaucracies

The second reason to view colleges and universities as culturally-differentiated is based on the characteristics of professional bureaucracies (Mintzberg, 1979). Ignoring the occupational culture and instead describing organization-level consensus overlooks a large component of the organization (Van Maanen & Barley, 1984). Occupational rather than organizational forces are prominent in professional bureaucracies, with professionals deriving valued identities from their occupational roles. These roles promote differentiation for two reasons. First, the socialization of professionals is rarely conducted by the employing organization, but instead through several years of graduate school (Lortie, 1968; Van Maanen & Schein, 1979). Thus, the organization-wide consensus of an integration approach is less explanatory of organizational behavior because of less socialization by the organization to create like-minded individuals (O'Reilly & Chatman, 1996). Socialization into independent functioning has already occurred (Weick, 1982a).

The second aspect of a professional bureaucracy that creates differentiation is the disciplinary control of work. As Clark states, "There is quite literally no way to stop the field of history from expanding its boundaries of coverage in time and space and from proliferating its arcane specialties—nor political science nor economics nor sociology nor anthropology. The basic disciplines are inherently imperialistic" (1993, p. 264). Over time this creates more subspecialties and differentiation (Clark, 1963b, 1993); the organizational structure accommodates to the multiplicity of goals by dividing into segments, creating a "federation of professionals" (Clark, 1963b). Thus, in professional bureaucracies occupational dominance causes differentiation by controlling the means of socialization and directing the focus of work activities.

The Multiversity

The third conceptualization of higher education organizations that presents reasons to favor the fragmentation perspective is Clark Kerr's idea of the multiversity (1963).[5] In his description—which falls far short of Newman's integrated ideal

(1875)—a university is comprised of a series of communities held together by a common name. Kerr says:

> The multiversity is an inconsistent institution. It is not one community but several—the community of the undergraduate and the graduate; the community of the humanist, the community of the social scientist, and the community of the scientist; the communities of the professional schools; the community of all the nonacademic personnel; the community of the administrators (1963, pp. 18–19).

Kerr describes how a university has many competing "publics" with many interests—legitimate and frivolous—similar to a city-state, with each of these competitors vying for fractionalized power. These include students, faculty, administration, and external constituents. Within a multiversity there is little sense of community, nor confinement, neither are there clear goals, "there are several ends and many groups to be served" (1963, p. 38). Kerr sees constant, fleeting interest groups, many unrelated to each other, where a president "must be content to hold its constituent elements loosely together" (1963, p. 40). In a notion prescient of loose coupling, he says, "Many parts can be added and subtracted with little effect on the whole or even little notice taken or blood spilled" (1963, p. 20). Given these observations, and their correspondent acceptance over time (Kerr, 2001), it seems implausible to describe the unitary ideal of an organization-wide culture.

Summary of Empirical Findings

With colleges and universities being conceptualized as loosely-coupled systems (Weick, 1976), professional bureaucracies (Mintzberg, 1979), and multiversities (Kerr, 1963), there are reasons to favor the differentiation and fragmentation perspectives. These models highlight the disconnectedness, unclear goals, professional federations, and environmental influences that impact colleges and universities—making them far from an integrated ideal (Newman, 1875). Additionally, the empirical findings of culture support the differentiation and fragmentation approach, as well as the utility of viewing culture through multiple perspectives (Eisenberg, Murphy, & Andrews, 1998; Harman, 1989).

In several studies the researcher began with an integration perspective but found it inadequate to describe culture. These include Sporn (1996) who concluded that "the concept of the university as a whole barely exists and has no meaning for the university members" (p. 51). Likewise, Adkinson (2005) finds little support for the integration perspective in concluding that "the integration bias of the competing values framework as originally conceived appears to oversimplify the complex construct of organizational culture" (p. 89). Silver (2003) also finds that "the great majority of interviewees found it difficult to respond to questions that were directed explicitly at a 'culture' of their university" (2003, p. 161). Clark (1970), on the other hand, found a unique, unified saga among three liberal arts colleges. Not surprisingly, this suggests that the integration perspective may be best employed in small, tightly-knit communities (Schein, 1984). In using an integration approach, Schein

(1985) stresses the need for stable membership, shared history, and influential founders—conditions not readily met in large universities.

Similar to Sporn (1996) who uses an integration approach but finds fragmentation, Becher (1989) sought to use a differentiation approach but finds fragmentation. In using disciplines as the unit-of-analysis, he says there is little clarity within the culture of a discipline. "Nearly all those interviewed were at pains to emphasize that their disciplines, even if unified, were far from being homogenous entities. Some went out of their way to draw attention to the complexity and variety of the approaches adopted" (1981, p. 115). He eventually found himself forced to abandon the academic discipline as the unit-of-analysis (1990). Becher's work derives from a differentiation perspective, but his conclusions lend support to a fragmented academic world. He says that research groups "are not only impermanent and constantly changing, but also tend themselves to fragment into smaller and smaller units as the march of specialization proceeds" (1990, p. 343).

In the research using the competing values framework there is support for the integration perspective (Fjortoft & Smart, 1994; Smart, 2003; Smart & St. John, 1996; Smart et al., 1997; Smart & Hamm, 1993a, 1993b; Zammuto & Krakower, 1991). The strength of the competing values model is that it allows researchers to compare across organizations and generalize about culture with high sample sizes. The tradeoff, however, is that we lose the uniqueness and complexity of culture in each organization. The authors are explicit in their decision to "sacrifice analytic depth for comparative breadth" (Cameron & Freeman, 1991, p. 31). With its focus on organization-wide consensus, the differing views of faculty, admissions officers, financial affairs, and academic administrators are aggregated into one unified perception. Thus, the unique texture of work-life is lost.

One of the most prominent figures in culture research, Burton Clark, unequivocally advocates a differentiation perspective. He says, "Wisdom begins with the will to disaggregate, seeking to give proper weight to settings that make a difference. As academic labor becomes finely tuned, we must play to a theme of differentiation" (1987, p. xxii). The lone exception to this statement is his work on the culture of three liberal arts colleges (1970). Nevertheless, the majority of his scholarship is firmly within the differentiation realm (Clark, 1963a, 1963b, 1968, 1984). He continually describes colleges and universities as highly differentiated "federations" and advocates understanding them in all their diversity (Clark, 1985, 1989, 2000).

The integration perspective, however, does have its advocates and utility (Bartell, 2003; Chaffee & Tierney, 1988; Dill, 1982; Hartley, 2003; Masland, 1985). Along with the competing values framework, Schein's three levels of organizational culture (1985, 1992) is widely-cited in the higher education literature (Kuh & Whitt, 1988; Peterson & Spencer, 1990), and forms the conceptual basis for many studies of culture. The framework, however, is focused on *shared* assumptions at the organization level-of-analysis, which places it within the integration approach.

Schein's framework is particularly useful if an organization has a strong culture. Schein says, "The 'strength' or 'amount' of culture can be defined in terms of (1) the homogeneity and stability of group membership and (2) the length and intensity of shared experiences of the group. If a stable group has had a long, varied, intense

Table 4 Studies of administrative and faculty culture in higher education

Integration	Differentiation	Fragmentation
Case studies	*Faculty differentiation*	Cohen and March (1974)
Bartell (2003)	Becher (1989)	Silver (2003)
Chaffee and Tierney (1988)	Clark (1963a)	Weick (1983)
Clark (1970, 1972)	Clark (1987)	
Dill (1982)	Goulder (1957)	
Hartley (2003)	Lodahl and Gordon (1972)	
Masland (1985)	Snow (1959)	
Sporn (1996)	Toma (1997)	
Tierney (1988)		
Competing values research	*Administrative versus faculty subcultures*	*Studies using multiple perspectives*
Adkinson (2005)	Etzioni (1964)	Harman (1989)
Cameron and Ettington (1988)	Feldman (1987)	Eisenberg et al. (1998)
Cameron and Freeman (1991)	Lunsford (1968)	
Fjortoft and Smart (1994)	Swenk (1999)	
Smart (2003)		
Smart and St. John (1996)		
Smart et al. (1997)		
Smart and Hamm (1993a, 1993b)		
Zammuto and Krakower (1991)		

history (i.e. if it has had to cope with many difficult survival problems and has succeeded), it will have strong and highly differentiated culture" (1984, p. 7). Thus, the degree to which a college or university meets these criteria for a "strong" culture is the extent to which the integration perspective is most useful. If a college or university has had an intense history, then underlying assumptions that are distinct to that organization will be discernible, such as Clark's descriptions of organizational sagas (1970, 1972).

Table 4 lists the studies reviewed in the previous sections of this chapter, indicating a heavier focus on the integration perspective. This implies greater attention should be given to scholarship from the differentiation and fragmentation perspectives.

A Framework for Analyzing Culture in Higher Education

As argued in this chapter, culture is formed through many complex influences both in an organization and as the result of its environment. Understanding the multiple contexts in which people operate helps us understand the complexity of higher education organizations and improve administrative action. Based on the literature review of this chapter and building upon a similar model proposed by Sackmann (1997, 2001), a framework specific to higher education is diagramed in Fig. 4. It displays not one, single culture, but several factors that influence the work context. It reminds us that individuals are simultaneously members of several groups, and describes many "frames" to "work" from in analyzing culture.

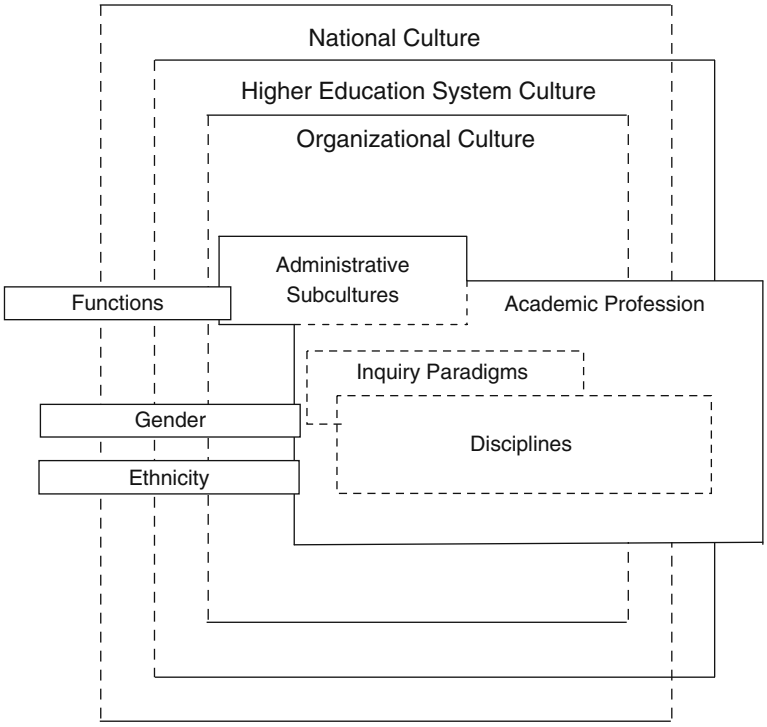


Fig. 4 A framework for analyzing culture in higher education

Culture is differentiated into academic and administrative subcultures—in line with descriptions of colleges and universities as professional bureaucracies (Mintzberg, 1979). Likewise, the relative size of the two subcultures is weighted toward greater dominance of the professional culture. The boundary between the two groups is permeable and overlaps because some members are part of both subgroups and move in-and-out of either context. The academic subculture is partitioned into the profession-at-large, the disciplines, and inquiry paradigms. The entire system is exists within an organizational culture, a national system of higher education (e.g. research universities, liberal arts colleges, and community colleges), and a national context.

The framework visually depicts the idea that "colleges and universities are organizational systems comprising many overlapping subsystems" (Bess, 2006, p. 504). It portrays socially meaningful groups in which "thick description" of behaviors, attitudes, and norms can occur (Geertz, 1973). The framework is static, however, not describing dynamic processes. Its strength is overcoming the perceptual simplicity of thinking about culture from only one unit-of-analysis. It suggests that culture is more pluralistic and diverse than most studies assume. To expand this framework, I will develop each of these frames, with the exception of national culture (see Hofstede, 1991, 2001), system culture, and gender/ethnicity which are not reviewed to keep a manageable scope.

Organizational Culture

Within the organization, culture is the result of an organization's unique history (Clark, 1970, 1972), its leadership (Schein, 1992), and critical events (Pettigrew, 1979). When culture at the organization-level is the dominant influence on behavior (as opposed to a profession, discipline, or functional unit) it is considered a "strong" culture, formed through an intense history (Clark, 1970). This describes Clark's notion of an "organizational saga" which is a "unified set of publicly expressed beliefs about the formal group that (a) is rooted in history, (b) claims unique accomplishment, and (c) is held with sentiment by the group" (1972, p. 179). The concept of organizational saga focuses our attention on the analytical importance of the historical context in which a college or university emerged. Overall, at the organizational level-of-analysis, not all colleges and universities have distinctive cultures (Pace, 1974). If they do, institutional size and an intense history are related to its development and salience (Clark, 1970; Kuh & Whitt, 1988; Peterson et al. 1986; Schein, 1992).

Academic and Administrative Subcultures

In the higher education literature, administrative subgroups have produced the least amount of research in comparison to students and faculty (Kuh & Whitt, 1988). These administrative subgroups include: librarians, admission officers, financial operations, human resources, information technology, student affairs staff, and so on. Some of these functional groups may have similar cultures with those found in non-academic organizations. For example, information technology professionals are likely to exhibit similar attitudes and values as those in business organizations (Gregory, 1983). As shown in Fig. 4, functional subcultures overlap with administrative ideologies (Lunsford, 1968), the organization's culture, the higher education system in which it is embedded, and the national culture.

Academic Profession-at-Large

The academic profession-at-large has been explored by various authors who describe the common values and norms of this subgroup (Clark, 1987; Kuh & Whitt, 1988). For example, Weick (1983) outlines many underlying assumptions of faculty at colleges and universities.[6] These include:

> Tradition is a source of error rather than truth; be suspicious of received wisdom. Stubborn, insubordinate, young geniuses are to be listened to even if their ideas go against the prevailing views of older, more established people. Competence rather than likeableness should be rewarded. Contribution to science is the only legitimate basis to bestow status. Punish dishonesty with ruthlessness and finality. And practice competitive replication (1983, pp. 261–262).

Also describing the culture of the profession-at-large, Gouldner (1957) depicts faculty as cosmopolitans and locals, and in Clark's (1987, 1989) study of academic life, he describes the academic profession as sharing a commitment to generating knowledge, striving for understanding, having disdain for the crime of plagiarism, and believing in academic freedom and personal autonomy. Similarly, Kuh and Whitt (1988) describe the culture of the academic profession as based on the concepts and symbols of: academic freedom, the community of scholars, scrutiny of accepted wisdom, truth seeking, collegial governance, individual autonomy, and service to society through the production of knowledge, the transmission of culture, and the education of the young (p. 76). The "academic profession" frame of Fig. 4 indicates that analysis of culture in colleges and universities should emphasize the occupational community of professors to comprehensively capture the culture of the organization (Van Maanen & Barley, 1984).

Disciplinary Subcultures

In addition to viewing faculty as an occupational community, disciplinary subcultures offer another frame to explain culture. These include a distinction between physical scientists and humanists (Snow, 1959); the level of paradigm development in a discipline, which describes the agreement about which problems need investigation, what methods are appropriate, and which findings are "proven" (Lodahl & Gordon, 1972); and whether a discipline is hard-soft and pure-applied (Biglan, 1973). In expanding our knowledge of disciplinary subcultures, Becher (1989) found a difference based on whether a discipline (1) seeks simplicity or embraces complexity (2) concerns itself with the "steady accretion of knowledge by building on previous work, as against the continuing reinterpretation of a more or less stable body of ideas" (1981, p. 112); (3) prioritizes discovery or invention, and (4) whether ideology has a visible role in scholarship.

Inquiry Paradigms

Toma's (1995, 1997) analysis of inquiry paradigms comprises an additional frame in our understanding of culture. It corresponds with Van Maanen and Barley's (1984) appeal for "research strategies open to the discovery of socially meaningful work groups and methodologies that resonate to the inner cleavages of work worlds" (p. 298). The term "inquiry paradigm" is not traditionally used in studies of culture, but the idea closely aligns with Schein's notion of culture as the implicit assumptions that guide behavior and have become "taken for granted" (1992). The idea of paradigms has mostly arisen through studies in the sociology of knowledge (Berger & Luckmann, 1967; Kuhn, 1969). Therefore, inquiry paradigms have less applicability to business organizations, where most culture research has been developed, and more utility in understanding knowledge organizations such as colleges and universities. Thus, the concept of inquiry paradigms is an important consideration in any cultural analysis of higher education organizations.

Toma's (1995, 1997) analysis describes how working from a postpositive, interpretive, or critical paradigm divides academics and deeply impacts scholarly lives and careers. A paradigm derives from our fundamental assumptions about ontology, epistemology, and methodology (see Guba & Lincoln, 1994; Lincoln & Guba, 2000). Similarly, Burrell and Morgan (1979) outline four paradigms from which social scientist operate: functionalist, interpretive, radical humanist, and radical structuralist. Burrell and Morgan (1979) define the four paradigms as "very basic meta-theoretical assumptions which underwrite the frame of reference, mode of theorizing and *modus operandi* of the social theorists who operate within them. It is a term which is intended to emphasize the commonality of perspective which binds the work of a group of theorists" (1979, p. 23). The functionalist paradigm seeks rational explanations of social affairs and applies the models and methods of the natural sciences to the study of human affairs. The interpretive paradigm seeks explanation within the frame of reference of the participant and views social reality as an ongoing, emergent process. The radical humanist paradigm has a subjective view of the social world with an orientation to radically changing constructed realities, while the radical structuralist paradigm seeks radical change of structural realities (Burrell & Morgan, 1979).

Inquiry paradigms are another important "frame" or vocabulary through which to understand the culture of a college or university. Along with organizational culture, the academic and administrative subcultures, and disciplinary subcultures, inquiry paradigms describe "taken for granted" assumptions that differentiate members of the academy. In Fig. 4, inquiry paradigms are shown to greatly overlap—as well as reciprocally influence—disciplinary subcultures, which is why the two "frames" overlap and have dashed boundaries. As another "frame," inquiry paradigms help us better understand the complexity of culture in higher education organizations.

Implications of the Framework of Cultural Complexity

With individuals simultaneously members of several subgroups, a research implication of this cultural complexity is a movement toward social identity theory (Dahler-Larsen, 1997; Hernes, 1997; Hogg & Terry, 2000; Tajfel & Turner, 1985; Välimaa, 1998). With several overlapping subcultures, how do members of the organization compartmentalize or understand their multiple identities? Ashforth and Mael (1989) posit that, "Individuals have multiple, loosely-coupled identities, and inherent conflicts between their demands are typically not resolved by cognitively integrating the identities, but by ordering, separating, or buffering them" (p. 35). A research implication of Fig. 4 is a need for a better understanding of how people switch "frames" from context to context as members of several subcultures (Hong, Morris, Chiu, & Benet, 2000). Likewise, a practical implication is that to be an effective administrator, one should see an individual as having multiple cultural identities.

Zerubavel (1997) also mentions different subcultural identities in his description of cognitive sociology. He says, "Each of us is a member of more than just one thought community and therefore inhabits different social worlds. As a result,

we each have a rather wide 'cognitive repertoire' and often think somewhat differently in different social contexts" (p. 17). The model of cultural complexity outlined in Fig. 4 helps us visualize the various "thought communities" in which we, and others, are members. It also implies a movement away from the "organization" in "organizational culture" toward an understanding of occupational communities (Van Maanen & Barley, 1984) or "thought communities" (Zerubavel, 1997), which are meaningful subgroups in everyday work life.

Implications for Practice

The framework also has implications for the practice of administration in colleges and universities. For example, to be an engaged member of a community and to appreciate what change an organization may need to make, a rich understanding of culture is necessary (Louis, 1990; Pfeffer, 1981; Schein, 1992; Tierney, 1988). With culture being complex and difficult to understand and change, a simple map can help administrators take effective action (Roethlisberger, 1977; Weick, 1979, 1995). This is what I hope to offer with the framework in Fig. 4. As Roethlisberger states, "Instead of treating the world of facts (the territory) as simple and making the map complex, one should treat the territory as complex and keep the map simple. A simple map applied to a complex territory could do wonders" (1977, p. 139). The framework in this chapter is meant to be a simple map to a complex territory, thereby allowing us to wade-into complex territories with greater hope of successful navigation.

Another implication of this chapter is whether administrators at colleges and universities should pursue cultural integration, differentiation or fragmentation. To some degree each cultural perspective makes claims of improved organizational effectiveness. From an integration perspective, there are benefits to interdisciplinary research such as creative breakthroughs and the ability to study complex or practical problems that cannot be studied within narrow disciplinary bounds (Nissani, 1997). Better scholarship arises through interdepartmental linkages and collaboration, through sociologists working with psychologists, historians with anthropologists, and so on. From a differentiation perspective the specialization of tasks produces better scholarship (Weick, 1983). For the English department to be tightly connected with the physics department would hurt the inquiry of both fields. The law of requisite variety implies that differentiated scholars can better sense a complex knowledge environment. From a fragmentation perspective, ambiguity of purpose fosters the existence of multiple viewpoints, which promotes agreement on abstractions so that specific interpretations are not limited (Eisenberg, 1984). With a multiplicity of viewpoints and ambitions, ambiguity is hypothesized to improve innovation (Martin & Meyerson, 1988). For example, when there are unclear expectations and preferences, there is no apparent right or wrong outcome. Therefore, "because there is no risk of being 'wrong,' experimentation, and thus creativity, is encouraged. And if objectives are not clear a priori they can be permitted to emerge" (Martin & Meyerson, 1988, p. 119).

The question becomes: Is better knowledge a result of interdisciplinary scholarship, differentiated inquiry, or the pervasiveness of ambiguity and unclear goals? What do scholars think is the case from their experience? What does this imply for the management of colleges and universities? Should there be more interdisciplinary linkages, less collaboration among scholars, or more ambiguity and promotion of academic freedom which allows scholars to experiment and explore? Weick (1979, 1983) argues we should remain in disciplinary silos to produce more accurate knowledge. Contrary to this, the current president of Harvard, Drew Gilpin Faust, states:

> If we at Harvard are to accomplish all we intend, we need to find new ways of working together, of engaging the creativity of one of the most talented communities in the world. We need to break down barriers that inhibit collaboration among schools or among disciplines, barriers that divide the sciences and the humanities into what C.P. Snow once famously called two cultures, barriers that separate the practice of the arts from the interpretation of the arts, barriers that lead us to identify ourselves as from one or the other "side of the river." Collaboration means more energy, more ideas, more wisdom; it also means investing beyond one's own particular interest or bailiwick. It means learning to live and to think within the context of the whole university (2007).

Who has the best model of organizing to produce the best scholarship? The integrated world described by Faust (2007)? The differentiated, loosely-coupled system described by Weick (1983)? Or the ambiguity of an "organized anarchy," which may lead to more innovative thinking from professional autonomy (Bess, 2006; Cohen & March, 1974; Martin & Meyerson, 1988; Robertson & Swan, 2003)? This line of inquiry moves our thinking from "what colleges and universities are" to "what they should be" by examining the implications to the production of knowledge of each perspective.

In sum, studying colleges and universities "much the same way that [an anthropologist] studies a primitive tribe or modern community" (Riesman & Jencks, 1962, p. 104) has provided scholars and practitioners insights into organizations, management, and working life. Understanding the multiple identities of faculty and administrators—their differences, factions, and socially-meaningful work groups—all situated in complex environments, will continue to generate those meaningful insights to both improve the management of colleges and universities and our understanding of them. The framework in Fig. 4 helps us overcome many of the weaknesses and tradeoffs in studying culture to analyze multicultural contexts from several units-of-analysis.

Notes

1. Masland (1985) outlines Schein's surface-level artifacts in a higher education context, describing culture as saga, heroes, symbols, and rituals. However, his highly-cited article does not mention a link to more underlying assumptions, implicit values, beliefs, and ideologies.
2. This distinction is noted by a vast number of organizational theorist (Birnbaum, 1988; Blau, 1973; Clark, 1963b; Mintzberg, 1979; Trice & Beyer, 1993), who variously label it as the administrative and occupational principle (Friedson, 1973), hierarchical and collegial

authority (Becher & Kogan, 1980), bureaucratic and professional authority (Clark, 1968), or value-rational authority (Satow, 1975).
3. Mintzberg (1979) criticized Etzioni (1964) for portraying administrators as "the errand boys of the professionals" (p. 362).
4. For a critical analysis of the garbage can decision making model see Bender, Moe, and Shotts (2001).
5. Drawing upon Kerr's observations Clark (1968) similarly describes the university as an "educational city." These observations are mainly descriptions of the University of California-Berkeley, where both of the authors worked, which means the concept directly applies to large universities and is less true of small liberal arts colleges.
6. Weick adapted the ideas from Campbell (1979).

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Research Libraries in the Twenty-First Century

Yvonna S. Lincoln

> *Today we have a similar opportunity to invest in research and education to bring the world closer together, improve our environment, and fulfill the age-old dream of every human being: gaining ready access to humanity's store of information. This era and what we are building go by many names, including Cyberspace, Global Information Infrastructure, Infobahn, Information Age, Information (Super) Highway, Interspace, and Paperless Society. They are all supported by networking (e.g., the Internet). However, their essence is information. Information is what flows over the networks, what is presented to us by our consumer electronics devices, what is manipulated by our computers, and what is stored in our libraries.*
>
> Fox, Akscyn, Furuta, and Leggett *(1995, p. 23)*

Were Rip Van Winkle to awaken today, and hope to find some comfort and updating from his long sleep in the library of a nearby research-extensive library, he would be stunned at the changes he encountered. The 20 short years of his nap, between 1990 and 2009, have totally reconfigured the library, and along with it, the way faculty work, the way they communicate within their "invisible colleges," and the way they cumulate, seek out, utilize, and regard information and knowledge. Images of the great Renaissance and Enlightenment libraries of Europe—the Bodleian, the original (older) library at Trinity University in Dublin, the Bibliothéque Nationale in Paris, the great hall of the University of Edinburgh, the magnificent medieval library at Barcelona—are rapidly being replaced by spaces which reflect not only the alterations in collections, but also new research on effective teaching methods and collaborative learning (Moran, 1984). The form and format in which knowledge is stored is not merely changing; the very architecture and interior organization of libraries is beginning slowly to reflect *deutero-learning,* or thinking about the ways

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we think, and the ways our patterns of thinking come to be and change (Bateson, 1972; Fallows, 2006).

Lee Hisle (2005), vice president for information services at Connecticut College, puts it in very plain language:

> This is a time of transition in academic libraries. Core functions—like reference services, collection development, and preservation—are being rethought and redefined as libraries move from traditional forms of services and print-based collections to online services and digitized collections (p. B6).

Technology, as one might expect, has been a major driver for changes in libraries and consequently, for how faculty work (Battin, 1982), but other forces are at play at research universities and the landscape of the knowledge and information economy more broadly (De Gennaro, 1982; Lougee, 2002). Those forces have interacted both to shape the ways in which libraries are organized, but also to shape how we view knowledge, how knowledge and information are organized, and how we access intra-, inter-, and cross-disciplinary information sources for research and teaching purposes. The environment for research and teaching has never been more convenient, nor have primary sources been more readily available for both missions. More to the point, libraries's missions have shifted and will continue to shift (ARL: A Bimonthly Report, 2002), as emerging needs, driven by the explosion of information, the development of new research tools and search engines, and new research on learning, cognition and the brain's structure and information retrieval systems, begin to shape new tasks, new roles, new utilization strategies and new missions for research libraries (Galvin & Lynch, 1982). Each of these interactive impacts is significant, and thus, the remainder of the chapter will deal with these forces and influences, organized as: research libraries as knowledge producers; organizing information and knowledge; teaching in the knowledge economy; new metrics for evaluating research libraries; the economics of collections; the creation and expansion of digital libraries; and, research in a globalized network.

Research Libraries as Knowledge Producers: Beyond Collecting, Cataloguing, Storing and Retrieving Information

Faculty who think of a library as a place to store the journals and books that are not on one's own shelf have only a portion of the picture today. As a matter of fact, the experience of spending an afternoon perusing the stacks is likely coming to an end for those who prefer "browsing. . . main library collections or separate discipline-based library collections" (Branin, 1998; Branin, Groen, & Thorin, 1999). While it is true that research libraries provide the most comprehensive and readily-available resources in the disciplines represented by departments on any given campus, research libraries are far more intricate and complex than cataloguing, storing and retrieval depots. The context of research libraries has shifted dramatically

over the past 20 years. For instance, attention to diversity has brought students to campus who might, two decades previously, never have entertained the notion of attending college. In the same manner, faculty ranks have been sharply diversified (Finkelstein, Seal, & Shuster, 1998; Shuster, 1998), with diverse faculty bringing with them research interests far removed from the traditional and conventional research agendas of 40 or 50 years ago. As well, the attention to internationalizing both the curriculum and the outreach of university missions has demanded new library research and teaching resources, with a concomitant demand for quality material and content which is deliverable to faculty and student desktops and laptops. Other forces at work include "the shift from text- and print-based collections to digitized collections,... emerging copyright and intellectual property issues,... the involvement of libraries in producing print-on-demand, contractual and organizational issues around shared storage and non-duplication of resources"—a cost- and space-saving effort, beyond any other cooperative, collaborative or consortial arrangements—and the "necessity for reorganizing and/or creating [or building] new physical workspaces for new forms of work being demanded by students and faculty alike" (Lincoln & Lechuga, 2006, pp. 2–3).

More important, however, is a need for staff to be creative in ways never previously necessary. New and emerging emphases on and interests in inter-, cross- and trans-disciplinary work between and among faculty and departments, as well as funders, has mandated a new kind of librarian (Carlson, 2007; Wilder, 2007). The new research librarian will not merely seek out existing resources for faculty and advanced graduate students; she or he will actively search for "new streams of knowledge" on a worldwide basis, utilizing search engines undreamed of 5 years ago. Among the services provided by the new research librarian will be translating, managing, suggesting and even "creating meta-data" for the new knowledge being generated. Around North America, such librarians are being assigned almost permanently to large research projects (e.g., the human genome mapping project, research on global warming phenomena, research on genetics and cancer interventions). Their tasks include accessing and evaluating new data which are emerging from both their "own" projects, and similar and related projects being undertaken around the world, creating categories and descriptors (meta-data) for the new knowledge (Krafft, 2002; Liddy et al., 2001), and generating new "data 'trees'" both to account for the emerging transdisciplinary knowledge being created, and also to make those data available reciprocally to other researchers and to their counterpart librarians (Lincoln & Lechuga, 2006).

Librarians are thus engaging the work which in another era would have been left to a small set of disciplinary specialists. To travel with librarians professionally today is to participate in a rarified conversation surrounding the problems of meta-data creation and the international and globalized issues of negotiating terminology for meta-data across nations. This conversation is not undertaken solely by meta-data specialists, but by an expanding group of reference and research librarians working in and with teams of researchers who themselves are not always certain where to search for new streams of knowledge or how to categorize and

cross-reference their own findings. As information expands from kilobytes to megabytes, to gigabytes, to terabytes, to petabytes and ultimately to exabytes, some means of organizing the mountains of data, and some means of extracting patterns so complicated the human mind cannot visualize them, must be devised. Mathematicians may ultimately provide some of the answers to the problems of creating meta-data, by working with "algebraic topology[ical]" analyses (Suplee, 2005, pp. 50–51). As a mathematical sub-discipline, topology "provides mathematical ways of describing shapes in multiple dimensions", and has the power to "use high-dimensional shape detection to determine whether a data set contains hidden patterns" (Suplee, 2005, p. 50). These hidden patterns are the keys to unlocking data's hidden patterns so that meta-data libraries can be constructed, and so that the complex patterns which constitute knowledge from sheer information can be extracted. Librarians can and will use topological analyses for constructing data "trees" as mathematicians, information scientists, informatics specialists, software designers, linguists, and other disciplinary specialists work across genres to create the tools for such analyses (Suplee, 2005).

The Library of Congress cataloguing system, still useful for print resources, has nevertheless been superseded quietly and efficiently by the digital revolution, digital and online cataloguing systems, and the sheer pace of information and knowledge generation, now estimated to be doubling, not every century, but every 5 years or less. Librarians who in the past served as cataloguers now find such work "boring" (Cook, personal communication, 2006). Indeed, when faced with a choice between cataloguing conventionally and working as a team member to create meta-data for organizing and seeking patterns in new information, why would anyone wish to miss out on being at the "frontiers of science"? The outcome of this situation has been fewer traditional cataloguers being turned out of library and information science schools, and more new, young research librarians eager to work at accessing new streams of knowledge and data, and fascinated with the possibility of generating new knowledge, new categories of knowledge, and new data "trees" for organizing new streams of data. Far from being conservationists and archivists, librarians now serve at the forefront of knowledge generation.

In the creation of meta-data for streams of data which may flow from major research projects, research librarians also serve another critical function, mentioned briefly earlier. They are the individuals and professionals most familiar with the extent and variety of "specialized finding aids" which enable researchers to access data, information and knowledge that may exist not only on the "opaque", or visible, Web—via search engines such as AltaVista, Google Scholar, Lycos, LookSmart, AlltheWeb, and other general purpose information-seeking mechanisms—but which may exist on the "private Web," the "proprietary Web," or the "truly invisible Web" (Borgman, 2003; Sherman & Price, 2003, p. 293 ff.). They are able to locate and search data fields which even experienced Web searchers may fail to find or access.

As well as working away from the library, in departments and with major projects, librarians are also working in emerging forms of cataloguing non-print, non-digital collections. In the past, research libraries were evaluated utilizing their

print and digital collections. Today, however, many research libraries' collections look quite similar. The comprehensive, research-extensive university has generated the comprehensive, research-extensive library. As a consequence, it has become a more difficult issue to evaluate the contributions any given research library might make to the missions of a university. The result of this quandary has been to move to examination of other resources and materials that a given library possesses. For example, one major research university's library owns an extensive collection of paintings from a given period. The collection, donated to the library rather than the university's art collection, now forms a portion of the library's holdings and serves as a major attractor for art historians who work in this period. While those paintings are inventoried, they now need to be catalogued, so that they are a permanent, digitized, and accessible library resource. The same is true for another library which has a rather extensive donated collection of "decorative objects:" vases, sculptures, and other important artistic artifacts from a private collector (Interview #3, October 2006). Still other libraries possess important manuscripts, coins, documents, autobiographical and archival letters, corporate papers, journals, musical recordings, and other materials. Some, or much, of such material has yet to be catalogued; consequently, scholars either do not now know of its existence, or, if they know of its existence, it is in any event not available for scholars' use. Librarians who wish to bring such materials online also have opportunities to create new knowledge, as conventional and traditional systems for cataloguing such material (and thus making it readily available via digitization for research and teaching purposes) do not now entirely exist. Frequently these unique collections begin to characterize the subtle but critical differences in research libraries' holdings, and therefore, their "identities" among peer libraries.

Organizing Information and Knowledge

The "problem" with information generation is that librarians and researchers alike want "to avoid the situation where we are drowning in data and thirsting for statistics" (Baden, 2005, p. 50). As Suplee (2005) points out,

> Information is not knowledge. Those four words contain one of the most vexing paradoxes of the 21st century. We are accumulating data at exponential rates, but our understanding of what is being stored is creeping along (p. 50).

Closely related to the issue of knowledge generation discussed in the foregoing section is the issue of how such information (and ultimately knowledge) is organized, and how it is accessed. Much of the petabytes[1] of information now being generated is not organized, nor have patterns been identified which would clue researchers regarding links to other data sets, to important but hidden research findings, or meaningful linkages or connections which could be made. Research libraries (and their reference and research librarians) are now engaging in the design of organizing rubrics for the information local researchers are creating. Organizing rubrics are one

step below the creation of comprehensive meta-data, but are necessary prior to the generation of data trees.

Recognition of patterns in data is being aided by topological analyses discussed above, but a first step for smaller data sets is frequently an astute disciplinary reference librarian, an individual who has been a team member, although not engaged in the "bench work" of the laboratory, but someone who has participated in the discussions regarding what the data appear to be showing the researchers, and who is equally conversant with search tools and related bodies of information and knowledge. Such work is frequently taking place on research university campuses across North America.[2] Thus, librarians and libraries are working constantly to organize information and turn it into accessible knowledge.

The Semantic Web

One exciting example of the theoretical progress in access is the development of the "Semantic Web" (Lougee, 2002, p. 11). Berners-Lee (the creator of the World Wide Web [Berners-Lee & Lassila, 2001], 2001, cited in Lougee, 2002), is the driving force behind the intellectual development of this extension of the Web, which "brings together metadata, a language to structure the data, and a road map (or *ontology*, as known in the artificial intelligence community) that explains relationships between terms. . ." (p. 11, italics in the original). This is a critical step in the sorting, categorizing and making accessible information which can be translated into knowledge. Lougee goes on to say that

> These ingredients for *knowledge representation*—structured content, rich metadata, and a framework for ontology of relationships—allow software agents in computer systems to make inferences and therefore retrieve more intelligently from the vast body of distributed information on the Internet (p. 11, italics in the original).

She notes that the experience of metadata creation and "descriptive techniques" which are the provinces of the new research librarians means that librarians will have a significant role in the creation and development of the Semantic Web. Advances in artificial intelligence (AI), software development, and disciplinary specialties will speed this process. As well, she observed, librarians have what she terms "latent experience in areas such as thesaurus development", which will aid in the development of ontologies, "defining relationships between entities such as classes and subclasses or properties and subproperties," involving librarians in "multidimensional description. . . and specifying the logic of relationships between metadata elements and objects." (p. 12).

Teaching in the Knowledge Economy

Arden Bement (2007), director of the National Science Foundation, remarked in a recent forum on technology that

> The power of cyberinfrastructure to enhance education and provide new learning opportunities is such an expansive and beneficial feature that we must be sure to create the conditions for synergy between research and education from the outset. That means that developing these strategies at the very core of our cyberinfrastructure enterprise, rather than as an afterthought, is critical (p. B6).

One service which has always been available for teachers, but that has not been utilized nearly as frequently as it should have been or could be is having teachers and classroom instructors working with librarians to prepare lesson plans, to develop instructional materials, and to guide students in searching out and evaluating (Brandt, 2001) the best possible materials for projects, papers, presentations and other assignments (Carlson, 2002). It is often the case at research libraries now that disciplinary specialist reference librarians are assigned to departments, and may even be officed, at least part-time, within the departmental space. In these roles, librarians often act as adjuncts to the continuing role of teachers and researchers (Breivik & Gee, 2006) in seeking out their own materials for creative teaching with visually and intellectually exciting primary source content digitized from other research libraries and collections around the world (Covi & Kling, 1996).

When coupled with the digitized archival material rapidly becoming available from collections around North America (and indeed, from Europe and around the world), collections exist in many more forms and formats than ever before, including digitized images, text, documents, objects, and manipulables (for example, learning objects which can be electronically altered as faculty or students operate with/on them [see, for instance, the learning objects within the Multimedia Educational Resource for Learning and Teaching Online—MERLOT—website, www.merlot.org, one of the national digital science libraries funded by the National Science Foundation [NSF], and created and populated by thousands of individuals around the country and beyond now]). Merely discerning where interesting, useful and level-appropriate primary source material or learning objects might be is an overwhelming task for an instructor. Enter reference librarians, who can and will create thesauri, search data bases perhaps unknown to an instructor, and find appropriate materials, digitally archived source documents, and content from far distant libraries which can be marshaled for creative teaching and learning assignments. If "libraries are really all about access" and "the aim of the academic library is to make information available in support of scholarship—that is, research and teaching" (Greenstein, Tiedt, & Smith, 2007, p. B24), then librarians are the gateways. As the digital components of research libraries expand exponentially, busy faculty can lose track of new materials coming online, new content being leased or purchased, or other possibilities for teaching with high-quality content. Disciplinary librarians provide ongoing access, familiarizing scholars with new materials as they arrive and are catalogued. Much of the laborious searching for new materials (some faculty call it "scrounging") is disappearing, with the access specialists just down the hall.

Libraries and librarians alike also help to design, or create themselves, laboratory and mathematical simulations for teaching purposes. Working with content specialists and specialized faculty who are conversant with imaging technologies, librarians are collaborating with faculty to create both in-class and out-of-class

experiments which do not involve the "tangibility and messiness of the real-world laboratory" (Bement, 2007, p. B5), but which seem to hold every promise to provide students with additional experience with scientific concepts without the necessity of scheduling busy laboratories each and every time. Bement (2007) proposes that such simulations "offer additional modes of interaction among people, information and facilities," an advantage when people are collaborating across the country, or internationally (p. B5). Researchers have used such simulations as long as they have been possible when conducting collaborative multi-national research. Now, the possibilities for teaching are emerging rapidly.

Another critical task which libraries and librarians now assume is a weekly or monthly teaching or research "interest search" for researchers and teachers. One major research library on the east coast of the U.S. works with researchers and teachers to identify their specific interests and desires for teaching and research materials, then delivers a bibliographic list every week to the faculty member's computer, with a listing of the newest journal articles, books, and online, digitized materials which became available during the past week. While it may be the case that browsing in the open stacks could create mental linkages that faculty or graduate students might not otherwise make, nevertheless, the new search and access services being provided by libraries to faculty are extremely efficient and highly targeted to the researcher's main interests. For faculty who are regularly responding to requests for proposals (RFPs), preparing external grants and contracts proposals, or searching for new material and content for teaching purposes, such services are invaluable. Coupled with the ability to download such materials instantly to personal and workspace computers, this facilitates proposal preparation as well as high-quality teaching and learning assignments for students. Literature reviews, too, are required for both funding proposals and most research papers and journal articles, and now are less labor intensive and more highly focused, since they are user-centered, rather than data-centered. The "really rich personalization engine" which is the "dream" of librarians, teachers and researchers alike is now becoming a reality on campuses (Greenstein et al., 2007, p. B25).

In addition to having faculty instantly connected to high-quality digital content, students can likewise be connected handily and readily to such material, out of class, or in class, for teaching purposes. The wireless classroom permits students to access materials and content from their own laptops, work with faculty, independently, or with groups to assess, analyze and question documents and other digitally archived material, to engage in simulations, to review what was carried out in a laboratory or engineering workshop, or to practice working from a bank of problems called up according to the student's own diagnosis of what her learning needs are.

New Metrics for Evaluating Libraries

Libraries are in the business of providing *services* and *access*, access sometimes determined by the level and sophistication of the services. Although deeply intertwined, service and access refer to different aspects of libraries. Service refers to

the kinds of help, usually via contact with a reference librarian, which are delivered, and the manner in which they are delivered (availability of staff, references services, availability of extended hours of use, user perceptions of helpfulness of service rendered, usability of equipment, and other dimensions of consumer satisfaction). Access, on the other hand, refers to the collection, to preservation, to the availability of digital resources and how easy they might be to navigate, or to download to one's personal computer, to the interoperability of various databases (Borgman, 2000), to the ease with which inter-library loans are effected, and the like.

In the near past, when libraries were evaluated, the major criteria were the size of holdings and annual expenditures on new acquisitions. New criteria, reflecting redefined core functions and shifts in the nature of holdings, are emerging in light of the transition from more traditional print-base collections to digitized collections, and from personal, face-to-face services to online services (Hisle, 2005).

Access, at present, may include not only the holdings of a given library, but those materials, text-based and digital, available from members of any consortia to which the library belongs, or materials which may be leased from another collection on a fairly regular basis. De Stefano and Walters (2007), however, posit that there is a rather low level of collaboration between institutions that are Association of Research Libraries (ARL) members in the arenas of archival collections, and in their departments of archival resources and preservation, for which the ARL libraries form the most significant repositories in the U.S. An important criterion for evaluating research libraries emerging from shifts in how libraries are evaluated and the transitions libraries face is their special collections, especially significant archives and unique collections. Increasingly, research libraries are ranked according not only to their print-based and digital resources, but also according to their special collections and archival resources, which are frequently unparalleled in any other library's holdings (Carlson, 2005a; Torgovnick, 2008). Just how such materials are assessed, or how the calculus of their scholarly value (as well as their monetary value, perhaps) is derived is unclear. What is clear is that a natural disaster—e.g., Hurricane Katrina's effects on the libraries in New Orleans, or the flood in Venice over 40 years ago—can wipe out a significant portion of cultural history literally overnight.

With the advent of the digital age, it is also clear that all manner of archives are being created, as well as preserved. How libraries make a choice between what they will maintain, and what they will not maintain, or cannot maintain, is undecided; but much of the material which is being generated (blogs, online encyclopedias, video clips, political newsletters [e.g., MoveOn.org], cultural commentary of the sort embedded in YouTube, and the like) records a cultural studies perspective on the late twentieth and early twenty-first century which will ultimately be critical to political and cultural historians (*Chronicle of Higher Education,* 2005, p. A25). Although there are those—librarians and patrons alike—who feel that "popular items aren't scholarly" (*Chronicle*, 2005, p. A25), some librarians recognize that such archives are those to which historians may return decades from now. It is also the case that such items are difficult to catalogue, since much of what is collected as a part of a set of archives may not be dated.

Thus, special collections of many sorts are being archived and preserved by librarians with special interests in social and political culture. Consequently, one metric for evaluating research libraries may well be the particular collections or archives they are currently assembling. Such archives or collections may be regional, they may reference a particular subculture (e.g., surfing, the Daughters of the American Revolution, quilters and antique quilts, military memorabilia from the Civil War, comic book collectors, cowboys and the old West, and the like), or they may represent significant cultural movements in the U.S. (e.g., Beatniks, Viet Nam-era protesters, the fight for civil rights for African Americans, rock and roll history, or the Grange movement). Whatever such archives represent, they are believed to be a significant source of one slice of American history, and librarians who set about assembling such materials are not only preserving one part of the U.S. cultural heritage, they are in the process of creating significant "rare collections" which are neither duplicated nor duplicable anywhere else, and which therefore assure their libraries of important roles for historians, political scientists, women's studies researchers, and cultural studies scholars, among others (but also see Committee on Intellectual Property Rights and the Emerging Information Infrastructure, 2000, for a discussion of problems with intellectual property rights and therefore, problems with such collections). Indeed, Nicholas Burckel, dean of libraries at Marquette University, comments that "The issue will be not how many volumes you have in the library. . . but what you have that contributes to a *national documentation strategy*" (Carlson, 2005c, pp. A23–24, emphases added).

Another critical metric is shifting notions of *library services* (Cook, 2001). In an era of tight budgets and a focus on the student-as-consumer, libraries need to demonstrate rather continually that they are providing a critical service on campus, and that major consumers of library services—undergraduates, graduate students, and faculty scholars and teachers—are satisfied with the services which are offered, and with their encounters with librarians (whatever their requests might be), as well as being comfortable with the "library as place."

For many years, each library designed their own evaluations, depending on what local librarians determined to be their own campus's needs. But a grant from the Fund for the Improvement of Postsecondary Education (FIPSE) provided the opportunity for a team of researchers to interview extensively and "ground" (i.e., create from real-time stakeholder data) an extensive set of survey questions which could be used to evaluate a library's service to patrons (Heath et al., 2000). The interview data, collected from various locations in the U.S. and Canada, were content analyzed and sorted into thematic categories. Those categories were then matched against the ServQUAL™ instrument, a survey designed to measure customers' perceptions of service quality (Berry, 1995; Parasuraman, Berry, & Zeithaml, 1988; 1991; 1993), and a survey paralleling ServQUAL™ was constructed utilizing the categories of interest to research and academic librarians. LibQUAL™ (Heath, Cook, Lincoln, Thompson, & Kyrillidou, 2000) contains a bank of nearly 100 items from which individual libraries may choose the items of interest to their specific locale, and it is both Web-administered and Web-analyzed, utilizing the ATLAS-ti™ qualitative data management system, which is capable of managing both qualitative and

quantitative data sets and arraying them side by side. LibQUAL^{TM} is administered for free to any library in the world which requests it, and a full set of analyses are provided to the requesting library. The program has been used throughout Europe, Saudi Arabia, Southeast Asia, India, South Africa, and the U.S. Originally designed primarily for research libraries, it has apparently proven itself useful to 4-year institutions, regional state institutions and community colleges alike. At present, the data banks hold over 100,000 responses from faculty, undergraduates and graduate students, rating the variety of services and the facilities of libraries over 50 countries. Librarians at a variety of institutions utilize the survey to determine where to continue services highly valued, and where to improve services their patrons feel need buttressing.

Coincidentally, there is a parallel effort underway with the National Science Digital Libraries, funded and sponsored by the National Science Foundation (Marlino, Sumner, Fulker, Manduca, & Mogle, 2001). Evaluation surveys have been created for, and are now embedded in, four of the ten digital libraries which NSF sponsors (Kyrillidou et al., 2007; Kyrillidou, Cook, & Lincoln, 2008). The digital library service assessment instrument, DigiQUAL^{TM}, is now being utilized to assess how users view the navigability, the interoperability, and user ease, and the content usefulness of the materials available on DLESE (the Digital Library for Earth System Education), MERLOT, The Math Forum and several other NSF digital library sites.

Consequently, there is now a quasi-common set of issues which libraries may address, and responses may be garnered from every group of major academic and research library stakeholders. The fact that the survey is grounded and constantly re-validated, and that librarians may compare their results to those of other similar institutions creates strong comparison data that enable libraries and librarians to argue for continued support on their campuses as a part of the critical services that must be provided to users.

It is not enough, of course, for chief academic officers and other superordinate administrators to be fans of their research libraries. Services, access, information resources, preservation and conservation efforts, digitizing fragile materials, and collection development all cost money—millions and even billions of aggregated dollars across research libraries. The economics of supporting libraries is least well understood across institutions of higher education, and perhaps one of the most critical issues for all research libraries.

The Economics of Collections

> We want to save money because our faculty members are constantly asking us for more content. If we are efficient in the way we manage our collections, we can acquire and deliver more content. Save money, buy more stuff, save money, buy more stuff, save money, license more stuff—it is very simple (Greenstein et al., 2007, p. B24).

Libraries are expensive. Any individual who sits on a budget committee, who is a central level administrator, or who is affiliated with a research library understands

that extensive content costs, whether purchased or leased. Research libraries are now seeking ways to save money (especially as state-level funding for higher education decreases across the country), since they find themselves in competition with the colleges on their campuses which are delivering teaching and engaging in research. Just as libraries cost money to staff, collect and operate, the same is true of academic departments, which remain in stiff competition for the most prestigious faculty and which wish to remain competitive in the national rankings. Thus, libraries must compete with other critical expenditures on campus, e.g., for faculty, for start-ups, for laboratories, for equipment, and for administering complex research and teaching apparatuses on campus. Libraries have found multiple ways to save dollars, and are exploring others, in the race to collect high-quality content in the service of teaching and research. But one librarian anxiously writes

> . . . I do have some concerns. I worry about the economics of scholarly communication—the combination of plummeting library budgets and skyrocketing journal and database prices. I fear that leasing digital collections of material, rather than owning them, will leave librarians dependent on the long-term benevolence of corporations. I worry that the so-called graying of the profession isn't actually opening up new jobs, but is creating empty positions in libraries with tight budgets looking for ways to cut back (Breakstone, 2005, p. B20).

These concerns, and more, occupy librarians increasingly, especially in the wake of what appears to be a long-term recession from which North America, and particularly the U.S., may recover only slowly. Some figures may help to make this clear (See Table 1).

As the reader can see, the total holdings in 2004 and 2006 represent a powerful cultural heritage shelved and digitally stored at the nation's 255 doctoral degree-granting research extensive universities. While holdings are not evenly distributed by any means, the holdings at the beginning of fiscal year 2004, when coupled with the additions by the end of the fiscal year, average to roughly 5,419,356 volumes or other resources, including digital resources, per institution. In 2004, the average expenditure per library for information resources alone averaged $5,289,625.04 per institution, and for hardware, software, and other equipment, the average per institution equaled $1,666,342.37.

The figures for 2006 demonstrate clearly what librarians are talking about when they reference skyrocketing costs, and pinched budgets, coupled with shrinking numbers of staff and professional librarianship lines. (The figures for 2008 are not yet available from NCES, and if the timing is any indication, will not be available in their entirety until 2010). The percentage increase of volumes, serials, and the like rose 5–11% from the beginning to the end of the two fiscal years, while expenditures for information resources available for purchase or lease, and acquired, rose 10%. Expenditures for equipment, however, including computers, hardware, software, and operating expenditures, rose 14%, outstripping acquisitions of either text or digital form. At the same time, all expenditures for the same libraries rose less than $300,000,000, or roughly, 9%, and salaries of library employees dropped from

45.8 to 45%, a figure which represents either the youth of a new crop of librarians (clearly at the bottom of the salary scale), or the practice now being employed at many public institutions of simply not replacing retiring faculty and librarians as swiftly as might have been the case a few years ago (if they are replaced at all). A drop, however, in 4.2% of library staff can mean slower response times, less reference desk help for patrons needing assistance, or fewer services being delivered.

Equally clearly, a drop in the number of acquisitions can mean more efficient consortial arrangements, where nearby libraries collaborate on what they might purchase and depend on each other to supply faculty and student needs (Carlson, 2003). But it might also mean, where no such arrangements exist, somewhat longer waits for inter-library loans, or for materials from databases which a given library does not own or lease. The figures are not heartening, especially considering the heavy reliance on information literacy services libraries are now committed to providing.

Table 1 A comparison of expenditure levels at Public Research Extensive Universities, 2004 and 2006[1]

Public Research Universities, Carnegie Classification as "research extensive" $N = 255$	Expenditures, all classes, 2004	Expenditures or resources, all classes, 2006	Percentage increase (%)
Number of volumes, units, and subscriptions held at the end of the fiscal year[2]	1,348,145,621 units	1,409,819,477	5
Number of volumes, units and subscriptions added at the end of the fiscal year	33,790,263 units added	37,466,852 units added	11
Expenditures for information resources at academic libraries	$1,348,854,385.	$1,482,440,591.	10
Expenditures for equipment and other selected expenditures[3]	$424,917,305	$486,524,172	14
Expenditures at academic libraries and salaries as a percentage of total expenditures	$3,276,896,195/1, 502124,505/45.8%	$3,559,747,403/$1, 600,782,640/45%	−4.2

Source: Column 2, from Holton et al. (2006), pooled figures. Column 3, from Holton, Hardesty, and O'Shea (2008), pooled figures.

[1]NCES utilizes the 2000 Carnegie Classification system, and those are the figures I am reporting here.

[2]Holdings includes: books, serial backfiles, and other paper materials, including government documents; e-books; microform units; current serial subscriptions; audiovisual materials; electronic reference sources and aggregation services, which "include citation indexes and abstracts; full-text reference sources. . .; full-text journal and periodical article collection services. . . dissertation and conference proceedings databases" (Holton, Vaden, & O'Shea, 2006, p. 7).

[3]Includes computer hardware and software; bibliographic utilities, networks, consortia; and other operating expenditures.

Space

First and foremost, libraries occupy, generally, space in the most central parts of campuses. This means they are "also expensive real estate" (Greenstein et al., 2007, p. B24). In some instances, there is little room for expansion. If collections require more space, space is frequently "purchased" via disciplinary libraries, which are constructed away from the site of the main library. Space for collections, even as digital materials slowly outgrow book and journal hardcopy editions, grows increasingly scarce, and is likely to do so more and more rapidly, as information expands, and as metadata are created in order to access this information and turn it into usable, accessible knowledge.

One means for creating or preserving collection space is shared storage spaces, or off-campus repositories. When books are needed, but used only rarely, increasingly research libraries are storing those books off-site. These repositories also hold older print copies of journals (even when, occasionally, the online digital versions exist), and some pieces of unique collections (artwork, statuary, decorative objects, older film libraries, and the like). The delay in accessing such materials, when they are needed, is frequently only 24 hours, and research libraries have discovered that they can maintain some balance in space utilization by moving print resources, in particular, off campus.

In some instances, universities are seeking shared resources. The University of California's 10 campuses are now engaged in resource sharing—again, the delay for a book from another library is only 24–36 hours—in order to avoid the kind of duplication which mandates high dollar expenditures (Carlson, 2003). Texas A&M University and the University of Texas-Austin are considering a shared storage facility, and likewise, some sharing of resources, in effect creating a single, enormous research library for the two flagship campuses. Large central libraries and disciplinary libraries will still exist on both campuses, but collaboration in acquiring resources will make economies possible for both campuses, thus affording each the needed space on their respective campuses, and the opportunity to both save more money and acquire additional content (Mangan, 2005). Clearly, such an arrangement requires close cooperation between campuses, but such arrangements—as well as consortial and cooperative agreements between multiple campuses, where they are closely situated—make achievement of fiscal economies possible and fruitful. It is likely that over the coming decade, new and even more imaginative agreements between institutions will be created, especially since sharing digitally has become commonplace.

Creating New Workspaces

`Research libraries have another problem of money, space and economics. Many of them, responding to emerging teaching styles and collaborative work arrangements across disciplines are busily creating adapted and adaptive work spaces where group work, laptop work and technology services are readily available and possible

(Carlson, 2005b; Mangan, 2005). Columbia University just completed such an adaptation, and the University of Texas-Austin pioneered such a move in Texas. Other major research libraries have rapidly followed suit. Books have been moved to the storage spaces mentioned above, or distributed to disciplinary libraries around campuses. The creation of these "information commons" has facilitated different types of learning, and more flexible work spaces for teams of researchers and teachers. Librarians are frequently referring to their libraries as the "'great intellectual and cultural center' of the academic community" (Carlson, 2005b, p. B3). Carlson writes that

> Librarians sometimes call the library a "third place," a reference to a theme in Ray Oldenburg's book *The Great Good Place.* Mr. Oldenburg, a professor emeritus of sociology at the University of West Florida, lamented in his book that good public places are disappearing in America. Society, he says, desperately needs third places—places that are neither home (the first place) or work (the second), but spaces that allow people from different parts of a community to come together and engage one another (p. B3).

This sentiment echoes the earlier work of Russell Jacoby (1987), who lamented the loss of public intellectuals in American life, and accorded one reason for this loss to the loss of cheap urban housing, which attracted writers, artists, and social commentators, who then gathered in the "third places" readily available in an urban environment: cafes, bars, inexpensive restaurants, bookstores, coffee shops, and other gathering places that are the accoutrements of a dense urban life, of urban "place" in every Westernized country.

With technology support frequently available 24/7 in the larger libraries, students now prepare multimedia presentations rather than oral reports, and have become more adroit with various presentational software (PowerPoint, Moodle) than their own instructors might have been a few short years ago. Clearly, such technology and technological support costs money, but many of those in dean's and director's positions believe the costs are well worth it, since they "believe we're at the beginning of a second truly epochal change" (Mangan, 2005, p. A28).

Acquiring and Digitizing Unique Collections

Quietly, deans and directors of the major research libraries in North America speak of their new roles as development officer. Development officer roles are one step removed from direct collections development, which refers to the acquisition, cataloguing and provision of access to new content. The "development" to which they refer is their new roles in seeking donations to support acquiring specialized collections, authors' papers, and other unique and one-of-a-kind materials (Byrne, 2007). In some instances, deans and directors seek donations of the collections themselves; in other instances, private collections of papers go on sale, and library directors search for donors who might be willing to pay for these important collections held by private individuals. Thomas Staley, director of the Ransom Humanities Research

Center at the University of Texas, says about this special kind of development effort at the major research universities:

> When I came here almost 20 years ago, no one said anything about fund raising. Nothing. And I looked at where we were, and these great funds weren't coming. And I thought that if you're going to really continue the impact of this institution and its place in the world of manuscripts and rare books, you're going to need funds. So I formed an advisory council, and we gradually built up a group that was willing to help support us—a network... So we started our first campaign, and that how I realized that there was a lot here that people wanted to buy into. That it had a history... (Byrne, 2007, p. A11).

Clearly, this kind of development work was not the kind of work for which most librarians were prepared in their schools of library and information sciences, but those who wish to move into library administration are finding that it is necessary in order to acquire first-rate materials. And those materials might include not only manuscripts, papers, rough drafts, correspondence, diaries and other personal materials, but also official papers (Spanish land grant deeds from the period when Spain controlled Texas, for example), costumes, scripts, musical scores, memorabilia and "other assorted materials" (Byrne, 2007, p. A10).

Such careful collection and archive building costs money. A recent set of papers acquired from a private collector in Mexico City which might buttress the Texas-Mexico-NAFTA nexus, and strengthen the already substantial holdings around Texas history for an institution, cost a million dollars (Cook, personal communication, 2004). The dean responsible for acquiring this private collection of important historical papers from the reigns of both Spain and France in Mexico courted donors, marketed the critical connection between this collection and extant holdings, and found the money, all without having to go to any university, state or foundation funds. Thus, building, archiving and creating access to specialized resources is a costly process, one which librarians engaged in rarely, if at all, a generation ago.

A second cost embedded in the creation and maintenance of such collections is the cost of digitizing those papers. While Google estimates that it can digitize an out-of-print book for roughly $30, handling old, fragile papers in the digitizing process is rather more expensive and time-consuming, as the possibility of damage is greater (Herring, 2005; see also Young, 2005, for a discussion of what some of the issues might be with Google's project). Thus, creating access to such collections is more expensive, even prior to creating the metadata which permits online access (McCray & Gallagher, 2001).

Closely related to those kinds of costs are the costs of conservation and preservation of old and fragile documents, texts, books, illuminated manuscripts, and other aging materials. The technologies for conservation and preservation are improving every year, but the costs are also rising, simply because the issues are not merely the preservation and conservation issues, but all of the "attendant technical, managerial and policy issues" that go with caring for older resources (Cloonan & Harvey, 2007, p. 3). Cloonan and Harvey (2007) outline some of this related complexity by observing that there are really two issues:

> ... the need to *preserve* and the theoretical issues concerning preservation—what to save, how to save it, and how such decisions are made [the policy issues]... preservation is now

> equated with history and memory, thus cultural heritage preservation is currently a subject of considerable interest to a wide range of stakeholders. . .. Some of these issues emerge from the attempt to define from varying perspectives the concepts of cultural property ownership that were developed in colonial times; from the expropriation of cultural heritage for political and ideological aims; from changing understandings about intellectual property rights in an increasingly globalized environment; and from the changing techniques now available to cultural heritage preservation, most notably the impacts of digital culture (pp. 2–3).

The issues no longer revolve solely around technical aspects of preservation, but are now equally involved with legal issues of intellectual property (Committee on Intellectual Property and the Emerging Information Infrastructures, 2000) and cultural heritage (see, for instance, Coombe, 1998; Marcus, 1999; McLeod, 2007; and Zerner, 2003, for extended treatments of cultural heritage and intellectual property rights, especially for indigenous peoples), geopolitical concerns regarding preservation of ancient artifacts, sites, earthworks, and built contexts, and the strains of conflicting stakeholders' interests. The managerial and policy aspects now extend librarians into legal spheres where they rarely ventured a generation ago. Developing legal cases regarding intellectual property ownership, famous and quite public court cases around ownership of papers (e.g., the recent battle over the papers of Jacques Derrida between the University of California-Irvine and Derrida's family [see Bartlett, 2007]), federal court proceedings surrounding the return of native American bones, legal challenges surrounding the use of tribal symbols for place and site markers and marketing, and other issues make cultural and historic preservation—even if one is not an archaeologist, but rather a librarian—a potentially fractious field. Thus, the technical side of preservation is now equally balanced with the policy side of preservation, extending the care with which materials must be handled and the determination of ownership to other more complex and perplexing questions. Further, the costs of such preservation for research libraries is only likely to go up, creating not merely a cost for these libraries, but a larger social cost for cultural heritage preservation.

The Creation and Expansion of Digital Libraries and Archives

Marianna Torgovnik (2008), director of the Duke [University] in New York arts-and-media program, and a frequent commentator on cultural studies matters in the U.S., asks: "As libraries jettison newspapers, magazines and journals, and as more publishers request less documentation or banish it to the Internet, are we in danger of losing our past?" (p. B15). The "past" to which she refers, of course, is not "past" at all, but rather yesterday, last week, last year—a very contemporary history. As rapid digitization of everyday life occurs, how do we decide how to save it, what to save, how to record it, the merit of saving cultural artifacts (especially as we do not know what we will want to know about ourselves or our actual past), what, among the things that we are keeping records of, will connect to some critical future event and therefore will be worth excavating? Torgovnik (2008) observes that

> archives offer less permanence and certainty than we commonly think. They don't represent the truth in a full, direct, or unmediated way; they don't guarantee immortality or memory. Although archives are repositories for facts, they depend on living beings to animate them, and so mistakes, alterations, and distortions come with the territory (p. B15).

Derrida was quite right to worry about his archives, if not his place in the pantheon of literary and sociological theorists (Bartlett, 2007).

Digital libraries come in several forms (Arms, 2000). Increasingly, what we are seeing is a set of "conversion projects in which analog objects are converted to digital form" (McCray & Gallagher, 2001)—the situation where older volumes of journals are now translated into digital form, or in which books or portions of books, particularly those now out of print, are created in digital format (essentially, what Google is attempting to do in working with five major libraries, four in the U.S. and one in England). A second type of digital library embodies materials which "have always been in digital form ('born digitally')," and a third, termed "mixed"—where "the objects may be of both types"— which resembles the library most of us know well from our own campuses (p. 49; see also Arms, 2000; Kenney & Rieger, 2000).

Most of us do not think much, if at all, about preserving the digital records we have created, or which have been created for us. Among librarians, however, there are horror stories of data bases preserved on platforms now no longer in use, and where the technology has moved such distance that machines that can read these data now no longer function or even exist. When we consider saving our cultural and historical record in digital form, what kinds of plans have we made for accessing the information stores when the rapidly evolving technological landscape may make such data inaccessible within a few short years? The Research Libraries Group (1996) warns that "technological obsolescence represents a far greater threat to information in digital form than the inherent physical fragility of many digital media" (p. 12). At present, librarians rely on "refreshing" digitally-stored information, but encoding digital content from one format to a newer one is a risky and problematic operation, since moving from one set of software and hardware does not guarantee interoperability between platforms, or compatibility of present and future software and hardware. Librarians initially spoke of "converting" digital data; now the terminology is "migration"—data need to be able to "migrate" across platforms, even when technology has outstripped the original hardware and software on which they were originally preserved (Research Libraries Group, 1996). Hence, Torgovnik's "file under fleeting" warning.

A second issue which arises surrounds the assignment of metadata (Krafft, 2002). If the object is a book, the descriptors may be readily understood by information science librarians, including indexers, cataloguers and archivists. These are the individuals most accustomed to assigning descriptions of "the content of an item. . . title, creator, date of publication and subjects discussed" as well as ". . . scan status, quality-control status, and internal notes, as well as. . . file format and size" (McCray & Gallagher, 2001, p. 50). Other kinds of objects—such as the unique collections of non-text, non-video, non-audio objects that libraries own (e.g., paintings, miniatures, decorative objects, the antique samurai swords that several libraries own, and the like) may require different kinds of metadata if they are to be utilized well by scholars interested in those unique collections.

Research: The Connections across Time and Space

That in which most of the readers of this volume are passionately interested is the role of their own libraries in the research enterprise. Whether completing a thorough literature review for a journal article, preparing a literature review for a grant or contract proposal, or searching for the right material for a class lecture, assignment, or other useful content, the library is first and foremost, for most of us, an access point. Whether we trek to the actual library itself, consult the disciplinary reference librarian who might be down the hall in our own departments, or sign online to enter the electronic catalogue to deploy various search engines and directories, the library represents access to content necessitated by both our research and our teaching. And in most instances, we are able to locate what we need, either on our own, scrutinizing the Web with various search engines, or with the help of a reference librarian. Many of the most powerful search engines are available to us, and while we may have our favorites, we can scour Lycos, Google Scholar, LookSmart, Ask Jeeves, and other directories until we locate what we need, especially as we work alongside the online catalogs in our own institutions.

There are, however, other sources which we might find equally or more helpful, if we knew where to look. Sherman and Price (2003) call this content "the Invisible Web." They say, of the Invisible Web, that it

> consists of content that's been excluded from general-purpose search engines and Web directories. . .. There's nothing inherently "invisible" about this content. But since the content is not easily located with the information-seeking tools used by most Web users, it's effectively invisible because it's so difficult to find unless you know exactly where to look. . .. [There are] four different "types" of invisibility, ranging from the "opaque" Web which is relatively accessible to the searcher, to the truly invisible Web, which requires specialized finding aids to access effectively (p. 282).

The importance of the invisible Web is that the individuals who access this part of the Web most effectively are reference librarians (Borgman, 2003). Of all the arcane knowledge residing in research libraries, perhaps none is more useful than the professionals who know about those "specialized finding aids" to enable researchers to locate materials which are not indexed on the Web. Sherman and Price (2003) make the point that some of this content could be added to the indices of various search engines, but that the content "is hidden *because search engines have deliberately chosen to exclude some types of Web content*" which are nevertheless "first-rate content sources" (p. 283, emphases in the original). When a researcher does not know that certain content has been "locked out", then it is unlikely that she will go searching for it. And yet this invisible content, frequently accessible to the librarian who knows these finding aids well, can seek and locate such content, extending the intellectual range of material available to researchers, of which researchers might never have been aware.

The central point is that unless directed to this "deep Web" or "dark matter", researchers might miss "high-quality authoritative information" crucial to some aspect of his or her research. In grant and contract work, this might cost a researcher a multi-million dollar research contract. Thus, the reference librarian who is the tour guide into the searches which can uncover this material is worth his or her

weight in gold. Yet, many faculty deeply involved in research do not know of these non-popular "finding aids", and consequently, miss critical and high-quality content. Failing to ask a reference librarian after one has completed one's own searches may lead researchers to conclude that the search has located all relevant content, when in fact, more and better content awaits, if only the researcher knew how to look for it, or knew about the specialized tools librarians utilize for locating non-indexed material. The new generation librarian is a specialist in locating digital information, and can provide access in ways which most faculty have only dreamt of.

Libraries in the Twenty-First Century

Wendy Lougee (2002) speaks of the research libraries of the twenty-first century as "diffuse libraries," by which she means libraries will utilize "distributed models for information access and management," a model which is open, collaborative, non-hierarchical, and in which information and resources become available throughout an open system. The open access movement is a part of this model, and speaks to the collaborative generation of new and synthesized knowledge (Smith & Casserly, 2006). But such diffuse systems are also, as this chapter argued earlier, engaged not only in collecting knowledge, but also in generating and disseminating it.

Libraries and librarians will be engaged in creating collaborations between and among researchers, in part because of their ability to search out the invisible Web and use "dark matter" to suggest related areas of research and findings, and as well, creating collaborations between other collections and other institutions, making information resources available through a variety of contractual, legal, or consortial agreements and memoranda of understandings—a process called *federation.* For scholars and teachers, this work by librarians will accrue saved time, money and travel to acquire resources, as they can become available through one's own institutional collection arrangements with other sources and providers. These libraries will also develop resources around "information communities" (National Enquiry into Scholarly Communication, 1979)—groups of individuals, including scholars, teachers, research specialists, librarians and other interested stakeholders—which have common interests (most often, teaching and research), to create thematic information resources related to some interest of the group, and including not only text-based resources, but also other digital content, such as video, film, photographic archives, images and other material difficult to access on the Web. The possibilities for such inter-institutional collaborations are without (theoretical) limit, and one can imagine, within a few short years, some thousands of these information communities coming into being, midwifed by reference librarians acting themselves as collaboratives to locate and define content.

When James Fallows (2006) talks about how the Web and its potential have "fitt[ed] its users with mental eyeglasses—and [let] them see new vistas of knowledge in the process" (p. 146), he is talking about what an individual can do with the Internet and its power. The addition of a new generation reference librarian,

with specialized search and "finding aids" makes such discovery not geometric, but rather logarithmic.

Notes

1. Petabytes are equivalent to 1,000,000,000,000,000 bytes of data.
2. I continue to refer to North America, simply because several of these enormous research libraries engaged in collecting, referencing, archiving, digitizing and collection development, as well as information systemization, retrieval and knowledge generation, are in fact in Canada as well. The University of Toronto's library is one of the premier research libraries in North America, for example, and it engages in each and all of the new missions outlined in this chapter, as well as others at the cutting edge of information sciences. Its current dean and director is an individual routinely nominated by her peers as a "visionary" of research and information and knowledge sciences. Thus, it is clear that the designations for research libraries extend well beyond the U.S., and permeate all of North America. The same may be said of many of the great European libraries—both those attached to universities and some which are national libraries. Their directors are in the forefront of discipline crossing, and operate well beyond degrees in library and information sciences; they are well informed about informatics, new findings in the neurosciences, and emerging technologies for organizing and sorting information.

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An Examination of Faculty Work: Conceptual and Theoretical Frameworks in the Literature

Vicki J. Rosser and Lynn N. Tabata

Faculty work has long been viewed as encompassing the academic triad of research, teaching, and service. Each component encompasses a plethora of activities which vary by and within similar institutional types and have positive or negative impact on faculty productivity and performance. All of these elements add to the complexity in conceptually or theoretically defining and measuring faculty work.

A review of the prevailing literature reveals various approaches by researchers to measure faculty work. These include: workload and productivity-related activities, conceptual or theoretical emphasis upon motivational or affective responses such as job satisfaction, institutional or organizational morale, and subsequently the intent to stay in or leave the position and/or academe. Furthermore, cultural and moreso technology issues within departments, colleges, and institutions continue to emerge as important themes influencing faculty work.

The purpose of this chapter is to examine the research conducted on faculty workload and productivity and to present the various conceptual and theoretical frameworks. Due to the varied and numerous conceptualizations, this literature review strives to draw on much of the previous empirical work within chapter limits.

Faculty Work: Teaching, Research, and Service

The activities that faculty members perform and the roles they assume in fulfilling their work-related responsibilities form a substantial amount of research. Seminal research conducted by Schuster and Finkelstein (2006), Blackburn and Lawrence (1995), Bowen and Schuster (1986), Blau (1994), Boyer (1990), Boyer, Altbach, and Whitlaw (1994), Clark (1987), Fairweather (1996, 2002), Gappa, Austin, and Trice (2007), and Park (1996) are often cited by researchers examining faculty work

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within the conceptual lenses of teaching, research and service. Moreover, other studies extend these frameworks by examining varying aspects of faculty members' work includes rewards and salary (Boyer, 1990; Hagedorn, 1996; Matier, 1990; McKeachie, 1979), professional priorities, personal and professional interests, and quality of life (Johnsrud, 1996; Johnsrud & Heck, 1998), professional growth and development (Gappa et al., 2007; Rice & Austin, 1988; Plater, 1995), work productivity (Mamiseishvili & Rosser, 2010a) and administrative support (Kerlin & Dunlap, 1993; Matier, 1990). Research on faculty work is further enriched by scholars examining the academic worklife experiences of women and ethnic minorities such as Antonio (2002), Aguirre (2000), Bronstein and Farnsworth (1998), England (1992), Finkelstein (1984), Gappa et al. (2007), Glazer-Raymo (1999), Johnson and Harvey (2002), Johnsrud and Sadao (1998), Menges and Exum (1983), Medina and Luna (2000), Park (1996), Perna (2001a, 2001b), Tack and Patitu (1992), Turner and Myers (2000), Turner (2002), and Valian (1999).

Teaching

Although teaching is a fundamental part of faculty work rarely are new faculty members hired at Doctoral/Research universities for their expertise in teaching, and fewer are formally trained to teach (Boice, 2000). Many new faculty members teach as they have been taught or would have liked to have been taught, or they teach the way they learn rather than how others may learn. While there are numerous aspects in which we can examine teaching (e.g., academic preparation, classroom practices, faculty-student interactions, teaching behaviors, institutional context), the fact remains that it is an important piece of the academic culture and reward structure within institutions of higher education. Common areas by which faculty members are assessed on their teaching often includes the number of hours per week faculty members spend on teaching and the amount of student contact hours they spend on the teaching and advising of their students within and outside of the formal classroom structure. However, the measurement and assessment of these areas continue to be problematic throughout academy. For example, Blackburn and Lawrence (1995) note that there are no clearly measurable products that result from teaching, and faculty cannot obtain consensus on what constitutes high-quality teaching. Fairweather (2002) found that neither prestige of the institution where the professor received the degree nor experience as a teaching assistant are significantly related to time spent on teaching. He contends that the congruency between organizational culture and the culture of orientation of the faculty member—the institutional fit–is related to commitment to teaching.

Teaching remains a "local" phenomenon; rarely does a faculty member's reputation extend beyond the immediate campus; seldom does teaching excellence bring national recognition (Blackburn & Lawrence, 1995). Park (1996) contends that the more closely teaching activities are related to research, the more highly teaching will be valued by tenure and promotion committees. For example, teaching graduate courses carries more status than teaching undergraduate courses. Also, not everyone

teaches the same number of courses or teaches the same number of students (Park, 1996). Thus, faculty members who teach core courses will serve many more students than those who teach specialty courses.

The advising and student committee work are areas that receive little attention across academe. More important, the specific measurement and assessment of these one-to-one sessions are very difficult to monitor and evaluate. As Kennedy (1997) notes, working with students is at the very core of the university mission as well as the faculty's academic duty. Research has shown that the more faculty members are engaged with students, the more satisfied they are with their work (Hagedorn, 1996; Johnsrud & Rosser, 2002; Rosser, 2004a, 2005).

As documented earlier, many of these teaching and advising duties have fallen and continue to fall disproportionately to women and ethnic minorities (e.g., Austin & Gamson, 1983; Johnsrud & Des Jarlais, 1994; Menges & Exum, 1983; Park, 1996; Rosser, 2005). For example, women spend more time preparing for courses and more time advising students than their male counterparts (Park, 1996). The time women and ethnic minorities allocate time to their teaching and advising activities can become an important barrier to their promotion and tenure, as well as to their professional socialization within the existing academic culture. However, the road to teaching is not typically the road to tenure (Boice, 2000; Menges & Exum, 1983).

Research shows that ethnic minority faculty are designated to advise ethnic minority students as well as others studying in similar fields. Furthermore, they are more likely to have their authority challenged by students and have heavier out-of-class instructional loads (Turner, 2002). Minority faculty, however, are more likely to value their students' emotional development and their out-of-class experience as part of their educational charge as teachers (Antonio, 2002).

Research and Scholarship

In Doctoral/Research-Extensive universities and increasingly 4-year colleges, research and publishing is rewarded more than teaching and has supplanted teaching as the principal faculty role (Blackburn & Lawrence, 1995; Rice, 1986). Engaging in research is a professional goal pursued by most faculty members due to its emphasis as an important criterion for promotion, tenure, and career success in 4-year colleges (Aguirre, 2000; Blackburn & Lawrence, 1995). This focus also underscores the tension between teaching and research as faculty who produce more research have less classroom contact, fewer hours preparing courses and consider teaching much less important than research (Fox, 1992). The actual and "preferred" distribution of faculty time suggests that faculty at research universities would like to engage in more research activities and shift some of their time from teaching to research (Finkelstein, Seal, & Schuster, 1998; Schuster & Finkelstein, 2006).

Research and scholarship exerts great influence on a faculty member's academic career (Fairweather, 1996; Blackburn & Lawrence, 1995; Park, 1996; Schuster & Finkelstein, 2006). Fairweather notes that research is valued by academic peers

through a peer-reviewed system of publishing and grants awarding and is an important aspect in the research-and-prestige model. Moreover, Blackburn and Lawrence (1995) note that in today's competitive academic environment a career depends upon becoming known for one's work. They go on to say that recognized scholars are individuals whose reputations transcend the local college or university. Park (1996) contends that research is decisive in two ways: first, research is necessary for successful promotion at Doctoral/Research universities (if a candidate's research is deemed inadequate, no amount of teaching or service will compensate for this dearth of activity); second, research may be sufficient for successful promotion (excellent research will counter-balance almost all other deficiencies in a faculty member's record) (p. 48). Park also notes that within the category of research, publishing is deemed a more noteworthy activity than presenting papers at conferences; publishing articles in scholarly journals is considered more important than publishing textbooks; and publishing purely theoretical articles often ranks above publishing articles that merely apply theory to a problem. Furthermore, research clearly promotes hierarchical relationships in academia (Bell, 1966; Jencks & Riesman, 1968; Clark, 1987). For example, the scholar's placement of their journal articles in highly respected and or top tiered publications adds to the perceived higher status of these scholars.

Women and ethnic minorities experience distinct challenges regarding their research and scholarship (Antonio, 2002; Park, 1996; Turner, 2002). Park notes that differences in research productivity can often be explained by women's structural position in the university: women carry heavier teaching loads, bear greater responsibility for undergraduate education, and have more service commitments than their male counterparts (p. 55).

Antonio (2002) found that ethnic minority faculty members are much more likely to place a high degree of personal importance on engaging in research activities, spend more time per week engaged in research and writing, and feel that the opportunity to pursue research was a very important consideration in choosing a career in academe than White faculty members. However, faculty of color can be differentiated from White faculty in terms of their stronger support for educational goals encompassing the affective, moral, and civic development of students, and in the more explicit connection they make between the work of their profession and service to society (p. 594). Further, Turner (2002) contends that ethnic minority faculty members are often psychologically divided between home and career, or between community and career, and frequently have to make sacrificial choices.

Service and Committee Work

"Service is the catchall name for everything that is neither teaching, research, nor scholarship" (Blackburn & Lawrence, 1995, p. 222), yet its importance in faculty work cannot be underestimated. Boice (2000) notes in order to fail in teaching and writing one has to prove oneself incompetent beyond doubt. To fail socially, one needs only the appearance of aloofness and uncooperativeness; however,

downplaying socialization and service activities only increases the risk of a poor start, which can lead, ultimately, to failure (p. 203).

More definitive explanations in the literature identify service as a commitment to the academy (Kennedy, 1997), that it ensures our public trust (Fairweather, 1996), or it can be examined as either internal or external to the institution (Bowen & Schuster, 1986; Boyer, 1990; Blackburn & Lawrence, 1995; Fairweather, 1996; Gappa et al., 2007; Kennedy, 1997). More commonly, service is most often referred to as unpaid committee work (as opposed to paid consulting) in the area most faculty members contribute their time and energy (Townsend & Rosser, 2007). Research shows that committee workload activities can be classified or defined in various ways. For example, internal committees (e.g., department, college or school, university, state university system) often include such activities as search committees, policy and curriculum committees, promotion and tenure committees, senate/council work, as well as guest speaking or teaching in other areas across the campus or state university system in their area of expertise (e.g., Blackburn & Lawrence, 1995; Bowen & Schuster, 1986; Boyer, 1990; Fairweather, 1996; Gappa et al., 2007; Park, 1996; Rosser, 2004a). Examples of external service activities entail working on committees or with organizations and/or professional academic associations outside the institutional structure in which faculty members work. These external commitments can include such areas as working with departments of education, contributing to state legislative policy work, holding a national office, or being a journal manuscript reviewer, to name a few possibilities (e.g., Blackburn & Lawrence, 1995; Bowen & Schuster, 1986; Boyer, 1990; Fairweather, 1996; Gappa et al., 2007; Park, 1996).

In addition to the variation of service and committee work activities, differences also occur in their interpretation among schools and colleges (e.g., Baldwin & Blackburn, 1981; Bowen & Schuster, 1986; Boyer, 1990; Blackburn & Lawrence, 1995; Fairweather, 1996; Clark, 1987; Kennedy, 1997; Schuster & Finkelstein, 2006). Such variation presents a cautionary tale for faculty members to have a clear understanding of what type and level of committee work fulfills promotion and tenure expectations within their college, university, professional field or academic discipline (Rosser, 2003, 2004a). In meeting service and committee work expectations, issues such as stature and elitism emerge due to the perceived "value" associated with participating on certain committees (Park, 1996; Blackburn & Lawrence, 1995). For example, Park (1996) argues that while service carries little weight in faculty evaluations, certain types of service, such as being an officer or chair of a national professional organization, imparts greater status and currency. She also suggests that there is an implied rank order valuation to consider when taking on service commitments: (1) professional service, (2) university service, then (3) community service. Similarly, committees in which faculty members are elected (e.g., faculty senates/councils) or play an important part in high-stakes decision making (e.g., policy or finance committees) are considered as more respected or valued in some fields or disciplines (Blackburn & Lawrence, 1995).

Committee work is perceived as an important element in facilitating academic governance, however, the work tends to be cautiously accepted or even skeptically

viewed by many faculty members in research universities (e.g., Boice, 2000; Kennedy, 1997; Park, 1996). While some faculty members are willing citizens and servants to the academy, others dismiss the work as nonessential yet they still serve, while others just consider it a waste of time and won't participate (e.g., Kennedy, 1997; Park, 1996). One commonly held perspective on committee work is that unlike the other two areas of the academic triad, it can quickly drain faculty members' time and commitment toward their research productivity (Rosser, 2004b). Furthermore, service and committee work is often the single most important barrier to the promotion and retention of faculty members (Boice, 2000). While service performance is perceived as an important component in promotion and tenure review it often goes unrewarded or acknowledged in Doctoral/Research universities (Chait, 2002; Fairweather, 1996; Gappa et al., 2007).

Research shows that service activities differ along gender and ethnic lines (Aguirre, 2000; Park 1996; Schiele, 1992). Aguirre found that service and committee work often played a role in promotion and tenure for women and minority faculty. Park found that women engage in significantly more and different types of service activities than males. Moreover, Park notes, women are often "given" or have more opportunities for serving student groups and community organizations, and are more likely to be approached by students with personal and academic concerns. A common misnomer, however, is that they are thought "to enjoy" and excel in the maintenance of chores that governance involves. In comparison to men, women devote a much higher percentage of their time to teaching and service activities (Park, 1996). In the case of ethnicities, the under-representation of ethnic minority faculty members causes over-loading of service-related activities (Wyche & Graves, 1992). Despite such obstacles, ethnic minorities are also likely to pledge the professional and personal growth of providing services to their respective communities (Antonio, 2002).

Faculty Workload

Meyers' 1998 monograph, *Faculty Workload Studies: Perspectives, Needs, and Future Directions,* provides a comprehensive literature review and discussion of issues concerning college faculty workload and productivity. In defining faculty workload, Meyer notes that it is "commonly defined as time spent on professionally appropriate activities, although in other contexts, a faculty member would refer to 'workload' as duties assigned or completed" (p. 49). Moreover, Meyer identifies three measures that are usually used to assess faculty workload: (1) the total number of hours faculty work per week in the fulfillment of their current jobs; (2) the number of hours spent each week teaching or on instruction-related activities, and (3) the number of hours spent each week on research or other scholarly activities. Meyer notes several caveats about faculty workload studies: (1) different studies use different definitions for similar terms (teaching may mean only direct classroom instruction in one study but include several support activities in another, so

direct comparisons of results are not possible); and (2) studies use different methods of collecting data (i.e., self-reports, administrative database, sample of faculty, one-time data, longitudinal information).

Schuster and Finkelstein (2006) note the challenges and limitations in measuring academic work which defies clear boundaries and includes activities which go "beyond actual hours in the class, preparation for classes, or interaction with students face-to-face or via e-mail" (p. 78). Furthermore, while national faculty surveys provide information on how faculty spend their time (i.e., teaching research service, office hours, consulting, committee work, administrative responsibilities), the results are limited to: "crude self-reported estimates of weekly work hours at the institution (differentiated sometimes between paid and unpaid work), and the actual (and sometimes preferred) distribution of effort across the basic tasks and some crude indicators of performance, including interaction with students, engagement in research and publishing, and sometimes even concurrent employment outside the institution" (p. 78).

Despite the caveats noted by Schuster and Finkelstein in measuring faculty work, the resulting information is still useful in developing a profile of activities and time spent on those activities. For example, according to the 2004 National Study of Postsecondary Faculty (NSOPF: 04), full-time instructional faculty and staff, overall, reported working an average of 53 h each week at all jobs both within and outside the institution, and part-time faculty (i.e., those who worked part time at the sampled institution but could have other full- or part-time employment elsewhere) averaged 40 h per week; full-time faculty in 4-year institutions averaged 54 h and part-time faculty averaged 41 h per week. Principal activity of full-time instructional faculty and staff for all institutions: teaching (68%), research (12%), administration (11%), and other (9%). Average percentage of time spent on various activities at the institution (for all institutions): teaching activities (62%), research activities (18%), and administrative and other activities (20%). Moreover, full-time instructional faculty and staff who taught for-credit classes averaged 11 classroom hours per week in fall 2003, for a total of 308 weekly student contact hours. Full-time engineering and natural sciences faculty at 4-year institutions reported more refereed or juried publications in the past 2 years than those in other disciplines. Engineering and natural sciences faculty averaged 4 publications of this type compared with an average of 1–3 publications for faculty in other program areas (Cataldi, Fahimi, & Bradburn, 2005).

Further understanding of the impact of faculty workload is more readily apparent when examining activities over time. For example, Shuster and Finkelstein (2006) in tracking faculty work patterns across institutional types from 1972 to 1998 found that weekly hours worked by full-time faculty at their home institutions increased across all types of institutions but most dramatically at research institutions. In 1998, mean hours worked by faculty were 50.6 (research universities), 48.3 (other 4-year institutions), and 45.1 (2-year colleges). This compares to hours worked in 1972: 43.7 (research universities), 41.2 (other 4-year institutions), and 40.4 (2-year colleges). Moreover, the proportion of faculty working more than 50 h per week has doubled since 1972, rising from 23.2% in 1972 to nearly two-fifths by 1998 (p. 81).

Furthermore, the proportion of faculty spending more than 55 h a week on their institutional responsibilities has increased from 13.1 to 25.6%. In examining patterns by institutional type, results showed that faculty work intensity affected 4-year and most notably research institutions more than 2-year institutions. In controlling for demographics such as gender, race, age, academic field and career cohort, results show than mean weekly work hours are highest at research universities and lowest as 2-year colleges with hours highest for faculty in natural sciences and engineering.

Additional information concerning instructional activities and corresponding measurement is documented by the 1999 National Study of Postsecondary Faculty, Institution Survey (Berger, Kirshstein, & Rowe, 2001). Measurement units include credit hours, and evaluations by students, administrators, department chairs, and deans. Among the reported findings:

> Full-time faculty members were responsible for teaching most of the undergraduate credit hours. Based on percentages reported by individual institutions, full-time faculty covered an average of 71 percent of undergraduate credit hours at their institution, part-time faculty covered an average of 27 percent of all undergraduate credit hours, and teaching assistants and other instructional staff each covered an average of about 1 percent of all undergraduate credit hours. Public research institutions assigned more undergraduate credit hours to teaching assistants than any other institution (p. 9).
>
> Most institutions have policies for evaluating the quality of their faculty's instruction. Measures based on student inputs or results were used by most institutions, with 86 percent using at least one student-based measure to evaluate full-time faculty. Institutions most commonly employed student evaluations of instructional quality (85 percent). Most institutions also used administrative-level evaluations, with 95 percent using at least one administrative-level measure to evaluate full-time faculty; two of the most common administrative-level measures were department chair evaluations (83 percent) and dean evaluations (77 percent) (p. 10).

In another study, Link, Swan, and Bozeman (2008) examined scientists and engineers at major research universities to explore faculty allocation of time. Multivariate regression analysis results suggest: tenured faculty work less and allocate fewer hours to teaching, research, and grant writing but more hours to service; associate professors who have not been promoted to full professor spend more time teaching at the expense of research time; males are more research active and less involved in university service; women allocate more hours to university service and less time to research than males; whites devote more total hours to work than blacks but not as many hours as Asians; married faculty work fewer total hours, and they teach less, but the hours allocated to other activities are similar as non-married faculty; time allocation of faculty with children is nearly the same as faculty without children.

While measuring faculty workload helps to define the type, range, and time spent on specific professional activities examining how these activities translate into tangible results is achieved through the conceptual framework of faculty productivity.

Faculty Productivity

Faculty productivity "has traditionally been defined as 'research productivity,' or the number of publications produced in a year or a lifetime" (Meyer, 1998, pp. 57–58) with various studies focusing on publication activity (Bland, Center, Finstad, Risbey, & Staples, 2005; Christensen, Finger, & Latham, 2002; Dundar & Lewis, 1998; Sabrin, 2002; Smith et al., 1998, 2003; Hasselback & Reinsteing, 1995). Similarly, Massy and Wilger (1995) define productivity as the ratio of outputs to inputs, or benefits to costs. However, Middaugh (2001) notes that emphasizing outcomes like scholarly publications and presentations, as well as the number of hours worked, particularly in the classroom, may reflect misguided views of faculty productivity. He maintains that institutional or academic emphasis on the number of published articles in a given time period has little meaning for the general public and legislators, who do not understand the peer review processes. Faculty productivity, as Middaugh suggests, is more appropriately defined in terms of outcomes such as pass rates in certification exams and job placement of graduates. He does concede, however, that understanding what faculty members do, that is how they spend their time, is "the first step in defining faculty productivity" (p. 10).

Many studies have examined the role of research productivity relative to other workload factors such as a salary and teaching. Studies have shown that faculty who published more while teaching less received the highest salaries regardless of institutional type (Fairweather, 2005, 1997; Fox, 1992; Porter & Umbach, 2001; Bland et al., 2005; Townsend & Rosser, 2007). For example, Fairweather (2005) examined the disparity between salary, research productivity and teaching using two national datasets (1998–1999 National Survey of Postsecondary Faculty, 1992–1993 National Survey of Postsecondary Faculty). The results showed that in all institutions for both data sets, hours spent in the classroom per week were significantly and negatively related to pay in research, doctoral-granting and comprehensive colleges and universities. For liberal arts colleges, in the 1998–1999 dataset, hours spent in the classroom changed from a neutral to a negative factor in pay. In all types of institutions for both data sets, teaching only graduate students was positively related to pay while teaching only undergraduates was negatively related. For both data sets, total refereed publications during one's career were strongly and positively related to faculty pay for each type of institution. Fox (1992) analyzed the influence of research and teaching interests, time commitments, and orientations of faculty and their perceived environments on publication productivity on a random sample of social science faculty drawn from a national survey. The findings indicate that those whose publication production is high are not strongly invested in both research and teaching but appears to "trade off one set of investments against another" (p. 301).

Porter and Umbach (2001) used the 1993 National Study of Postsecondary Faculty (NSOPF: 93) data set, to model research productivity as a function of human capital, personal taste, career status, teaching workload, demographics, and academic discipline. The analysis applied multilevel modeling to account for the hierarchical nature of the data and incorporated estimations using two models (OLS

and RCM) for each dependent variable. Results showed significant relationships among the variables. Among the findings: faculty that had research assistantships while in graduate school produced more publications; faculty holding a Ph.D. or professional degree published more than those who did not; faculty who prefer to teach publish less than faculty who prefer to do research; the older the faculty member, the few publications produced; and the number of undergraduate and graduate courses taught has a differential impact on publications across disciplines.

In another study, Bland et al. (2005) examined individual, institutional, and leadership variables that influenced faculty research productivity within the context of a large medical school. Their findings suggest that faculty productivity is influenced by individual (i.e., socialization, motivation, content knowledge, research skills, multiple projects, orientation, autonomy and commitment, work habits) and institutional characteristics (i.e., recruitment and selection, clear goals, research emphasis), supplemented by effective leadership. Individual productivity encompasses mentoring programs, facilitating networks, and providing research time. Characteristics that facilitated group productivity were more affected by institutional and leadership characteristics (i.e., culture, positive group climate, size, experience, expertise, and mentoring). The authors note that it is "the dynamic interplay of individual and institutional characteristics, supplemented with effective leadership determines the productivity of individuals and departments" (p. 236).

More recently Townsend and Rosser (2007) conducted a descriptive study examining workload issues and measures of faculty productivity comparing the 1993 and 2004 NSOPF databases in public institutions. To measure the extent of faculty workload they used the variable average total hours worked that included paid and unpaid activities (within and outside the institution). They measured instructional workload by the number of courses or classes taught (both credit and non-credit), total classroom credit hours, and total number of student taught in credit courses. Scholarly workload was measured by output within the last 2 years of articles in refereed and non-refereed journals, presentations, books, textbooks, reports, patents and computer software. Findings indicated that in the aggregate total hours worked and the total number of classes taught by the faculty significantly increased from 1993 to 2004. Similarly, scholarly or research output also increased in the aggregate particularly articles published in refereed and non-refereed journals. However, output for other publications (i.e., books, textbooks, reports, patents, software) declined.

Recent research has also shown that scholarly output has significantly increased from 1993 to 2004 for full-time community college faculty members of juried and nonjuried articles and presentations; book reviews, chapters, and creative works; presentations; and exhibitions and performances (Townsend & Rosser, 2009). Whether this increase in scholarly output occurred because community colleges during the 1990s began to stress scholarship for their faculty is unknown. However, the current NEA collective bargaining contracts indicate that there may be institutional incentives for participating in some kind of scholarly activity.

Other studies have examined a range of demographic and profile factors affecting faculty research productivity including, ethnicity, gender, and family-related variables (Antonio, 2002; Bellas & Toutkoushian, 1999; Sax, Hagedorn, Arredondo,

& Dicrisi, 2002). For example, Antonio conducted a comparison between faculty of color and white faculty using a national sample drawn from the 1995 Faculty Survey conducted by the Higher Education Research Institute. The findings indicate that faculty of color had a "lower publication record with respect to journal articles and books, higher commitment to research activities, stronger support for educational goals that encompass the affective, moral, and civic development of students, and in the more explicit connection they make between the work of their profession and service to society" (p. 594).

In another study, Bellas and Toutkoushian analyzed data from the 1993 National Survey of Postsecondary Faculty and found that women spend more time in teaching and produced less research publications than men. Also that in comparison to their white counterparts, Blacks, Latinos, Asians and faculty of other races spent significantly less time in paid activities (i.e., research) than Whites. Furthermore, that married faculty and faculty with more dependents had higher research output than unmarried faculty while faculty with fewer dependents. Sax et al., examined the role of family-related factors (marriage, children, aging parents) based on the 1998–1999 Higher Education Research Institute Faculty Survey. While the results showed publication rates among women faculty increased significantly over the past decade, family variables had little or no effect on faculty research productivity.

Additional characteristics described by researchers related to faculty productivity include: implications for state and institutional policy (Fairweather & Beach, 2002); relationships between research and teaching (Hatie & Marsh, 1996); and student evaluations, research productivity, and eminence of college faculty (Linsky & Straus, 1975).

Faculty Work Motivation: Job Satisfaction, Morale, Intent to Leave

Researchers have identified various attributes related to faculty work (i.e., teaching, research, and service) in relation to work motivation factors such as individual job satisfaction, institutional or unit morale, and their intent to stay or leave an academic position/career.

Job Satisfaction

Few theories have been developed in terms of *satisfaction* being an affective response to a series of determinants. Gruenberg (1979) defines satisfaction as the individual's emotional reaction to a particular job. Benge and Hickey (1984) identify job satisfaction as the combination of various attitudes held by an individual employee at a given time. Lawler (1994) suggests that satisfaction reflects components of both drive theories and need theories and that satisfaction is directly related to want and need. He states that the majority of work on satisfaction has

been in the context of the workplace and there is a continuing need to examine the factors that may influence job satisfaction. A review of the literature identifies numerous facets which contribute towards defining job satisfaction (Hagedorn, 1996; Olsen, 1993; Olsen & Near, 1994; Olsen, Maple, & Stage, 1995; Ambrose, Huston, & Norman, 2005; August & Waltman, 2004; Rosser, 2004a). For example, Rosser (2004a) defined satisfaction as a multidimensional construct which encompassed advising, course loads, benefits, and security. In analyzing data from the 1999 National Study of Postsecondary Faculty (NSOPF: 99), findings indicate that the perceptions faculty members have of their work have a direct and powerful impact on their satisfaction and ultimately their intentions to leave. That is, a combination of work perceptions of faculty members' professional and institutional issues and satisfaction initiates individuals' behavioral intentions and the desire to leave for another position and/or career alternative. Hagedorn (1996), in a study on job satisfaction relative to gender and salary, suggested that job satisfaction comprised three elements: stress level, global satisfaction, and the intent to remain in academe.

Olsen (1993) applied Locke (1976) and Locke, Fitzpatrick, and White (1983) work on job satisfaction which defines satisfaction as the positive emotional state resulting from attaining what one wants or values from a job. In addition to job satisfaction, Olsen's study included work stress and career development in examining a cohort of newly hired tenure-track faculty from a large public research university. Similarly, Olsen and Near (1994) examined a sample of newly hired faculty who are more likely to have a high level of role conflict and potential work-personal life satisfaction. They found that the balance and conflict between work and non-work roles influenced faculty members' life satisfaction. Namely, that a successful life balance may take more time to achieve for new faculty members with heavy work demands and few career boundaries.

Another article by Olsen et al. (1995) defined satisfaction as encompassing two key areas of faculty work: satisfaction with teaching, and satisfaction with research. The findings showed that satisfaction with intrinsic aspects of faculty work was a significant predictor of satisfaction with the academic department, satisfaction with recognition and support, perceptions that tenure criteria were clear. Satisfaction with teaching proved most predictive of important aspects of institutional fit.

Ambrose et al. (2005) in a qualitative study based on a matched cohort of 123 faculty members, identified seven categories of satisfaction or dissatisfaction as congruent with prevailing literature: salaries, collegiality (time and interest, intradepartmental tensions, incivility), mentoring, reappointment, promotion and tenure process, and department heads. Two issues appeared unique to the studied institution which concerned regional issues and the university's interdisciplinary focus.

August and Waltman (2004) applied Hagedorn's (2000) model for conceptualizing faculty satisfaction which incorporates mediators (motivators and hygienes, demographics, environmental conditions), and triggers (change or transfer in personal, career, or emotional state). Regression analyses identified the domains of environmental conditions, departmental climate and demographics as affecting female faculty's overall career satisfaction.

Further attributes described by researchers related to faculty work and satisfaction include: "the opportunity to use valued skills and abilities (Alderfer, 1976), a

chance to learn (Patchen, 1970), room to be creative and greater control (Lawler & Hall, 1970), job enrichment (Maher, 1971), stress (Olsen, 1993), staff workload and satisfaction (Houston, Meyer, & Paewai, 2006), and difficulty of the work (Patchen, 1970) (as cited in Tack & Patitu, 1992, p. 28)." Additional workload—satisfaction studies may also suggest a productivity and job satisfaction relationship (Bland et al., 2005; Mamiseishvili & Rosser, 2010b).

Much of the theoretical rationale for productivity or performance leading to job satisfaction was grounded in expectancy-based and self-determination theories of motivation in the literature (e.g., Deci & Ryan, 1985; Gagné & Deci, 2005; Herzberg, 1966; Judge, Bono, Thoresen, & Patton, 2001; Lawler, 1994; Lawler & Porter, 1967; Locke, 1970; Vroom, 1964). For example, in his classic work, Herzberg (1966) examines the various *motivator-hygiene* factors individuals experience within organizations. Motivators are often referred to as intrinsic factors or the perceptions individuals hold regarding the quality of their work, the rewards they enjoy from their performance, and the importance and contribution of their role within the organization. Hygiene or extrinsic factors are often associated with issues that examine the various aspects of institutional worklife that individuals experience. The appropriateness of these theoretical frameworks suggest that job factors lead to the level of satisfaction individuals perceive to have experienced regarding their work. Satisfaction and morale have been defined by some researchers as separate and distinct constructs. Satisfaction appears to be more related to an individual's feelings about the job, while morale is more related to how one views or feels about the organization (Johnsrud & Edwards, 2001).

Morale

Faculty members' perceptions toward work, such as morale, have been found in a limited number of studies as a means for examining faculty work (Des Jarlais, 1995; Johnsrud, 1996; Johnsrud & Rosser, 2002; Kerlin & Dunlap, 1993; Madron, Craig, & Mendel (1976); Rice & Austin, 1988). Madron et al. (1976) define morale as a group's psychological state characterized by confidence, enthusiasm, discipline, willingness to work, and related attributes. They refer to [department] morale as a product of department-head performance, in addition to environmental and satisfaction issues. Madron et al. (1976) argue that morale may be seen as a potential symptomatic attribute which might be used in examining organizational difficulties. They contend that if department morale is low, then there may be organizational problems which should be remedied. Baynes (1967) defines morale as a quality of mind and spirit which combines courage, self-discipline, and endurance. More specifically, high morale is manifested when an individual shows determination to do their best under any circumstance. Low morale implies that the individuals see themselves as powerless or socially unimportant (Doherty, 1988). Johnsrud (1996), defined morale as a multidimensional construct that represents "the level of well-being that an individual or group is experiencing in reference to their worklife." Previous research has shown that morale can be examined through two primary perspectives: (1) morale is an attitudinal response to work conditions that has an impact

on behavior of individuals within the organization (Kanter, 1977; Lindgren, 1982; Wesbrook, 1980), and (2) morale is an individual (e.g., Baynes, 1967; Doherty, 1988; Wesbrook, 1980; Wofford, 1971) or a collective property (e.g., Des Jarlais, 1995; Johnsrud & Rosser, 2002; Zeitz, 1983), or both.

In examining faculty members employed in a 10-campus system of public higher education, Johnsrud and Rosser (2002) applied a multilevel analysis which found that morale is a primary factor in faculty members' intentions to leave their positions, institutions and professions. Kerlin and Dunlap (1993) found that inadequate financial resources had a negative impact on faculty morale in their case study of a public university in a period of austerity and retrenchment. Their findings underscored the adverse impact of declining financial resources coupled with perceptions of inequities within the institution. A national study of ten liberal arts colleges by the Council of Independent Colleges, Rice and Austin (1988) found that morale at liberal arts colleges had not deteriorated. Further examination of 10 campuses with the highest morale suggested that morale was attributed to distinct organizational cultures, participatory leadership, a sense of organizational momentum, and faculty identification with the institution.

Additional studies examining morale were guided by such conceptual frameworks as diminished expectations (Krugman, 1990), conditions of the professoriate (Bowen & Schuster, 1986), demands and tensions (Austin & Gamson, 1983), vitality and institutional productivity (Clark, 1987), and involvement in institutional decisions (Williams, Olswang, & Hargett, 1986). Despite how we define or measure faculty members' level of satisfaction and their institutional morale, the literature remains consistent in that both concepts are an attitudinal response to the quality or conditions of their worklives and, in turn, may or may not influence their intended behavior to stay in or leave the organization.

Intent to Leave

The "intent" to stay or leave one's position has been found to be a good indicator of actual turnover (e.g., Bluedorn, 1982a, 1982b; Lee & Mowday, 1987). Research conducted on faculty members' intent to leave often examines the concern to include individual, structural, and contextual characteristics. For example, Smart (1990) argues that at least three sets of determinants explain turnover intentions among faculty members: individual characteristics reflecting demographic and work factors, contextual variables reflecting individual stature and adjustment to the work environment, and the multiple dimensions of organizational and career satisfaction. His work represented an initial effort to explore the importance of these influences and to understand the dynamic process by which these influences contribute to intentions to leave mediated through satisfaction. Johnsrud and Heck (1994) found that demographic and perceptual variables about work life in the institution were significant in differentiating those faculty members who stayed and those who left. Both individual and contextual variables predicted leaving. In these results, women were more likely to leave than men. Faculty members who left the university, both women and men, had perceived different barriers to their successful retention than

those who stayed. Individuals leaving and staying differed most sharply according to their perceptions of quality of life, time, pressure, and chair/department relations.

Barnes, Agago, and Coombs (1998) investigated the relationship between stress and faculty intent to leave using hierarchical regression analyses on data from a national faculty survey. The stress variables include reward satisfaction, institutional/departmental reputation, time commitment, departmental/institutional influence, and student interaction. Results suggest that; higher levels of stress were associated with greater intent to leave academia; time commitment had the strongest relationship to intent to leave. Analyses of demographic variables showed that males and untenured faculty were significantly more likely to intend to leave academe.

Johnsrud and Rosser (2002) found in a system-wide study that the combination of demographic variables, the perception of faculty worklife (i.e., professional workload and rewards, administrative relations and support, quality of benefits and services, support services, and standard of living) and three interrelated dimensions of morale (i.e., engagement of work, institutional regard, sense of well-being) subsequently explained faculty members' intentions to leave their career, position and institution. Rosser (2004a) conceptualized and measured faculty members' worklife (i.e., technical support, administrative support, committee and service work, professional development), satisfaction (i.e., advising and course load, benefits and security, overall satisfaction), and intent to leave (i.e., institution, career) using NSOPF: 99 data.

More recently, Xu (2008a) investigated distinctive variations of turnover behaviors for faculty members in different academic disciplines. Also using NSOPF: 99, Xu examined full-time faculty members from Research and Doctoral universities and found that major factors related to faculty turnover had systematic patterns that were unique to discipline clusters. Xu's findings suggest that academic specialties of university faculty determine their professional values and concerns, which in turn exert direct and distinctive impact on turnover intentions (p. 56). Xu argues that discipline specific information should not be ignored in turnover research.

Additional studies suggest that job experience, including academic rank, tenure status, career time, gender, and salary influence faculty members' turnover intentions (Ambrose et al., 2005; Ehrenberg, Kasper, & Rees, 1990; Manger & Eikeland, 1990; Smart, 1990; Weiler, 1985; Xu, 2008b; Zhou & Volkwein, 2004). Many of these "intent" studies drew conceptually on the theoretical underpinnings of turnover and intended departure (e.g., Bluedorn, 1982a, 1982b; Lee & Mowday, 1987; Mobley, 1977; Price, 1977; Steers & Mowday, 1981).

Faculty Work and the Impact of Technology and Distance Education

The emergence of technology in the academic workplace has served to reshape faculty work and roles within the academy (Baldwin, 1998; Schuster & Finkelstein, 2006). Research shows faculty use computers, software applications, e-mail,

electronic resources, CD-ROMs, and the World Wide Web often in support of teaching and research activities (Inman & Mayes, 1998; Kagima & Hausafus, 2000; Mitra, Hazen, LaFrance, & Rogan, 1999; Warburton, Chen, & Bradburn, 2002). Investigating faculty at a Midwestern public university, Spotts and Bowman (1995) found that faculty were shown to have the highest levels of knowledge pertaining to word processing and video and used those technologies frequently. Inman and Mayes (1998) surveyed faculty at fourteen community colleges in the University of Kentucky System on their use of four types of technologies including computer-aided instruction, computer-based multimedia presentations, electronic communication with students using e-mail and discussion groups, and electronic library information resources on CD-ROM or the WWW. Their findings showed that faculty primarily used computer-aided instruction (41.0%) and electronic libraries (36.8%) followed by multimedia presentations (19.0%) and e-mail (11.7%). Kagima and Hausafus (2000) examined faculty use of computers and their ability to integrate instructional technologies from three colleges (agriculture, education, and family and consumer sciences) at the Iowa State University of Science and Technology. Their findings showed that the faculty's computer self-efficacy was a significant factor in predicting integration of electronic communication in teaching. Furthermore it was shown that faculty characteristics such as age, college, and teaching years, had a significant relationship with self-efficacy.

Mitra et al. (1999), and Warburton et al. (2002) noted faculty use of e-mail in communicating with students. Mitra et al., found that faculty who perceived that technology would positively impact the general process of instruction tended to be more frequent users of e-mail. Furthermore they found that the expectations of the functionality of e-mail for communicating with students are related to the use of e-mail with students for teaching activities. In a nation-wide study on postsecondary faculty, Warburton et al. (2002) found that those faculty who had Internet access and rated their institution's computing resources as either good or excellent were more likely to use e-mail to communicate with students in their classes than those who rated their institution's computing resources as poor. Moreover, faculty use of e-mail to communicate with students in their classes and use of course-specific websites was associated with their Internet access. Faculty who had access at home and work were more likely to use e-mail and course-specific websites.

Besides applying technology for instructional purposes, a few studies show faculty use technology for research and service activities (Xu & Meyer, 2007; Henry, 2002). Henry noted faculty use of e-mail and web-based technologies in support of their scholarly work in the way of contacting colleagues, conducting research, accessing libraries, and sharing information. Xu and Meyer applied a hierarchical multiple regression analysis using the 1999 National Study of Postsecondary Faculty and found that research productivity was negatively related to Web use in three institutional types. Moreover, service productivity had a positive correlation with both e-mail and Web use. A limited number of studies identify faculty characteristics such as computer experience, gender, age, ethnicity, disciplines and principal field of teaching in influencing their willingness to use technology (Spotts, Bowman, & Mertiz, 1997; Xu & Meyer, 2007). In a study on gender and faculty use

of instructional technologies, Spotts et al. (1997) reported significant differences between male and female faculty with regard to knowledge and experience with various technologies. Male faculty rated their knowledge and experience higher than female faculty with newer technologies such as multimedia, distance learning, and computer aided instruction. In the use of older technologies such as audio, film, and video, there was no significant difference found between males' and females' rating of their knowledge or experience with these technologies. No significant difference between male and female faculty was found in their knowledge and experience in using word processing, computer spreadsheets and presentation software. Xu and Meyer in a nationwide study examining faculty technology use and productivity found that female faculty used e-mail more than males but used the Web less than males. Also older faculty members used e-mail and the Web much less than younger members, however, faculty of various ethnic groups did not show consistent and substantial differences in their use of technology.

A few studies have shown differences in technology use among faculty from different disciplines and their principal field of teaching (Spotts & Bowman, 1995; Gueldenzoph, Guidera, Whipple, Mertler, & Dutton, 1999; Warburton et al., 2002). Spotts and Bowman (1995) found significant differences in faculty knowledge and experience of new technologies between those from the College of Engineering and Applied Sciences, and the College of Fine Arts. Faculty from the Business College also significantly differed from faculty in the colleges of Fine Arts, Education, Health and Human Services, and Arts and Sciences, with business faculty reporting a greater level of knowledge in using technology. Engineering faculty also reported a higher level of knowledge than faculty in Fine Arts and Education. Likewise, Gueldenzoph et al. (1999), in examining faculty use of instructional technology at a Midwest university, also found significant differences between computer use and discipline. Warburton et al. (2002) found that the faculty's principal field of teaching was found to be related to their use of telecommunication technologies. For example, with the exception four instructional fields (business, education, humanities, and social sciences, instructional faculty and staff who taught in the field of engineering and computer sciences were more likely to use e-mail and course-specific websites than faculty in other disciplines). Furthermore, Warbuton et al. (2002) found an association between type of institution and telecommunications technology use with a larger percentage (39%) of full-time instructional faculty and staff using e-mail to communicate with students at 4-year doctoral institutions than at 4-year non-doctoral institutions (29%) or 2-year institutions (22%).

While research shows faculty using technology to facilitate their work, studies also show the negative impact technology use exerts on work load. For example, Warburton et al. (2002) in a 2002 report for the National Center for Education Statistics in studying use of telecommunication technology by postsecondary faculty and staff found that full- and part-time instructional faculty and staff who used e-mail or course-specific web sites generally reported working more hours per week on average (55 h) compared to those who did not use e-mail (50 h) or did not use course-specific web sites (52 h). Postsecondary instructional faculty and staff who used e-mail or course-specific web sites reported spending more time on research

activities while those who did not use these resources reported spending a larger percentage of their time on teaching activities. Faculty concerns about time and workload also extend to integrating educational technology within courses and programs or delivering instructional content by distance (Kleiner, Thomas, & Lewis, 2007; Spector, 2005).

For example, Kleiner et al. (2007) studied the 1998 National Survey on Information Technology in Education and found institutions with teacher education programs for initial licensure one of the key barriers for programs to integrate educational technology into the daily and learning environment of teacher candidates was faculty members' lack of time, training, and interest. Spector (2005) conducted a qualitative study to examine time demands placed on online instructors and found the use of e-mail, discussion forums, chat sessions, associated with the medium required a greater investment of time than in face-to-face instructional setting.

Theoretical frameworks such as diffusion theory are used in a limited number of studies examining faculty work in context with technology use (Tabata & Johnsrud, 2008; Anderson, Varnhagen, & Campbell, 1998; Dooley & Murphrey, 2000). Tabata and Johnsrud (2008) examined faculty participation in distance education in relation to their adoption of technology innovations at a public postsecondary 10-campus system. Ordinal regression analysis identified 20 significant variables among the four latent dimensions (i.e., technology use, attitude toward technology, attitude toward distance education, adoption of innovations) of the conceptual model and four demographic characteristics (age, minority status, institutional type) that explain faculty participation in distance education. Anderson et al. (1998) used diffusion theory to examine the use, attitudes, and perception of barriers to increase use of instructional technologies by faculty in a large research university. The findings indicated that while faculty generally believed that the technologies had some potential in aiding the teaching and learning process, many remained deeply suspicious of the way in which the change was being implemented and supported. Furthermore, many of the faculty saw themselves or colleagues as leadership sources and were less trustful of administration and administrative leaders such as chairs, deans, and those who had already adopted the technology. Age was also a consideration in that the early adopters were found to be younger, more self-reliant faculty who believed that the instructional technologies enhanced contacts with colleagues and students and also improved the quality of learning. Moreover, Dooley and Murphrey (2000) in a study of perceptions and reactions of faculty, administrators, and support units at a university that had been engaged in distance education delivery for 10 years, found that the rate of adoption of distance education technologies could be enhanced through revised policies and procedures and the development of strategies to address critical issues.

Faculty use of technology to support their work-related activities appears to have a large impact in directing how they spend their time. Further research that explores technology use and new technologies will provide deeper understanding of this under-studied area.

Faculty Culture

Colleges and universities have a strong academic culture and reward structure that requires performance in teaching and advising, research and scholarship, and service and committee activities for earning promotion and tenure. While many institutions may require a degree of performance in all three areas, Clark (1972) takes an initial look at faculty culture through his classic work on organizational sagas in higher education. He contends that "an organizational saga is a collective understanding of unique accomplishment in a formally established group... the group's definition of the accomplishment, intrinsically historical but embellished through retelling and rewriting, links stages of organizational development" (p. 178). He goes on to say that organizational sagas highlight nonstructural and nonrational dimensions of organizational life and achievement. Sagas emphasize normative bonds, referring to a unified set of publicly expressed beliefs about the formal group that (a) is rooted in history, (b) claims unique accomplishment, and (c) is held with sentiment by the group. Embedded within these beliefs is the culture of academic work within which the components of teaching, research and service exist.

Faculty culture enables researchers to examine the ways faculty fulfill their work responsibilities. In defining faculty culture, Austin (1990) identifies four contributing subcultures: the culture of the discipline, the culture of the academic profession, the culture of the academy as an organization, and the culture of institutional types. Tierney and Rhoads (1993) noted that "colleges and universities, as social institutions, each exhibit a unique organizational culture" (p. 1). This unique aspect of institutional culture "evolves over time, shaped by patterns of routine interactions among students, faculty, institutional leaders (including founders), alumni, and other constituents" (Kuh & Whitt, 1988, p. 45). Similarly, Tierney and Bensimon (1996) contend that although institutional and departmental contexts of one's work may vary, the cultural framework in which it is defined and performed is often quite similar across campuses and disciplines. They believe that the structure of academic work is culturally based within an organization and pertains not merely to what is important to its participants—research versus teaching—but also how the participants decide whether someone is deserving of promotion. Tierney and Bensimon (1996) think of tenure and promotion as a cultural process that orients individuals and the organization to evolving institutional values and ideologies; they view socialization as a ritualized process that involves the transmission of the organizational culture.

In studying cultural elements in academe, research has focused on three subcultures within academe: students, faculty, and administrators. While research on academic culture tended to focus on student subcultures, a smaller body of research has focused on faculty (Lechuga, 2008; Beecher & Trowler, 2001; Wong & Tierney, 2001; Tierney, 1991; Freedman et al., 1979). For example, Tierney (1991) examined the relationship between faculty culture and institutional culture. Becher and Trowler (2001) studied the association between faculty behavior and discipline. Freedman et al. (1979) explored the affiliation between faculty development and academic culture.

Faculty culture and socialization has been used by researchers as a conceptual framework for examining faculty work (Lechuga, 2008; Wong & Tierney, 2001). In a qualitative study exploring faculty culture at for-profit institutions, Lechuga identifies three cultural elements: assessment (a focus on organizational effectiveness and indicators of success), knowledge (education aligned with the needs of employers and the marketplace), and customer service (a commitment to students and a responsibility to employers). Wong and Tierney conducted an ethnographic study of faculty work at the Charter School of Education at the California State University at Los Angeles, a higher education organization within a public state university. The study suggests that faculty work changed as collaboration and participation became highly valued activities and the context of work evolved as faculty "saw themselves as part of larger movement to improve the role and quality of education within the state and national scene" (p. 1097).

Although there is a plethora of research that has been conducted on faculty and institutional cultures, the issue we are trying to present here is that culture is deeply embedded and can take on numerous underlying meanings within workload priorities. This section is by no means exhaustive, but rather an important aspect that can not be ignored within academic organizations.

Conclusion

There have been numerous books, monographs, articles, and opinion pieces examining the various roles and responsibilities regarding faculty work (i.e., teaching and advising, research and scholarship, and internal and external service activities). These roles and responsibilities consist of an incredible range of valued and tiered activities that add to the complexity, as well as to the debate, to adequately define and measure faculty workload and productivity, including the influence of culture and technology. The purpose of this chapter was three-fold: to examine the various scholarly approaches within the burgeoning research conducted on faculty workload and productivity, to explore the various conceptual and theoretical frameworks within the empirical research, and to present those motivational or affective responses to the quality of faculty worklife, such as job satisfaction, institutional morale, and the intent to stay in or leave an academic position. This chapter is by no means exhaustive, but serves to provide an overview of various frameworks most often gleaned from empirical research. While the conceptual and theoretical approaches applied by researchers assist in extending our understanding of faculty workload and productivity activities, careful monitoring and further assessment is needed to better inform institutional policy and decision making.

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Herding Cats and Big Dogs: Tensions in the Faculty-Administrator Relationship

Marietta Del Favero and Nathaniel J. Bray

Introduction

It is a common observation in the higher education literature that the relationship between faculty members and administrators in colleges and universities is often, if not typically, contentious (Birnbaum, 1992; Kezar & Eckel, 2004; Peterson & White, 1992; Rosovsky, 1990; Stark, 1986; Thelin, 2001). Campbell and Slaughter (1999, p. 310) have referred to the tension marking the relationship as "an enduring part of academic life." Faculty have expressed frustration related to poor communication with administrators and top–down autocracies (Johnsrud & Heck, 1998). Faculty and administrators have disagreed over what type of shared governance was at work in their institution, how much influence faculty had, and whether trust levels were adequate (Tierney & Minor, 2003). Tierney and Minor suggest that, "strife and conflict are likely to appear when individuals on campus have dissimilar views about shared governance" (p. 9). And while Tierney and Minor's research suggests the relationship is perhaps not as bad as it first seems with relatively high levels of trust between faculty and administration, even they indicate, as have others (Kezar, 2000; Minor, 2005), that differences between faculty and administrators impede shared governance processes. There is wide agreement that effective shared governance demands a partnership marked by buy-in from both groups (Kezar & Eckel, 2004; Kezar, Lester, & Anderson, 2006; Welsh & Nunez, 2005) and yet the preponderance of the higher education literature indeed suggests a contentious relationship. As higher education governance systems are increasingly considered weak and inadequate (Benjamin & Carroll, 1993, 1998) efforts to address this inadequacy may in fact rest on better understanding of the faculty-administrator relationship.

We have suggested that the lack of in-depth of study of this critical relationship is related both to our reluctance to study ourselves as well as the taken-for-granted nature of the relationship (Del Favero, 2003; Del Favero & Bray, 2006). While

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there is a considerable body of work in the higher education literature devoted to faculty and their work, study of administrators is far less abundant and ill-focused for purposes of understanding their relationships with faculty. Examination of the challenges facing administrators (Association of Governing Boards of Colleges and Universities, 1996; Cohen & March, 1974; Fisher, 1991; Gross & Grambsch, 1968; Ryan, 1980; Tucker & Bryan, 1991) are far less frequent in the literature than themes related to their styles, roles, and professional development (Kezar, 2000). This lack of knowledge is problematic as the effectiveness of shared governance in higher education is closely tied to the partnership between faculty and administrators in any institution. In this chapter we address this lack of knowledge about the faculty-administrator dynamic by examining it across a variety of key functional contexts, and offering alternative frameworks for its further study.

A Contentious Relationship

The root of the tension between faculty and administrators is both structural and cultural. On the structural side, the number of administrators, as well as the variety of specialized administrative functions, continue to increase with the professionalization of administrators (Rosenzweig, 1994; Waugh, 1998), raising the perception among some that this comes at the expense of the faculty (Hansen & Guidugli, 1990). This structural dilemma has a ripple effect in producing tension points as faculty and administrators alike have grappled with their roles and responsibilities as well as their areas of influence and whether it includes academic or administrative concerns, or a bit of both (Kater & Levin, 2005; Volkwein, Malik, & Napierski-Prancl, 1998). One result has been that, while faculty and administrators govern within a shared organizational structure (Morris, 1981), the faculty role in academic governance continues to decline (Schuster & Finkelstein, 2006b).

Collins (2003) found administrative and faculty differences over who should be involved in various aspects of governance. Administrators believed faculty should be involved in programmatic and curricular decisions but not nonacademic matters like budgeting and termination processes. Faculty on the other hand, believed they should share governance in all administrative functions. While this is broader than the discussion of tenure, it highlights the context of the argument, a battle of wills over who has a governance say in which parts of institutional functions. Yet, faculty do not always believe that shared governance creates an adversarial relationship (Piland & Bublitz, 1998). Pressure mounts as expectations for what needs to be done differ, with administrators in positions where they to need to seek positive change, while faculty are believed to desire the status quo (Welsh & Metcalf, 2003). Schuster and Finklestein (2006b) believe the net effect is resulting in faculty having to shift from the status quo and engage in a renegotiation of the contract they have with their institutions, a situation which further complicates the structural foundation defining faculty and administrator roles. Such contracts and their associated expectations for faculty work and performance, stimulated in part by Boyer's (1990) work and

the upsurge in support from external sources, are no longer uniform but unique to one's discipline and individual talents and interests. This condition has the effect of fracturing the academic community such that organizing around common goals has become more difficult.

Studies of shared governance are mixed on how well it works, with or without tensions. McCormick and Meiners (1989) suggest that faculty inclusion in the process hampers institutional functioning. Cunningham (2009) argues that a strong faculty presence in governance can both serve as a proxy for monitoring administrative behavior in a low cost fashion and lead to improved institutional functioning. Like Cunningham, Brown (2001) also found that the value placed on faculty inclusion in governance varies by area; in this case, he found that if faculty had greater incentive or interest in the topic, they were beneficial to the governance process. Minor (2005) suggests it is less a question of inclusion than opportunity to contribute meaningfully. What is occurring then is a kind of structural fault in higher education institutions according to Keller (2001) which contributes to the ambiguity of governance and ultimately exacerbates the tension and conflict which has historically marked the relationship between faculty and administrators. Complicating, if not stimulated by, these structural problems in governance, professors nonetheless continue to demand a full partnership in decision-making in their institutions.

While ambiguity in governance structures most assuredly contributes to a decision-making environment which easily breeds conflict, the culture of academe is also a factor. At the core of academic work, or traditional academic decision-making, i.e. academic planning and program development, a managerial culture has emerged (Deem, 1998) in an increasingly entrepreneurial higher education environment (Slaughter & Rhoades, 2005) which encourages deans and department chairs to restructure faculty participation (Waugh, 1998). As a result, the character of the faculty relationship with their institutions may be ambiguous and counter to their preconceived notions of academic life. In some disciplines, academic decisions concerning curriculum are increasingly influenced by outside constituents representing the market for college graduates or viable sources for program support. This is particularly true in applied fields such as education, engineering and business. Faculty in these fields are linked more closely to external constituents such as certification agents of the state in the case of education, and industry in the case of engineering and business. These linkages require faculty in applied fields to be more concerned than faculty in other fields about the wider, societal relevance of their work (Becher, 1989), which in turn implies increased sharing in academic decision-making. Thus, to the extent that outside influences have crept into the academic planning sphere, a redistribution of influence of all involved in such decisions must necessarily occur. This is problematic given the likelihood of faculty placing more faith in the academic culture than they place in administrative culture (Birnbaum, 1988; Volkwein & Malik, 1997).

Governance structures are not the only structures which contribute to the tension between faculty and administrators. Academic work structures, or the roles and expectations which frame faculty work and their rewards for that work, also are relevant. Specifically, we refer to faculty understandings associated with what

constitutes success in their faculty role, what they expect from their institution in support of their work, and how these both parlay into evaluation for promotion and tenure. One example which complicates faculty understandings of their roles is the tendencies of many institutions to submit to "mission creep" (Dubrow, Moseley, & Dustin, 2006; Fliegler, 2006; Martin & Samels, 2002). In this situation, the relative weight of research and teaching as institutional priorities may become muddied as those who historically considered teaching a primary focus have communicated to their faculty what they believe as a necessity of "moving up" in the Carnegie classification (McCormick & Zhao, 2005) with the hope of enhancing their status and visibility. Also related to teaching are structures associated with the evaluation of faculty teaching. The most commonly used formal measure is the student evaluation, which has a long and controversial history in higher education. The ongoing debate as to the validity of these evaluations often creates deep rifts between faculty and administrators, particularly when administrators use low ratings to influence their overall evaluation of faculty performance. These administrative evaluations cause even greater consternation when they are linked to ambiguous expectations of the tenure and promotion system. Perceived arbitrariness and inconsistencies in the reward system frustrates faculty and often strains their relationship with administrators, particularly since administrators are not the significant persons from whom faculty members desire feedback (Nelson, 2004; Stark, 1986). Given these structural barriers, faculty incentive for working toward a good working relationship with administrators is not likely to be strong. Thus the ambiguities and relevancies which define academic and governance structures, both create and support, a multitude of opportunities for conflict.

The relationship between faculty and administrators is also rooted in a well-documented "cultural clash" (Schuster & Finkelstein, 2006b) emanating from their widely divergent cultures. This is explained by the fact that faculty and administrators are oriented very differently toward their work and in their relationships to their institutions. Simply, faculty are motivated by their individual, scholarly interests, while administrators are commonly motivated by their responsibility to the collective interests of the institution (Volkwein et al., 1998) and often by the need to change to face future challenges (Welsh & Metcalf, 2003). Faculty work is driven by a desire to make significant contributions to knowledge in their field through scholarship in its various forms. Administrators' work on the other hand is driven by the collective. They occupy decision-making roles which require that they consider competing interests—all vying for their share of scarce resources. The work of administrators is primarily institution-based, while the autonomy of faculty work and its primary product, i.e. ideas, levies few boundaries with respect to time and place of work.

Given these structural and cultural limitations, it is no surprise that faculty and administrators often conflict around matters related to the evaluation of scholarly performance (Stark, 1986) and institutional functioning (Bensimon, 1991; Blackburn & Lawrence, 1995; Peterson & White, 1992). Most interestingly, these differences prevail despite the fact that many administrators often share the same training as faculty and have "risen" to their positions in the hierarchy through the

faculty ranks (Blackburn & Lawrence, 1995; Cohen & March, 1986; Dill, 1980; Morris, 1981). This suggests that common ground for understanding may be possible and that the varied and pervasive symptoms which characterize the relationship (Altbach, 2005b; Birnbaum, 1988; Blackburn & Lawrence, 1995; Del Favero & Bray, 2006; Dill, 1991; Dykes, 1968; Krahenbuhl, 2004; Walker, 1981) may be susceptible to mediation.

Characterizations of the Relationship in the Literature

In a previous work (Del Favero & Bray, 2006) we examined the characteristics of the faculty-administrator relationship in a shared governance context. Our findings in that review of the literature provide a solid basis for this current work not only by confirming the prevailing perception of the relationship as problematic, but by offering a framework for understanding how the two groups perceive each other. Through a review of the literature we classified the relationship as falling into three categories—*holistic, perceptual, and behavioral*. *Holistic characterizations* were derived primarily from knowledge associated with the divergent cultures of the two groups and describe the relationship in terms of enduring cultural differences. The notion of culture and the value systems which define it is critical in determining what consumes the attention of faculty and administrators as groups and the realities upon which members base their perspectives. These perspectives in turn potentially determine how groups might view the potential for collaboration and consensus as essential to effective shared governance. The enduring cultural differences in the two groups which we described have no doubt stimulated many of the perspectives of the relationship encountered in the literature. For example, Borland (2003) characterized it as we-they, Mortimer and McConnell (1978) as adversarial, and Leslie (2003) as two alternative, irreconcilable realities where the terrain is contested and must constantly be negotiated. Dill (1991) characterized the relationship as defined by conflicting values, similar to what O'Brien (1998) referred to as a philosophical split between the two groups. Other characterizations of the relationship which reflect the enduring cultural clashes between these two groups are: adversarial (Mortimer & McConnell, 1978); uncomfortable alliance (Guffey & Rampp, 1998); deep chasms (Gayle, Hakim, et al., 1999); turf struggles (Guffey & Rampp, 1998); deliberations marked by stalemate and gridlock (Guffey & Rampp, 1998); lack of agreement not lack of consultation (O'Brien, 1998); typically confrontational (Greer, 1997); and, latently hostile (Thompson, Hawkes, & Avery, 1969). Unfortunately, these characterizations suggest that a permanent state of understanding and cooperation may be unachievable given the enduring cultural clashes.

The second category derived from our past research is *participant descriptions* of the relationship expressed in the literature by faculty and administrators. While there is some overlap across categories, how members of each group view the other is important to building a solid relationship in that such views provide a starting point for collaboration and joint effort. Positive perceptions have a greater chance of

influencing collaborative effort while negative perceptions are likely to hinder productive interactions and influence an overall decision-making culture that is contrary and divisive. To illustrate how faculty and administrators view each other, we highlight several examples of how each has characterized their perception of the relationship or each other. Faculty, according to Carlisle and Miller (1998) see administrators as overbearing and overpowering. Ehrenberg (2000) offers the faculty view of colleagues in administration as enemies. Leslie (2003) presents one faculty view that "while others decide, faculty feel left out." And according to Etzioni (2000) faculty believe they are more knowledgeable which no doubt automatically sets up an adversarial dynamic. While there is much less written about the views of administrators, what we know about their views on the relationship have most assuredly been less candid as they are being described through the eyes of faculty. For example, Miller (2003) says administrators lack respect for faculty, assuming of course that faculty are due such respect automatically, and further, that the matter of faculty respect for administrators is of less concern. On both sides, an expectation of a "display of authenticity" in their interactions (Guffey & Rampp, 1998) suggests a perspective that both parties are often not genuine in their dealings with the other. Such a perspective on either side is indeed problematic as it may potentially jeopardize any effort at improving the relationship.

The third characterization, *participant behaviors*, describes specific behaviors within the relationship. Administrators, for example, have been characterized as having disregard for faculty rights and shutting them out of decision-making processes (Carlisle & Miller, 1998), deviating from the wishes of faculty (Miller, Williams, & Garavalia, 2003), and devoting minimal time to faculty contact (Dill, 1991). They are often suspicious of, if not resent, faculty involved in administrative work (Pope & Miller, 1999); and while displays of authenticity and commitment to process are common, they often color, alter, misuse, and hold information hostage (Guffey & Rampp, 1998). Faculty on the other hand, have been reported to be inattentive to institutional issues (O'Brien, 1998), and resistant to administrative controls (Gumport, 2000) and acknowledgement of their authority in certain matters (Etzioni, 2000). While anger and frustration over perceived lack of consultation are not uncommon (Kissler, 1997), faculty often react defensively to the suggestions of administrators, and cede ground grudgingly (Association of Governing Boards of Colleges and Universities, 1996).

These characterizations in the literature have been attributed to one or the other party, however it is not unrealistic to assume that the behaviors described are limited to either group. So while these categories are not exclusive given the nature of their definitions, what they offer are alternatives for expressing how the literature has presented the problem. They illustrate as well that both faculty and administrators as a collective are aware at some level that this relationship is important even if only because it creates tension in their work environments. This is particularly true given the fact, as we have shown previously, that the relationship is generally viewed as dysfunctional and conflict-prone.

What we continue to believe is that progress toward improvement will continue to be jeopardized because this knowledge of the dysfunctional relationship has gone unchallenged in the literature. Studies of the relationship and how both faculty and administrators might work toward its improvement, are hampered by a lack of frameworks for its scholarly study. We also see a need for a more balanced perspective in how we understand the relationship. We perceive a faculty bias in practice in terms of how the relationship is depicted, and the lack of empirical attention to specific measurable differences in the higher education literature serves only to amplify and sustain such bias. In addition to our current role as faculty members each of us has also devoted time in our careers to administrative roles. We have drawn from both sets of experiences in our scholarly work to frame what we believe is a balanced view of the demands and challenges each face in their interactions with the other. The inadequacy of the knowledge base on this relationship is further supported by the fact that while faculty work has been systematically studied in the higher education literature, there is a paucity of data on academic administrators as a collective (Campbell & Slaughter, 1999), and even less on executive administrators who are not academics. This lack of attention we believe may in part be related to the perceptions of higher education researchers that administrators are merely secondary institutional actors, if not marginally relevant to the study of higher education, a perspective which again, creates a knowledge void that only sustains a contentious, too often unproductive, relationship.

Exploratory Approach to Understanding the Relationship

Without a doubt the institutional contexts within which faculty and administrators are bound to interact are far too numerous to address in the space allotted. We have chosen to address three functional contexts, or institutional sub contexts, which frame faculty work—(a) curriculum and teaching; (b) academic entrepreneurialism and research; and, (c) appointment, contract, and tenure. We believe that based upon the literature, these contexts suggest ample opportunity for both cooperation and tension. We further address the need for viable frameworks for understanding this critical relationship. It is important to note that our perspective in addressing this topic has its foundation in traditional ideas of faculty work as encompassing a tri-partite role—research, teaching, and service, because we believe that the tension between faculty and administrators is very much rooted in the more traditional definitions of faculty work. While we acknowledge that the academic profession in particular, and higher education in general, are undergoing substantial changes which will continue to impact the character of faculty work (Austin, 2002a; Boyer, 1990; Schuster & Finkelstein, 2006a, 2006b), we believe that traditional formulations defining faculty work, along with a resistance to what is certainly perceived by many as large-scale change (Altbach, 2005a), are producing much of the tension we discuss. We hope that our analysis of this evidence of tension in the relationship will stimulate further research into its dynamic.

Curriculum and Teaching

The autonomy faculty expect in matters related to curriculum and teaching (Simplicio, 2006) is being increasingly challenged as colleges and universities are being pressed to respond to external accountability mandates. Yet Tierney and Minor (2003) showed that faculty still report that this is their largest area of influence, with the undergraduate curriculum and standards for evaluating teaching ranking as two of the top three areas of faculty influence. Pressures for higher education to become more efficient (Bess, 1999; Blau, 1994; Bok, 1986; Jenkins & Oliver, 1997) and for teaching to become more student-centered (Barr & Tagg, 1995; Dressel & Marcus, 1982) have important implications for the structure of the curriculum both at the departmental and institutional levels where consolidation of course offerings, increased class sizes, and the threat of elimination of programs with "low productivity" is becoming the norm. Administrators and faculty, particularly those in public institutions, must work together to meet these external mandates lest external boards and legislatures dictate consolidations and eliminations which threaten overall program quality. Pressure to meet the onslaught of such mandates, particularly in times of economic crises, will most assuredly stress the faculty-administrator relationship. To illustrate the strains on this relationship in a curriculum and teaching domain, in the paragraphs following, we will examine the evidence offered in three prominent contexts—academic planning, evaluation of teaching, and distance learning.

Academic Planning as a Shared Endeavor

The curriculum and its related processes have been defined by Stark and Lowther (1986) as an *academic plan,* a term which is meant to capture the multifaceted nature of the curriculum process. In a broad sense, the process includes the activities of planning and developing the curriculum, implementing it through the teaching role, and assessing its effectiveness on an ongoing basis. As such, we use the terms academic planning and curriculum interchangeably. Faculty are the architects of the curriculum. They are responsible for determining the direction of programs, developing course offerings and degree options, program review and assessment, and the determination of fit between the curriculum and its goals and student interests, predispositions, and capabilities. This responsibility is heightened by faculty expectations that their greatest control exists in the area of their academic programs and their direction (Bray, 2008; Tierney & Minor, 2003; Volkwein et al., 1998), and they cling steadfastly to their pronounced autonomy in their academic work (Austin, 1990; Bess, 1988; Clark, 1991; Stark, Lowther, Sharp, & Arnold, 1997).

Yet while ownership of the process is perceived as certain by faculty, the involvement and leadership of administrators is viewed as essential to successful curriculum management (Briggs, 2007; Dubrow, 2004; Evers & Wolstenholme, 2007; Hill, 2007; Kanter, Gamson, & London, 1997; Raby, 2007; Roy, Borin, & Kustra, 2007; Stark & Lattuca, 1997; Stark, 2002; Stark, Briggs, & Rowland-Poplawski, 2002; Stark et al., 1997). Stark and Lattuca (1997) characterize the most active role of

the faculty to be at the course level, while the administrative role is focused primarily at the college level. They use three categories to describe the administrative responsibility in academic planning—*curriculum development*, *implementation*, and *evaluation/adjustment*. They assert that the way in which these responsibilities are distributed can vary by institution type and the level of academic plan. Our synthesis of the literature bears out the validity of Stark and Lattuca's categories and the consistency with which the literature characterizes the importance of administrative involvement in curriculum-related processes. These three categories organize the following examination of the academic planning context.

Curriculum development. According to Stark and Lattuca (1997), administrators assume a role in curriculum development whereby they communicate academic plans; ensure that such plans are congruent with the institutional mission; create a collaborative climate for planning; and, establish institutional expectations for the curriculum. In communicating academic plans, administrators initiate conversations about educational purpose both at the institution and program level, engage faculty in the discussion of program frameworks and issue strong statements of commitment to undergraduate programs (National Endowment for the Humanities, 1984). In ensuring plan congruency with institutional mission, administrators link curricular efforts to institutional goals and coordinate curriculum across departments (Ewell & Lisensky, 1988; Haynes, 2002). They create a collaborative climate for planning, serving as catalysts for curricular change (Stark et al., 1997), act as program champions (Evers & Wolstenholme, 2007) and incentivize faculty participation in the change process (Briggs, 2007). Institutional expectations for the curriculum (Baldwin & Baumann, 2005; Klein, 1994) are established through administrative shaping of the curriculum (Kushner, 1999), and establishing plans that all are required to follow (Grunwald & Peterson, 2003). Administrators participate in curriculum visioning activities (Wolf, 2007), and act as custodians of academic standards (Bennett & Figuli, 1993; Stark et al., 2002).

Implementation of the curriculum. As custodians of university resources, administrators are charged with providing the needed program and process resources (Baldwin & Baumann, 2005; Bolt & Swartz, 1997; Hill, 2007; Kanter et al., 1997; Kushner, 1999; Pharr, 2000; Raby, 2007), and influence the level of their institution's curriculum-related involvement with external constituents (Grunwald & Peterson, 2003). Administrators adjust reward systems as needed to focus on teaching, and improve faculty salaries (National Endowment, 1984) so that faculty are appropriately rewarded for their instructional effort in support of the curriculum. Promoting the curriculum is also necessary to its successful implementation. Administrators must influence the enthusiastic support of all stakeholders—faculty, administrators, students, and (in the case of applied fields), organizations who hire graduates (Pharr, 2000). They must support the hiring of faculty (i.e., disciplinary specialists) to support the academic plan (Bennett, 1984; Kushner, 1999; Stark et al., 1997), provide the required teaching capacity (Pharr, 2000), and support needed faculty development (Bennett).

Evaluation and adjustment. Stark and Lattuca (1997) charge chairs with the monitoring of plan progress and assessing related outcomes. Along with the dean and

provost, chairs often oversee the adjustment of plans, while the role of deans is to influence plan adjustment efforts as needed. Such evaluation involves promoting the effective use of student evaluations of teaching (Bennett, 1984; Ewell & Lisensky, 1988), mobilizing faculty effort toward curricular improvement (Ewell & Lisensky, 1988), and ensuring the curriculum is consistent with the changing needs of students (Pharr, 2000). It is the purview of academic administrators to work with faculty in such matters as evaluating teaching performance, documenting curriculum, and mobilizing faculty effort toward curricular improvement (Ewell & Lisensky, 1988). In the end, however, academic administrators are held accountable for curriculum and overall teaching performance of the faculty.

So while the academic plan is considered to be the purview of the faculty, administrators are critical to the management of the environment in which academic plans are embedded. This environment is comprised of external influences (e.g. government, marketplace, alumni), organizational influences (e.g. program relationships, resources, and governance), and internal influences (e.g. students, faculty, disciplines). Lest the importance of faculty autonomy minimize the role of administrators in the curriculum leadership process, Stark and Lattuca (1997) are very clear of the importance of the administrative role in curricular processes. So ample evidence exists that while faculty are viewed as the architects and keepers of the curriculum, that it is indeed a shared responsibility (Briggs, 2007; Kanter et al., 1997; Kushner, 1999; Stark et al., 1997).

Administrators, then, have considerable influence on faculty decisions related to academic programming (Hill, 2007). Despite the strong feelings of ownership of the curriculum felt by faculty, Stark et al. (1997) in fact found, that whether or not faculty participate in curriculum planning at the program level is related to their perceptions of the importance administrators attach to the activity. We suspect this may be partially related to faculty belief as to whether or not administrator-developed faculty reward systems "count" such participation. To the extent it does, faculty will be more likely to participate. Therefore, administrative involvement in the process, either by virtue of their control of necessary resources or by the meaning they attach to certain academic program activities, makes the curriculum and teaching arena ripe for conflict between faculty and administrators.

Sources of tension: Academic planning. Faculty resist shared curricular activity (Briggs, 2007) and see the process as a course planning exercise where their autonomy and investment is the greatest (Stark et al., 1997). Tension is produced when, as in many other contexts, faculty believe their autonomy in determining matters of curricular concern is being threatened by administrative control. Given that curriculum as a function of colleges and universities requires more continuous monitoring and adjustment than any other function (Briggs), this control would not appear to be negotiable. Such control, which in principle is resisted by faculty, coupled with a managerial culture that is becoming more firmly embedded into higher education institutions (Deem, 1998; Waugh, 1998), suggests that tension-laden academic planning issues will escalate.

Mandates to improve undergraduate teaching in recent decades provide one example of situations that may provoke faculty-administrative conflicts in the

academic planning arena. Faculty studied by Colbeck (2002) expressed frustration with budget constraints associated with such mandates; escalating pressures to measure student outcomes, assess faculty teaching using multiple measures, and move toward technology-enhanced instruction are but a few examples. Examples of administrative responses to such state mandates were to lengthen class periods, modify the reporting of faculty workloads, and institution of a requirement for submittal of departmental workload plans. Colbeck described faculty as resistant to such mandates, believing they were unenforceable largely due to the lack of measures to describe quality teaching. Faculty resistance was also based in their belief that if any changes to their teaching were to occur it would be faculty-initiated in response to the needs of students, not in response to state or administrative dictates.

Administrators can manipulate aspects of the curricular implementation environment such as course content, organizational structure, and faculty recruiting (Kushner, 1999). Indeed some department chairs see their role in curriculum processes as one of control (Stark et al., 2002). A key function of implementing the curriculum, assumed most commonly by the department chair, is the assignment of teaching loads to faculty. Traditional approaches to assigning workload may need to be altered (Bolt & Swartz, 1997) in the course of implementing new academic plans. Such changes may escalate as the curricular environment forces programs to accommodate increased faculty-administrator independence (Kanter et al., 1997), new approaches to interdisciplinary instruction (Lattuca, 2001; Letterman & Dugan, 2004; Lonning & DeFranco, 1998; Pennee, 2007; Seabury & Barrett, 2000), and new technology-enhanced instructional approaches (Bates, 2000; Paulson, 2002; Pina, 2008; Sellani & Harrington, 2002; Stark & Lattuca, 1997; Stark et al., 1997). And given that competition for resources often characterizes the academic planning process (Stark et al., 1997), such structural alterations will necessarily enact a price on some faculty as resources are reallocated to accommodate changes. Tensions may be further heightened where department chairs attempt to dictate workloads and in the process give inadequate consideration to faculty needs and preferences.

The curriculum planning arena is also one where educational and ideological views often clash (Stark et al., 1997). One area of critical decision-making in the academic planning context relates to the overall focus of the curriculum which is expressed in an institution's philosophy of what it means to be an educated person (Association of American Colleges and Universities, 2008; Bok, 2006; Newton, 2008). The literature describes curriculum content-related tensions in two somewhat overlapping areas—how a program curriculum should be organized in terms of sequence and content, and, the philosophies which should guide the development of core or distribution requirements, a requirement often referred to as general education. Faculty make critical decisions about how to structure general education (Jones, 1992; Stark & Lattuca, 1997). Such structure must attend to questions of course sequence and content, and whether students should take a sampling of courses across key fields (a distribution requirement), or a selection of common courses across a variety of fields (a core requirement). The notion of a common core versus student freedom to pursue quasi-individualized programs of study is the crux of the debate (Boyer & Kaplan, 1994). Differences of opinion on general

education (Jones), where reforms have often been purposed to incorporate increased diversity into the curriculum and make it more relevant to socially diverse groups (Chism, 1994), have fueled tension between faculty and administrators over the past few decades. These reforms, sometimes initiated by administrators (Dubrow, 2004) can incite faculty discontent that their autonomy is being threatened. Faculty can feel marginalized, disempowered, or unheard in curriculum reform matters. Where their input is solicited and valued in the general education reform process, the process becomes a venue for changing how faculty feel about the value of their input in reform matters (Arnold, 2004). The reform process may be seen as a venue for resolving those situations, and the manner in which faculty participation in the process is engaged can sometimes breed distrust and frustration on the part of faculty. Additional pressure will continue to impact a planning system where success is based on a positive working relationship between faculty and administrators(Briggs, 2007; Kanter et al., 1997; Raby, 2007).

Evaluation of Teaching Performance

Closely related to academic planning is faculty responsibility for implementing the curriculum through their teaching role. As teachers, faculty in most institutions are routinely submitted to an evaluation of their teaching performance in the classroom (Stack, 2003). This evaluation is most commonly conducted through the ubiquitous student evaluation (Ackerman, Gross, & Vigneron, 2009; Nasser & Fresko, 2002) whereby students evaluate some combination of the course, their learning as a result of the course, and the instructor's effectiveness in the course. Student evaluations of teaching are for the most part institutionalized in higher education (Stack, 2003), yet much evidence exists for faculty discontent associated with their usage (Blackburn & Clark, 1975; Franklin & Theall, 1989; Nasser & Fresko, 2002; Wachtel, 1998). And while other less utilized methods for evaluating faculty teaching performance do exist and are increasingly utilized, e.g. peer evaluation (Ackerman et al., 2009; Kohut, Burnap, & Yon, 2007; Seldin, 1999a, 1999b; Yon, Burnap, & Kohut, 2002), and teaching portfolios (Boileau, 1993; Centra, 1994; Froh, Gray, & Lambert, 1993; Knapper & Wright, 2001; Murray, 1994; Seldin, 1991; Urbach, 1992; Yon et al., 2002), we will restrict our coverage of the topic to evaluation by students as its use has heretofore defined the context for the tension between faculty and administrators in the teaching evaluation context.

Our examination of this context relied on a comprehensive review of the literature on student evaluations of college teaching conducted by Wachtel (1998), supplemented by an examination of more recent key literature for evidence of ongoing issues in this context which potentially impinge on the relationship under examination. Emerging from the literature were two overarching unresolved issues which hinder faculty buy-in to the use of student evaluations (SE)—the validity of the instrument as a measure of teaching performance, and how the ratings are used by institutions, especially in the promotion, retention, and tenure (PRT) process. Research in prominent higher education journals is ongoing in attempts to provide

evidence of validity, presumably to build faculty credibility for their use. Research over the past 30 years has examined the effects of factors such as class size, course level and characteristics, academic discipline, gender of instructor, student major, and anticipated grade on student ratings. While on balance, the research has been supportive of SE's as reliable (Centra, 2003) and valid (Centra, 2003; Eiszler, 2002; Marsh, 1984; Renaud & Murray, 2005) measures, much of the research would appear to be purposed to discredit the use of student evaluations by uncovering additional or new evidence of their many flaws. This "search for bias" (Kember & Wong, 2000, p. 70) provides ample evidence that faculty discontent with such evaluations has not subsided.

Wachtel's (1998) review of the research on SE's described the approach to administration of evaluations, and characteristics of the course, instructor, and students, as four overarching factors potentially influencing student ratings in ways that might impact their validity or charges of bias in the process. A brief overview of the issues presented by these factors reveals their potential for fueling faculty discontent with SE's as a performance measure, and thus with administrators who decide how they will be administered and used. Wachtel cited literature describing potential undue influences on the administration of the evaluation—the timing of the evaluation (point in course when instrument is administered), anonymity of student raters, and instructor presence in the classroom, all of which can impact ratings to a greater or lesser extent. While there was less disagreement between researchers as to the effects of timing of evaluation on ratings, ratings would appear to be lower if the evaluation is administered too close to the final exam. Research through 1998 also suggested students have trust issues with faculty and administrators as they tended to give higher ratings when they had to identify themselves. Wachtel also reported that not only the instructor's presence in the room, but their distribution of the form, resulted in higher student ratings. Both administrators and individual faculty may attempt to mediate what they see as undue influences on ratings by instituting ad hoc modifications to the rating system. Such mediation is a good example of an unintended consequence of SE's which provokes tension (Ory, 2001).

Wachtel's (1998) review cited course characteristics as potential influences on course ratings. While not confirmed in the preponderance of the research, it has been shown that early morning and late afternoon classes, and required classes, receive lower ratings. Inconclusive as well, is other evidence suggesting that the higher the course level, the higher the student ratings, although Wachtel suggests that the effect may not always be direct. The impact of class size has been given a good bit of attention with much of the research finding that rating scores decrease as class size increases; this conclusion should be tempered however, given other research suggesting that size operates on only certain dimensions of teaching performance and that the relationship may be curvilinear with higher ratings observed at the two extremes only.

Consistent with the literature on differences in academic disciplines, it has been shown that the subject matter of the course influences student ratings of their instructors (Cashin, 1990; Feldman, 1978; Kwan, 1999; Neumann & Neumann, 1985). This is not surprising in view of the variations across disciplines in inclination

towards teaching and approaches to creation and sharing of knowledge (Braxton & Del Favero, 2000; Braxton & Hargens, 1996). Wachtel (p. 195) believed that the comparison of ratings across "unrelated subject areas," as is the case in the use of standardized rating forms, could indeed be problematic as a result, particularly in institutional efforts to apply common criteria for faculty rewards, promotion, and tenure. This assertion of subject matter differences is supported by more recent literature advocating the use of multiple measures of teaching evaluation as a more valid approach (Ackerman et al., 2009; Braskamp & Ory, 1994; Centra, 1993; Harrison, Douglas, & Burdsal, 2004; Kember & Wong, 2000; Ory, 2001).

Finally, Wachtel (1998) noted course workload as a variable which may possibly influence student ratings. More work is needed to better understand the impact of course workload as some research suggests the influence may in fact be in the opposite direction that some have claimed—i.e., the more difficult the course, the higher the ratings. Wachtel concludes with the speculation that the pace of a course may indeed have an adverse effect on student rating scores. If indeed this effect can be shown, then there may be greater concern for the notion advanced by Dommeyer, Baum, Chapman, and Hanna (2002) and Wachtel, that in order to secure higher student ratings faculty may compromise quality educational practices. This kind of teaching behavior, if uncovered, could not only escalate tension around SE's but potentially fuel distrust in the faculty-administrator relationship around institutional efforts associated with teaching improvement.

Some instructor and student characteristics may also potentially impact student ratings to some degree. While noting contradictory research, Wachtel's (1998) review provides evidence for lower ratings of younger, and more junior professors, and teaching assistants, when compared to their more experienced counterparts. Additionally, while studies are scant in this area, there is some support for a connection between instructor reputation and student ratings. Mixed outcomes in the study of a link between instructor gender and student ratings have been observed. As for the effects of student characteristics, Wachtel suggests that controlling for prior interest in the subject area may be important, and his review of studies related to student gender suggests that this variable might be controlled as well to address potential bias in ratings. Research on possible connections between students' expected grade and their instructor rating have been far more plentiful in the literature and represents one of the most controversial charges of bias according to Wachtel. He noted a consensus in the literature of a moderate positive correlation between expected grade and student ratings; however, the research is inconclusive as to whether or not this positive relationship is a threat to, or supports, the validity of the SE. The fact that research seems to support both validity positions legitimizes whatever controversy and conflict may occur in the practical context.

From Wachtel's (1998) review it is easy to see how the environment for decision-making around SE's can be very conflict-prone. Not only is there a lack of agreement on what constitutes teaching excellence, but goals for use of SE's are often not adequately communicated throughout the institution (Dommeyer et al., 2002), e.g. if/how ratings are used in promotion and tenure decisions. Blackburn and Clark (1975) raised an important concern over 30 years ago that has been echoed

consistently in the literature that judgments on teaching are often not made until tenure time at which point it is too late to correct any deficiencies. Yet certainly faculty who may be deficient in their teaching skills and could have benefited from self-directed or institutionally sponsored efforts to improve may have reason to argue unfair treatment. The use of SE's for summative, and not formative, evaluation must be considered a shortcoming in their use as has been acknowledged repeatedly (e.g., Brookfield, 1995; Harrison et al., 2004; Kember & Wong, 2000; Marsh & Bailey, 1993; Moore & Kuol, 2005; Smith, 2001; Zabaleta, 2007), and is no doubt a critical focus of conflict associated with their use.

Sources of Tension: Evaluation of Teaching Performance. The literature provides evidence supporting the "state of general tension" surrounding course evaluation (Nasser & Fresko, 2002, p. 196). This tension is fueled by an absence of an agreed-upon description of what constitutes good teaching (Bain, 2004; Kember & Wong, 2000; McKeachie & Svinicki, 2006; Shevlin, Banyard, Davies, & Griffiths, 2000), the fact that expectations for faculty at the department level are seldom communicated (Blackburn & Clark, 1975), and that the criteria for promotion and tenure decisions are often ambiguous at best (Schuster & Finklestein, 2006b; Tierney & Bensimon, 1996; Tierney & Rhoads, 1994), as is the extent to which SE's are used in those decisions (Stack, 2003). The continuing ambiguity in the meaning of teaching as scholarship(Kreber, 2002), a notion which potentially elevates the function of teaching as equivalent to that of research, further complicates agreement on the role teaching performance should play in PRT decisions. Faculty apprehensiveness about the emphasis of SE's in personnel decisions (Simpson & Siguaw, 2000) is thus understandable.

Perceived bias in SE's is an ongoing issue impacting wide faculty acceptance of SE's. Not only do faculty often charge that the rating instrument is biased, but the lack of clarity around how the ratings are prioritized relative to other measures of performance, specifically research, is often unclear (Stack, 2003) or not adequately communicated (Dommeyer et al., 2002). Faculty-administrator disagreement around how the results should be used is a certainty given the history of faculty malcontent around their use. Faculty disagree with their use as the only evidence of teaching quality (Ory, 2001) and criticize what Eiszler (2002, p. 499) refers to as a "pattern of over-reliance on and over-interpretation of the ratings." Further, faculty dispute consistent use of SE's in "high stakes situations" despite documented limitations to their value (Zabaleta, 2007, p. 68), believing that they should carry little weight in administrative decisions (Nasser & Fresko, 2002). Administrators conversely, cling steadfastly to their value in faculty assessment (Ackerman et al., 2009).

The firm conviction of faculty that they are not properly judged (Blackburn & Clark, 1975) becomes more entrenched when the approaches to evaluating their performance are seen by them as faulty. The appropriate weight of teaching and research in judging performance is a clear tension point. Blackburn and Clark (1975) found that while administrators agreed that teaching was the most important function of the faculty, they confessed to affording more weight to research in promotion decisions. Another discrepancy which goes to the validity of student ratings is the

variation in emphasis faculty and students place on various dimensions of teaching excellence (Feldman, 1988) as well as the comparatively low relationship exhibited by Feldman (1989) between faculty self-ratings of their teaching and the ratings of their chairpersons and deans.

Unintended consequences of teaching evaluations may escalate the tensions discussed here. Where administrators may see roadblocks to successful negotiation with faculty on their use, there may be temptation to act unilaterally. Faculty on the other hand, who believe evaluation tools often infringe on their instructional responsibility in the classroom (Ackerman et al., 2009), that their own best interests are not being served by the evaluation process, or that they are the subject of unfair evaluation (Blackburn & Clark, 1975; Shevlin et al., 2000), may compromise good teaching practices to secure higher ratings (Davidovitch & Soen, 2006; Dommeyer et al., 2002; Wachtel, 1998) or otherwise refuse to cooperate with the process. Ory and Parker (1989) raised the potential for alteration of ratings after submission by students, and clearly both faculty and administrators could be subjected to such a charge by the other group. The impacts of such contrary behaviors on either side has the potential to compromise the teaching-learning process, the faculty reward system, and faculty attitudes (Nasser & Fresko, 2002) all suggesting faculty satisfaction and institution quality can ultimately be compromised.

It is not a stretch to glean from the above literature that measures and processes associated with the evaluation of teaching are likely to be a source of strain in the faculty-administrator relationship. Evidence that faculty and administrators differ on what criteria are critical for evaluating faculty performance (Blackburn & Clark, 1975), and the unresolved controversy related to validity of SE ratings and their use (Wright, 2006) suggest that agreement amongst stakeholder groups in the evaluation process is unlikely. Further, the research has not directly addressed how the conflicting perspectives surrounding the use of SEs impacts the faculty-administrator relationship. The development of procedures to conduct SE's, oversight of the process, and use of the results are often primarily the responsibility of administrators (Dommeyer et al., 2002), not faculty members. Ackerman et al. (2009, p. 23) demonstrated the problematic nature of SE's by describing them as a "tool for exercising administrative power over faculty." Tension therefore, can be related to the myriad of issues associated with the instrument itself, its administration, and how it is used in the overall assessment of faculty performance.

Distance Education

The movement toward institutionalization of distance education (DE) (Pina, 2008) in postsecondary institutions, i.e. "the ability to deliver instruction freed from geographic and time constraints associated with traditional face-to-face instruction" (Tabata & Johnsrud, 2008, p. 626) is escalating. Epper (1997) suggests that emerging technology provides the foundation for a new competitive focus for higher education which changes the emphasis in instruction from a product-oriented focus to a marketing orientation. Complicating the changing instructional focus is the

complexity of the new instructional delivery systems (Welsh, 2000) and technology's resultant unprecedented changes in how academic work and careers are structured (e.g., Austin, 2002a, 2002b; Gumport & Chun, 2005; Paulson, 2002; Schuster & Finkelstein, 2006b). Dramatic changes in teaching and learning are on the horizon, if not already occurring, and the issues associated with DE as the primary source of these changes is certain to affect faculty relationships with their institutions (Oravec, 2003).

In their review of DE research Bray, Harris, and Major (2007) described factors impeding faculty adoption of DE technologies which span three major themes—Structure of faculty work and rewards, ownership of instructional materials, and faculty predisposition and technology-related obstacles. These will be addressed in turn.

Structure of work and rewards

Several key issues related to the structure of faculty work and rewards and their participation in DE emerged in the literature—increased workload, compensation, and the weight of participation in promotion, tenure and reward decisions. Faculty frequently express concern that participation in DE requires more time and effort than instruction in traditional face-to-face venues. Faculty studied by Sellani and Harrington (2002) equated the work involved in teaching an online course equivalent to that required of two face-to-face courses. They further characterized the whole of the teaching task as more complex given the added preparation required, the often unfamiliar teaching and learning technologies employed, and the more sophisticated communication techniques required to compensate for the lack of face-to-face interaction. These faculty also noted that online testing and other approaches to evaluating student learning are difficult, presumably due to the fact that evidence of learning is limited to the written word.

The added effort faculty claim is required to engage with technology-based instruction (Sellani & Harrington, 2002) raises questions as to the effect such participation has on their workload. For many faculty, particularly at 4 year institutions or those where faculty work is to include other scholarship in addition to teaching, increased time spent on teaching often means that less time will be spent on other scholarship. In 2-year institutions where research is typically not required of faculty, an increase in teaching effort resulting from engagement with distance technologies will result in less time spent on other teaching. Faculty may be justified in the assertion that if their workload increases then added compensation in some form, e.g. release time, honoraria, is appropriate (Bray et al., 2007). Faculty in Sellani and Harrington's study expressed the belief that extra compensation is important if institutions want excellence in online instruction. Yet according to Bray et al., compensation and incentive models have yet to be developed for development and use of instructional technology.

The concept of *unbundling* aptly illustrates the impact DE technologies have on the structure of faculty work. According to Paulson (2002) the concept was

originally used to better understand the various costs associated with the different aspects of delivering instruction, specifically, course design; course development; course delivery; mediation of the learning process; and, assessment of learning. In traditional face-to-face instructional models faculty have been responsible for all of these aspects of instruction, yet with the advent of technology-based instructional models, other professionals can be relied upon to address those aspects of the instructional process which are not dependent on the content-based expertise provided by faculty. Other expertise which is not typically possessed by faculty is viewed by experts as necessary for the effective enhancement of learning promised by new technologies (Paulson, 2002). The distributed curriculum model employed by the University of Phoenix for on-ground instruction uses area experts to design the content of courses and curriculum, while part-time adjuncts develop the course around faculty content, deliver the instruction, and mediate and assess student learning. A more extreme case of unbundling is illustrated in the "brokering" of instruction model adopted by Western Governors University (WGU) whereby faculty design the courses and curriculum and the institution connects students with a variety of education providers (e.g., other institutions, publishers, corporations) who employ interactive video, and other online and asynchronous instructional opportunities. Mentor-Advisors employed by WGU also serve the mediation function by helping students to link subject matter in the various courses required to meet their educational goals. Student assessment is accomplished by third-party providers approved by WGU.

We might speculate that the ultimate restructuring of the teaching role is likely to comport to the five aspects of instructional delivery just described as DE becomes more institutionalized. Yet where institutions do not unbundle instructional responsibilities for lack of resources to staff the non content-focused activities, faculty must become responsible for all aspects of the instructional function under a technology-driven model. This not only dramatically alters how faculty spend their time and effort but requires technological skills which they often do not possess. Faculty must commit time to learn the technology. However, their investment in such learning is hindered by faculty reward structures and promotion and tenure guidelines (Paulson, 2002) which are unclear in terms of if, and how, such effort will be rewarded (Bray et al., 2007; Pina, 2008; Sellani & Harrington, 2002).

Sources of Tension: Structure of Work and Rewards in DE. The potential unbundling of the teaching role will no doubt lead to increased conflict. Faculty will most certainly voice discontent with the increasing numbers of contingent faculty required to implement the changes, as they have in the case of additional professional staff required for commercialization and its associated functions as described by Slaughter and Rhoades (2004). Required augmentations to the non-tenure track work force is seen by faculty as a diversion of resources needed for their own support (Baldwin & Chronister, 2001) while administrators criticize faculty lack of cooperation in responding to the ever-present competitive threats that face them. Thus the faculty contract, both tenured and non-tenured alike, becomes an opportunity to maximize resources using the most flexible of university assets—faculty time and effort (Paulson, 2002). Negotiation of contracts as a result can be contentious.

Sellani and Harrington (2002) described course management issues arising from DE implementation which can spark conflict between faculty and administrators. Administrators may require a common syllabus across separate sections of a course to promote efficiency and decrease the risk of student complaints of variation in course requirements and grading practices. Faculty protested such action as an abridgement of their freedom of expression. They cited their right to employ varying approaches to course management, e.g. timing, frequency, and preferred mode of student communication as based in their right of free expression. Also, to address the economics associated with class size, administrators in Sellani and Harrington study initiated a variable rate compensation approach which compensated faculty based on their class enrollment, while faculty oppose such an approach based on the notion that the preparation, teaching, and accountability effort does not change based on the number of students in the class (Sellani & Harrington). Believing seating capacity is not an issue in distance environments (Slaughter & Rhoades, 2004), administrators often push to increase class sizes. Yet, Faculty, according to Slaughter and Rhoades, believe that successful student outcomes may be negatively impacted by inordinately large classes. Further, faculty have a natural resistance to teaching loads they perceive as oppressive (Ruscio, 1987). Sellani and Harrington's faculty also thought the greater effort and skill required in online teaching should translate into extra compensation if the institution wants excellent on-line teaching. These faculty also protested their exclusion from student disputes with administrators over grading practices.

Ownership of Instructional Materials

The upsurge in distance learning technologies has created some contested areas associated with proprietary materials and intellectual property ownership (Averill, 2003; Bruwelheide, 1997; Harney, 1996; Lawhon, Ennis-Cole, & Lawhon, 2006; Seadle, 2002; Welsh, 2000). Rights to ownership of intellectual property is an issue for faculty both in contract negotiations and in their decision to participate in DE (Oravec, 2003). Traditionally, universities have not claimed ownership of copyrightable work (Palattella, 2001; Welsh, 2000). Yet with the rapid advances in instructional technology and the potential for postsecondary institutions to package and sell courses (Palattella), ownership is fast becoming relevant beyond the traditional commercial activities typical in hard science disciplines.

Faculty who participate in DE technologies can potentially produce a variety of copyrightable materials which may ultimately reside in virtual spaces accessible to unauthorized persons. Using web-based technologies faculty may make available to students a variety of creative products (Palattella, 2001) including but not limited to their course notes, outlines, and Powerpoint presentations; their "performance" of a lecture; learning software they may create; text materials from other creators; images and video; test review and assessment materials; and email and discussion group exchanges (Oravec, 2003). Unlike in the traditional classroom where faculty

have control over materials they use in their teaching, locating such materials in the virtual world limits faculty oversight as to their access and use.

The lack of clarity regarding the legitimate ownership of course materials developed by faculty (Chew, 1992; Harney, 1996; Palattella, 2001; Rhoades, 1998) is a recurring topic in the literature. Foundational to the issue of course ownership is the definition of a course. Pallatella (2001) asks whether a course is a syllabus, the professor's ideas, the books and materials used, and/or the act of teaching itself. According to Rhoads, determination of ownership will be further complicated by the variety of course-related products that can potentially be produced. Slaughter and Rhoades (2004) raise the possibility of further obfuscation of the ownership issue as other university employees who provide technical contributions to coursework (Paulson, 2002) might also assert claims of ownership over instructional materials. There is little doubt of a lack of precision in guidelines for ownership and related issues such as fair use of course materials, and that the fast pace of technology growth raises the ownership stakes considerably (Harney, 1996).

Sources of tension: Ownership of Instructional Materials. Higher education institutions are feeling increasing pressure to assume ownership of instructional products to remain competitive (Epper, 1997; Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004, 2005; Welsh, 2000) in an environment that is relying more and more on technology-based instruction. As such, claims to the work produced by faculty, is increasingly a contested area. Some assert that administrative claims to faculty work is legitimate (Welsh, 2000) largely due to their investment in DE resources (Palattella, 2001) and to administrators' belief that they are "helpless against, or responsible for" prevention of copyright infringement (Seadle, 2002, p. 20). Further justification for this administrative position is that faculty work products are created on institutional time, using institutional resources, and that what they produce derives from a responsibility associated with their employment (Chew, 1992). At the same time, faculty, whose ownership of such work has not traditionally been challenged, consider the creative work they produce as expressions of opinions upon which their academic careers are based (Palattella, 2001), and can be expected to increasingly assert their rights to teaching materials they produce.

Traditional faculty control of course content is also threatened by the issue of "bootlegging" (Oravec, 2003) of instructional materials, while a concern to both faculty and administrators is rooted in differing unacceptable conditions. Administrators see the potential for unauthorized use of instructional content as a potential loss of revenue for the institution, while faculty voice concern for loss of control over course content, particularly the more they are exposed to DE (Bruwelheide, 1997; Harney, 1996). The issue of ownership of instructional materials is further complicated as administrative technicians (e.g. professionals in media centers, teaching centers, DE and computing centers) claim co-production of instructional products with faculty (Slaughter & Rhoades, 2004). This effect of unbundling means that "ownership may not be an all or nothing proposition" (Palattella, 2001, p. 55) as the number of professionals and technicians with unique expertise make contributions to the instructional process. Administrators therefore, want control of instructional products, which collectively and individually define the

essence of the institution's DE capability. This control translates into greater command over the institution's revenue generating potential. Faculty on the other hand, see the materials they use in teaching, whether lecture notes, images, Powerpoint presentations, computational software, exams, or study guides, as products of their scholarly expertise and unique approach to the course material. According to Oravec (2003), they are concerned about losing control of their instructional materials to administrators or third-party providers, and consider the issue one of academic freedom. Academic freedom can be negatively impacted (Burk, 1998) as instructional technology enhances the potential for increased classroom surveillance (Slaughter & Rhoades, 2004). Not only does student-student and faculty-student discourse become a matter of record, but the potential for observation of instructional activity can inhibit free expression in the classroom (Nelson & Horowitz, 2007). Possibly not as intrusive as classroom surveillance, but nonetheless a potential infringement on faculty control of course content are administrative initiatives to standardize courses in an attempt to control course quality (Oravec, 2003; Sellani & Harrington, 2002). Faculty deal with these concerns by not participating in DE, or by restricting what they put on the web, both of which can result in compromised learning outcomes.

Faculty Predispositions and Technology-Related Obstacles

Faculty commitment is a necessity for success of DE initiatives (Tabata & Johnsrud, 2008; Ulmer, Watson, & Derby, 2007; Welsh & Metcalf, 2003). Yet fear of change is problematic in most environments. In the academy, where the "inertia of tradition" (Epper, 1997, p. 553) defines resistance to innovation, change related to faculty incorporation of technology into teaching is certainly no exception. Dey, Burn, and Gerdes (2009) opined that faculty resistance to technology may be less a matter of technological concerns and more related to their well-entrenched beliefs and teaching practices. And faculty perceptions of the changes they are required to make (Khoury, 1997) can be particularly problematic given the immense impact DE can have on the teaching role as previously described. While some faculty may opt not to participate in DE simply because they prefer face-to-face interaction (Tabata & Johnsrud, 2008), the literature suggests that other obstacles may loom larger in their decision. Needed equipment may not be available, or access to it may require a number of changes (e.g., to course format or location as in the case of compressed video technologies) that faculty believe compromise pedagogical approaches (AL-Bataineh & Brooks, 2003; Groves & Zemel, 2000) and thus, the quality of instruction (Ulmer et al., 2007).

Academic discipline is another factor which impacts instructional approach (Braxton & Hargens, 1996; Neumann, 2001) and may consequently define faculty predisposition to participate in technology-mediated instruction (Ulmer et al., 2007). Academic disciplines characterized by high student-faculty interaction such as is required in the hard-sciences (e.g. lecture courses supplemented by lab session) may adopt DE strategies with a greater degree of student interaction thus enabling

more immediate and reliable feedback on student learning. Faculty in applied disciplines as a whole may also be advantaged in terms of their knowledge of, and experience in technology use. Dey et al. (2009) posited that the use of online visuals in "equation heavy" disciplines may be particularly useful, suggesting faculty in the hard sciences may have fewer barriers to communicating course content in a DE environment. Given the importance of experience in faculty willingness to participate (Bates, 2000; Del Favero & Hinson, 2007; Tabata & Johnsrud, 2008; Ulmer et al., 2007), greater knowledge of and experience with technology could lead to increased acceptance and use.

The reliability of technology has been shown in research (Bray et al., 2007) to be yet another obstacle. Given the fast pace of the advancement of technology and the coordination of effort often involved in implementation, technological failures are likely. Even when faculty are knowledgeable in the technology being used, other campus experts i.e. academic computing professionals, technology mediation experts, etc., often control its implementation. Thus, when online or other technological failures occur, it is often out of the realm of faculty expertise to remediate the problem, requiring the involvement of others thereby complicating the problem with communication delays frustrating to faculty and students alike.

Also complicating both faculty predisposition and technology-related obstacles is the time investment required of faculty to become proficient in its use (Quick & Davies, 1999; Sims, 1997). This obstacle goes directly to lack of faculty expertise (AL-Bataineh & Brooks, 2003; Khoury, 1997) and thus their commitment to participate in DE. Faculty development and training is key to effective technology use (Bates, 2000; Sifferlen, 2003; Sims, 1997), yet institutions are deficient in their ability to train them (Sellani & Harrington, 2002; Ulmer et al., 2007). Consequently, faculty are often left to their own devices to incorporate technology (Groves & Zemel, 2000). So unless they are inclined to develop their own skills in this area, technology is not likely to be integrated into their teaching (Del Favero & Hinson, 2007). Thus, technology education, if properly addressed, could potentially allay faculty concerns related to the overall quality of technology enhanced instruction.

Sources of Tension: Faculty Predisposition and Technology Related Obstacles. The offering of DE options for students, both at the course and program level, can translate into a competitive advantage for institutions. Faculty however, are less likely to participate in DE where they think it is valued by their institution (Tabata & Johnsrud, 2008); and if pressured to do so by administrators, tensions in the relationship are likely to result. The unhappy fact we believe to be associated with the general tension between faculty and administrators is that faculty are often reluctant to support initiatives being championed by administrators (Welsh & Metcalf, 2003) as faculty are naturally suspect of what they perceive to be the purely economic motives of administrators.

Planning, development, and implementation of DE is often haphazard and non-systematic (Pina, 2008). According to Bray et al. (2007) administrators have little guidance from the literature as to the financial aspects of DE implementation. Consequently, faculty uneasy with the speed of development of DE technologies

(Epper, 1997) may opt not to participate or abandon its use. Faculty are also skeptical regarding the quality of technology-based instruction (Sellani & Harrington, 2002; Tabata & Johnsrud, 2008). Where faculty cannot be provided evidence that an initiative is worth their investment, they may not only question the motives, if not the competency, of administrators, but they may even attempt to deter its use. Administrators may then find their institution at a disadvantage both in terms of gaining a foothold in this potentially lucrative field (Bruwelheide, 1997) of DE, and in making the best decisions about implementation and allocation of resources.

Resource limitations can also impact the reliability of needed equipment (course management software, compressed video and other electronic connections). The consequence can often be frustrated faculty when an administrator is attempting unsuccessfully to service participating faculty needs. Resource scarcity can lead to intense dissatisfaction (Bolman & Deal, 1997) on both ends and conflict can easily result. Resource limitations also impact institutions' ability to provide the kind of training and development faculty need to be successful in DE instruction (Del Favero & Hinson, 2007; Ulmer et al., 2007). Where administrators are charged with developing and implementing training, it is not an easy proposition to persuade faculty to invest in it. So even when training is available, faculty will often not take advantage of it either because they may not see the value in such an investment of their time or possibly due to the fact that they prefer traditional modes of instruction.

Academic Entrepreneurialism and Research

One of the primary roles of faculty in higher education is the conduct of scholarly research in one's field of study. While the degree to which one engages in research is typically a function of institution type (Austin, 1990; Clark, 1987b; Ruscio, 1987), faculty are nonetheless socialized as doctoral students to the value of research and its products as the *raison d'être* of a bona fide scholar. This socialization is so strong that the value of research often remains a central value of one's work despite the modified demands of one's role as dictated by institution type (Becher & Trowler, 2001). Research as a core value of one's discipline demands its exploration as a context within which faculty and administrator interests intersect.

The role of administrators as it relates to an institution's research function is less clear. According to Stark (1986), administrators play a broad role in promoting scholarship. One of the key functions of an academic dean, for example, is to support the individual inclinations of faculty in support of the institutional mission, e.g., research, ensure appropriate job autonomy, and provide faculty feedback on research performance. Further, administrators at all levels are involved in allocation of resources associated with the research function, including distribution of indirect cost overhead recovery dollars and decisions regarding faculty release time for research activities (Westmeyer, 1990). As we consider the direction of academic research in the twenty-first century however, there is little doubt that higher education's increasing relationships with industry have possibly the greatest impact on the culture and function of academic research in colleges and universities. This

new entrepreneurial culture defines a tension-filled environment within which much faculty research is conducted. This research sub context will be addressed in this section, by examining first, the character and sources of tension related to the new academic entrepreneurship, and second, the attendant issues related to conflict of interest.

Academic Entrepreneurship

The academic research environment, largely due to the escalation in university-industry relationships, has drastically changed over the past 20–25 years in ways we believe heighten the opportunities for faculty-administrator conflict. Changes in the science and engineering environment, as evidenced by the passage of the Bayh-Dole Act and related legislation in 1980, are possibly the most dramatic. Bradley (2002) describes this legislation as authorization for non-profit recipients of federal monies (i.e. universities) to manage the commercialization of intellectual property developed by their employees, i.e. faculty members. With this legislation, faculty members became incentivized to redirect a portion of their effort from traditional scholarship (e.g. basic research for the public good), to the development of products for the marketplace. What the legislation effectively did was to redefine research in the public interest as being served by university employees' pursuit of private gain (Slaughter & Rhoades, 1993). This effectively renegotiated higher education's social contract with society enabling universities to participate for private gain in the new knowledge economy (Glenna, Lacy, Welsh, & Biscotti, 2007; Slaughter & Rhoades, 1993), thus spawning a new, and now well entrenched, culture of entrepreneurship in academe. Traditionally, faculty were considered to "own" their professional time (Schuster & Finkelstein, 2006b), whereas the economic thrust of the entrepreneurial culture has altered the faculty relationship with their institution to one resembling an employer-employee relationship whose time is "owned entirely by the university" (Slaughter & Rhoades, 1993). Even community colleges, which have historically relied on local or state funding to exist, have expanded their focus to incorporate a significant entrepreneurial agenda where faculty are expected to look outside the institution for support of programmatic initiatives (Levin, 2006). While many faculty report they have always engaged in the transfer of developed technologies to the market place, the 1980 legislation resulted in administrators' closer scrutiny of faculty work with commercial possibilities (Bradley, 2002; Glaser & Bero, 2005; Nelson, 2004; Slaughter & Rhoades, 1990; Vestergaard, 2007).

Industry-university relationships exist when academic institutions or any of their senior officials have a financial relationship with, or financial interests in, a public or private company (Campbell et al., 2007). This relationship has benefited universities in a variety of ways—opportunities for increased revenues, the building of strong research commercialization capacity (Harman & Stone, 2006), increased institutional participation in the regional economy (Etzkowitz, 2002; Etzkowitz & Leydesdorff, 1998), and integration of the knowledge and skill bases of academe and industry (Harman & Sherwell, 2002). The types of relationships

are varied as demonstrated in a seven-campus University of California study which reported nearly one-third of the sponsors were pharmaceutical companies, 28% were biotechnology companies, 8% were education and non-profit companies, 8% were electronics concerns, and 5% were computer companies (Boyd, Lipton, & Bero, 2004). This distribution suggests the extent of involvement of faculty across disciplinary boundaries. While industry involvement in science and engineering fields predominates, this example well illustrates that other industries find such relationships with research universities attractive as well.

The attraction of a variety of industries to collaboration with university faculties implicates the potential for involvement of faculty from a variety of disciplines. According to Tuunainen (2005) the disciplines are in various positions in terms of their ability to take advantage of what literature has termed *academic capitalism* (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004). In addition it is thought that the potential for generating third stream income such as that associated with university-industry relationships cannot be predicted by discipline, or by institution (Pilbeam, 2006). Research in science and engineering undoubtedly is more closely aligned with industry and thus the predominant involvement of this faculty in such collaborations is not surprising. We assert however that the research environment ultimately impacts the academic research enterprise in general, and therefore all faculty, particularly since the flow of resources for research impacts power relations on campus (Siebert & Mills, 2007) as well as the research process. This assertion is legitimated by Slaughter and Rhoades' (1993) recognition that institutional policy calling for scrutiny and regulation of faculty industry involvements extends as well to those who are not industry involved.

Indeed, the development of enhanced managerial capacity and expanded managerial discretion associated with the oversight of the commercial aspects of faculty work (Slaughter & Rhoades, 2004, 2005), and the greater specialization and formalization of faculty employment contracts (Slaughter & Rhoades, 1993) impacts faculty work life institution-wide. The extension of such industry influence on academic work to all faculty is also seen in commercialization of the curriculum to fields that market courseware and other instructional materials (Slaughter & Rhoades, 2005). Thus, even though all faculty are not involved in product development research, these conditions leave little doubt that an expanding entrepreneurial culture, particularly in institutions with a strong research focus, is altering faculty work (Austin, 2002a), academic culture (Evans & Packham, 2003), and the social relationship between universities and their faculties (Chew, 1992; Gumport & Chun, 2005).

As revenue-producing research opportunities proliferate, institutions are urging faculty to become more entrepreneurial (Austin, 2002a). Given this growing culture of academic entrepreneurship in research universities, it becomes necessary to understand distribution of faculty time between academic pursuits "for the public good," and other effort with potential for faculty financial gain pursued on their own time using non-university resources. This distinction in faculty effort is critical in an institution's need to determine ownership of the products of faculty research, and in evaluation of faculty performance. While how such determinations are made

varies across institutions (Crespo & Dridi, 2005), the common thread associated with faculty entrepreneurial pursuits is the blurring of the lines between the role of academic researcher and private entrepreneur (Vestergaard, 2007). This overlap in roles often leads to faculty frustration in trying to serve both academic and industrial goals (Crespo & Dridi, 2005; Evans & Packham, 2003).

In understanding the implications of an entrepreneurial culture on administrative role requirements, we turn to Slaughter and Rhoades' (2004) classification of three relevant institutional constituents in an academic capitalism environment—(a) faculty who are concerned with control over their work and the products ultimately produced, and with expanding their share of profits; (b) senior administrators whose role is related to the generation of revenues for the institution, such as those produced by university-industry collaborations; and, (c) managed professionals required in numerous functional areas to service the expansion of commercial opportunities associated with the new entrepreneurial environment (e.g., technology transfer, economic development, conflict of interest, marketing) whose concern, according to Slaughter and Rhoades, is the maintenance of their position and careers. While this characterization of the concern of managed professionals as purely self- as opposed to institution-focused (see also Glenna et al., 2007) may be a bit harsh, the identification of more than one category of administrative constituents evidences the level and extent of institutional involvement in this type of faculty research. Enactment of the roles of this increased retinue of professionals requires, from an institutional perspective, a new kind of monitoring of the work of faculty, and no doubt adds an additional layer of complexity to the faculty-administrator relationship.

Sources of Tension: Academic Entrepreneurship. The structure and culture within which academic research is embedded is changing to accommodate academic entrepreneurship. Most evident is the cultivation of enhanced managerial capacity (Slaughter & Rhoades, 2004). Administrative oversight roles have been expanded (Rhoades, 1998; Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004, 2005) to promote research oriented toward public or private outcomes (Glenna et al., 2007) thus insuring the distinct roles of university and industry remain separate, and that the public mission of the university is not violated. Oversight of commercial production by administrators is also meant to insure the protection of institutional and faculty intellectual property rights. While these objectives seem reasonable, expanded administrative monitoring of the work of those who consider themselves autonomous professionals (Becher, 1989; Bergquist, 1992; Clark, 1987a; Etzioni, 2000; Ruscio, 1987) is of serious concern to faculty. Not only is this administrative growth a threat to their autonomy but in their view it utilizes resources which would be better spent on faculty needs.

One of the key sources of tension relates to the formalization of the relationship entrepreneurial faculty are to have with their institution as it relates to intellectual property rights. Individual faculty want control over the knowledge and products they produce, while the faculty collectively want greater influence in matters related to ownership. And while researchers, by law, own the intellectual property they produce (Chew, 1992; Schuster & Finkelstein, 2006b), sharing of ownership with

the institution, or total institutional ownership is often a goal for administrators. In such situations, resource scarcity principles prevail, with each party engaged in an enduring competition for resources (Campbell & Slaughter, 1999). These divergent objectives can result in unpleasant negotiations as both the faculty member and the administrator seek to capitalize on the potential financial gain from the products produced through the university-industry liaison. Consequently, faculty contracts and their negotiation have become more complex. And depending on the effectiveness of the administrative structure for oversight of such arrangements, the many aspects of faculty agreements with outside entities can easily escape scrutiny, which portends inevitable conflict when university processes are ultimately engaged.

Also impacting how faculty and administrators engage with each other is the changing nature of research in higher education (Altbach, 2005b) brought about by the increasing importance of the university-industry relationship. The culture of academic research, traditionally defined by Merton's norms of science (Evans & Packham, 2003; Slaughter & Rhoades, 1990, 2004) is changing to place greater emphasis on short term commercialization goals as opposed to long term gains in basic knowledge (Bradley, 2002; Evans & Packham, 2003; Zusman, 2005). Consequently, to conform to the necessities of the market place and address corporate interests, information flowing from research is often restricted, graduate student degree completion is delayed, and undesirable research results may be repressed (Zusman), all of which can lead to tension in faculty-administrator interactions as the various interests of students, faculty, and industry collide. While the impacts of this penetration of the entrepreneurial culture is no doubt dramatic in its effects, one cannot overlook the lack of commitment to an entrepreneurial culture (Harman & Stone, 2006) particularly among those in non-science and engineering disciplines. The implementation of research policy to accommodate entrepreneurial objectives no doubt spawns negative reactions from faculty not involved in research with commercial potential who perceive their autonomy is being threatened without cause. Unlike their involved colleagues, these faculty are getting no benefit in exchange for closer administrative scrutiny.

From a theoretical standpoint, Merton's norms (free sharing of knowledge, public ownership of knowledge, researcher disinterestedness, and organized skepticism) which have traditionally been imbued in faculty during graduate training and continue to guide their scholarly work as faculty members, are being roundly challenged. Again, the profit-making motives of research commercialization, which constrains the sharing of knowledge, has blurred the public-private boundaries associated with university work (Rappert & Webster, 1997; Vestergaard, 2007). To the extent that administrators experience this tension between the public and private goals of academic research, their interactions with faculty will be complicated. In fact, according to a Slaughter and Rhoades' (2004) study, conflict between Merton's norm of communalism (i.e., knowledge is to be shared), and the norm of ownership as the basis of profit-making associated with academic capitalism, is the greatest source of tension between professors and industry and professors and their institutions.

Finally, the overlap of the researcher and entrepreneurial roles of faculty, as it relates to institutional structures and resource sharing, also has significant potential for creating conflict between faculty and administrators (Vestergaard, 2007). Vestergaard has reported that where spin-offs related to research products have been created, conflicts are common over the use of university equipment, the use of faculty time, the reporting of university requirements related to the spin-off, and external communications related to the connections between the department and the spin-off. The rise of organized research units (ORU's) as mechanisms for the conduct of large scale research, and participating faculty's dual allegiance to a department and the ORU, adds to the structural complications. Organized outside the academic departments, these units can threaten the viability of department-based graduate programs as faculty time, graduate training, and resources related to both are no longer the sole purview of the academic department (Gumport, 2005). Faculty accountability for, and allocation of time between, teaching and entrepreneurial activities (Tuunainen, 2005) is often at issue in departments. Faculty engaged in industry partnerships and commercial ventures may have reduced time for teaching (Harman & Sherwell, 2002) which can frustrate administrative allocation of teaching loads. Issues of fairness inevitably arise (Campbell & Slaughter, 1999), particularly for department chairs who seek to equitably distribute instructional loads while at the same time giving consideration (e.g., release time) to faculty with high research production. Competition for resources, again, is a central issue.

Conflict of Interest and Its Oversight

As institutions are increasingly urging faculty to become more entrepreneurial (Austin, 2002a; Bradley, 2002; Campbell et al., 2007; Chew, 1992; Levin, 2006; Slaughter & Rhoades, 1990, 2004, 2005; Vestergaard, 2007), issues associated with faculty conflict of interest in their research can be expected to escalate. Largely as a consequence of higher education's increased partnering with industry, the scholarly interests of many faculty are becoming progressively more aligned to those of industry. This increasing bifurcation of faculty interests between those tied to academic values of production of knowledge for its own sake and those associated with the production of knowledge for profit suggests these conflicts can only escalate.

Most agree that conflict of interest defines a set of conditions, not specific behaviors (Glaser & Bero, 2005). A conflict of interest exists "whenever an institution or individual has a primary allegiance which requires certain actions, and simultaneously has a secondary interest that (i) could abrogate that primary allegiance, and, (ii) is sufficiently tempting to raise a reasonable possibility that it might actually do so" (Cohen, 2001, p. 210). The primary allegiance for faculty is assumed to be the employing institution, while the secondary interest may be a partnership in a company manufacturing a product derived from that faculty member's research, the possession of significant influence on the economic and financial prosperity of a profit-making entity, or otherwise the potential for personal financial gain in a relationship with industry. The goal, according to Bradley (2002) is to manage, not

eliminate such conflict. Clear conflict of interest policies are needed to ensure that financial needs and interests of institutions and faculty respectively, are balanced with their obligation to protect the objectivity of academic research. Yet, there is no doubt that where conflict of interest conditions exist they are sources of tension for faculty researchers (Crespo & Dridi, 2005) and a breeding ground for conflict among institutional constituents (Harman & Sherwell, 2002).

Sources of Tension: Conflict of Interest Oversight. It has been said that the job of faculty is to create conflicts of interest, and the job of administrators is to manage them, so as to avoid undesirable outcomes (Murray, 1999), i.e., the surrender of academic research objectives to profit-making ones. And given that university-industry activity is a contested terrain (Campbell & Slaughter, 1999) where faculty and administrators compete for power and control, faculty and administrators are likely to clash. Such clashes may originate as much from a clear conflict of interest matter as from perceived, or potential, conflicts. Also, the perceived motivation of one party by the other can be expected to loom large in these tensions. While the weight of the higher education literature (written primarily by faculty) tends to attribute unadulterated motives to the collective faculty in their relationships with industry, administrators in practice can be skeptical that faculty value public access to knowledge more highly than any personal gain that may accrue to them in collaboration with industry. And as borne out by the tenor of the literature, faculty are skeptical of administrator motives as well.

Policies and procedures developed to assert administrative control over faculty involvements for personal gain may likely be at the core of tensions in the conflict of interest arena. Faculty negotiating contracts with industry to guide their involvement in collaborative work can find themselves up against university policies which limit the extent of their personal financial gain. Income from consulting arrangements as well as stock ownership or royalties from companies that sponsor their research are often limited by university policy. Faculty effort expended on outside work is also typically limited, for example, to 20% of their time or 1 day a week. While this is a policy that can be applied to all faculty, those who are either involved with industry or are feeling the pressure to engage in such involvements, may be more impacted by such a restriction.

Institutions typically have policies which require faculty involved in outside consulting, collaborative arrangements with industry, or having other financial interest in corporate entities sponsoring their work, to disclose any such interests. Administrators rely on this reporting mechanism to determine where their monitoring efforts should be directed. Faculty, however can be resistant to such reporting as they see disclosure as a symbol of administrator intent to extract profits from them (Campbell & Slaughter, 1999). The disclosure obligation is seen by faculty as limiting insofar as it enables administrators to exert more direct oversight over their work. When faculty do not disclose, the repeated efforts of administrators to obtain such disclosure and otherwise assert the dictates of disclosure policy only tend to strain an already fractious relationship.

Administrative obligations to implement conflict of interest policies can be viewed by faculty as further intrusion into their academic work. Because

universities cannot develop strong commercial capacity without cash flow from industry (Harman & Harman, 2004), institutional management of resources associated with extending this capacity (e.g., faculty time, intellectual property ownership) is critical. The greater the motivation a university has to extend this capacity, the greater the environmental barriers for faculty, thus we can assume the greater the tension in related faculty –administrator interactions. And when such interactions involve faculty involvement in a spin-off company resulting from a commercialized product, all of the above sources of tension may come into play. Faculty-administrator negotiations involving spin-offs may be even more conflict-laden as there is a lack of clear policies and procedures in institutions for the management of these relationships (Tuunainen, 2005).

Appointment, Contract, and Tenure

The challenges of developing effective and what are perceived to be equitable systems associated with both administrative and faculty employment will continue to engage the faculty-administrator dynamic in the next decade. Increases in contract and non-tenure track/adjunct faculty (Baldwin & Chronister, 2001) describes a major trend related to economic retrenchment and evidence that both administrators and faculty believe current reward systems need to be changed. There is every sign that this issue will continue to be a major area in which these two key stakeholder groups will have to be able to function effectively together. To address these issues, this section broadly addresses three related topics: hiring, the contract and reward structure, and promotion and tenure.

Hiring

One the main areas that will temper the faculty-administrator relationship is the question of the hiring practices and patterns of both groups. Hansen and Guidulgi (1990) provide a rationale for the tensions in the faculty-administration relationship in hiring concerns, at least in part. The growth of accountability has lead to more required oversight within institutions, meaning a larger number of campus resources going to a larger administrative body with increased hirings (Bassett, 1983; Hansen & Guidulgi, 1990). While these works suggest that faculty distrust arose out of the growth of administration, Hansen and Guidugli's own findings suggest that this distrust may be displaced as the largest administrative gains in higher education took place in the same general positions as growth seen in the private sector. Morphew and Baker (2004), however, in looking across three decades of studies document the rise in administrative salaries comparative to those of other campus stakeholders.

Against this backdrop of mistrust stemming from hiring growth, salary differentials, and practices seen in the 1970s and since, Youn and Gamson (1994) suggest additional tension in the relationship in terms of hiring. Using data from 1989 to 1992, they found that budget crises and other financial issues provided increased

evidence of lines being removed or un-renewed as faculty left or retired from institutions. Administrative growth at the perceived cost of faculty is also at issue (Hansen & Guildulgi, 1990).

Administrative hires. While the bulk of the literature considering possible tension points focuses on faculty hires, administrative hires do offer some issues to consider. Davis and Davis (1999) found that the presidency is a high-turnover, short tenure position; doctoral institutions have an average presidential tenure of 4 years, compared to a 7 year tenure average across all institutional types. This short timespan fits with Sagaria's (1988) argument that mobility and incumbent advancement characterize administrative positions. Administrators' often limited tenure in position then, which can be exacerbated by administrative burnout (Johnsrud & Rosser, 1999), creates a challenge in terms of the time needed for the establishment of a trusting relationship with faculty. While the presidency still derives mainly from the faculty ranks (Birnbaum & Umbach, 2001), suggesting faculty and administrators often share a common background (Blackburn & Lawrence, 1995), increases in presidential appointments of individuals from outside academia, particularly those with business backgrounds, is increasing.

The job search process for academic administrators is not dissimilar from a faculty search; the search committee is a central element of both. Representatives of key stakeholder groups are involved on both search committees, which in the case of administrators may be bigger than faculty search committees but reflective of the stakeholder groups themselves. As Twombly (1992) showed in her review of searches for deans, faculty representation is still strong with department heads, and full professors, figuring prominently. She found that the search committees were unlikely to take the time to conduct a complete review of the position needs and goals of the hiring unit. As a result, the make-up of the committee participants and their values take on a core component of defining the search. At the presidential level, Davis and Davis (1999) note that presidential searches are "highly politicized, time-consuming, and costly in emotion, energy, and money" (p. 126) with all constituencies interested in determining rapidly who is on the search committee. They also write that presidents work most closely with governing boards, upper administrators, and faculty leaders; as a result these players are all involved in that search process.

The lack of search focus and the political importance of having a representative on the search committee may cause some concern among faculty. Tierney and Minor (2003) showed that only 32% of faculty respondents in baccalaureate institutions, 26% of those at master's institutions, and 22% of those at doctoral institutions said they had a substantial level of influence in the hiring of the president or the academic vice president (provost). This pattern holds true in HBCUs as well (Minor, 2005). Perhaps some may think this is the right level of involvement as Cunningham (2009) suggests that institutional performance deteriorates when faculty are active in hiring administrative personnel. The level of trust in an administrator may begin from the point of hire; the lack of clearly articulated goals and needs make the hiring process an almost exclusively political one, or at least even more than it is inherently. Those who do not "win" in having their choice selected or are not involved have

little reason to believe that the administrator will be their advocate. Furthermore, given that Bensimon (1991) showed that new administrators are hemmed in by faculty expectations which impact their ability to be effective, this challenge may be cyclical.

The diversity of those hired to the presidency has not changed greatly in recent years, and remains a possible source of tension as those desiring change seek avenues for recourse if the current hiring process does not show signs of improvement. Sagaria (2002) found troubling signs of race and gender becoming significant in final hiring decisions, well after the original search pool had been constructed, with white men being significantly benefited and to a lesser degree, white women. While there has been an increase in the number of women represented in college and university administration, including at the presidential level, that diversification does not appear to have spread evenly to minority administrators (Birnbaum & Umbach, 2001; Lively, 2000). Jackson (2004) supports this claim, demonstrating that while African American administrators have demonstrated gains at the department chair and provost level, and at 2-year and private institution administrative positions, they have seen overall decreases across the period of his study. This will be a challenge for both faculty and administrators to confront together as the hiring process involves both of these groups in avoiding maintenance of the status quo.

Faculty hires. Faculty hiring is conducted in much the same way; via search committees of key stakeholders, this time including program or department faculty as prime members, with approval processes via deans, provosts, and presidents. As opposed to a deleterious link between active faculty participation and institutional functioning in administrative hires, Cunningham (2009) here indicates improved performance through faculty activity in the hiring process, with others suggesting this inclusion is still present and typical (Minor, 2005; Simplicio, 2006). Coates, Humphreys, and Vachris (2004) found that administrative decision making has a large impact on faculty hiring in particular, beyond just this chain of final approval. As with Coates and Humphrey's (2002) single state study, their 2004 study of two states demonstrated that while faculty play a key role in the search process and on the search committees, the influences of administrators on the hiring process are multiple and layered which can frustrate and foster resentment in those who must work with those they felt they should have voice to hire but did not select. By helping determine strategic enrollment plans and subsequent faculty demand, and thus the extension of lines to departments or programs, the administrative influence here is strong.

The factors considered in faculty hiring decisions can be another point of contention. Twombly (2005) and Gahn and Twombly (2001) both suggest that historically prestige has been a main consideration in faculty hiring. Research, as opposed to teaching, is often touted as key to prestige and hiring as well; however Meizlish and Kaplan (2008) examined the relevance of teaching in the hiring process of faculty and found that it does indeed play an important role. Twombly (2005) found that in community college hiring, prestige is not the defining element. Many instances of applicants with Ph.D.'s being passed over in favor of those with Masters degrees was one indicator in her study. In counterpoint, Melguizo

and Strober (2007) found that faculty with terminal degrees from institutions with prestigious undergraduate programs had greater rewards in their hiring than those from other institutions. Prestige, and debates over weights for prior teaching and research become part of the source of tension in faculty hires (Youn & Gamson, 1994). Interestingly, Youn and Gamson suggest that affirmative action and other policy requirements are so constrained by rules that rather than becoming a tension point they instead serve as essentially a ritual. Articulating the expecting hiring model can be a source of tension as well, as they may differ particularly across 2-year institutions (Twombly, 2005). Twombly (2005) found that in two institutions, hiring was a dean's responsibility with approval from the vice president of instruction or vice president of academic affairs, and the consent of the governing board. The office of human resources may likely coordinate the search. At a third institution, the president was responsible for the hiring, with board consent. The control of the hiring decision can thus be a cooperative one via this process or a cause for more conflict.

While prestige may often be a central concern in hiring, two other main areas are of central concern in the literature of faculty hiring patterns: diversity and increase in non-tenure tack or contract positions. Diversity in faculty hiring patterns has continued to be a source of concern, much as it has for administrative hires, although with some different dynamics included. Perna, Gerald, Baum, and Milem (2007) have shown that the low number of Blacks at the entry faculty level is causing representation issues throughout the rest of the faculty career pipeline, with fewer Blacks getting tenure and filling full professor positions. Moody (2000) argues for the viciousness of this cycle; because faculty who hold tenure are instrumental in granting it upon others. Faculty of color therefore, cannot ensure their own greater representation, promotion, and academic survival, because they are not yet well represented at high levels in tenured positions. These effects also influence the issues aforementioned in diversity of administrative hires.

Affirmative action has been considered at various levels. For example in looking at law school faculty hiring Merritt and Reskin (1997) found that affirmative action effects were largely mediated by other factors in comprehensive models. Schwindt, Hall, and Davis (1998) looked at a single institution case study of hiring and found that faculty search committees did not feel bound by affirmative action mandates, expressing instead the feeling that affirmative action should be guiding and helpful in forming a pool of candidates but play little role thereafter. The faculty expressed no sense of being pressured to meet a quota or externally imposed goals in their hiring decisions. On the other hand, Smith, Turner, Osei-Kofi, and Richards (2004) found that minority faculty were hired far more frequently when the search was for a position that had a link to the study of race and/or ethnicity, used targeted hires, or explicitly included diversity indicators. This creates a sense that minority faculty may not be making the gains in traditional searches as might have been hoped by a cursory examination of simple headcount type reports. Smith et al. also found that the make-up of the search committee, particularly inclusion of a minority faculty member, also had a small relationship to increased likelihood of a minority faculty hire. Yet again this may be a place for tension, despite any positive impact on

minority hiring. Welsh and Metcalf (2003) suggest administrators feel the pressure from societal demands for change and faculty are more interested in preserving the status quo, a struggle which can negatively impact further diversification of college and university faculties.

Another concern given prevalent focus in the literature is the increase in the hiring of part-time or contingent faculty. Antony and Valadez (2002) point to the rise of use of non-tenure track and part-time faculty as a major and consistent trend across the last two decades. The increase in full-time non-tenure track faculty (Schuster & Finkelstein, 2006b) as a cost-saving measure (Baldwin & Chronister, 2001; Zusman, 2005) is often problematic for faculty members. Concerns about this shift go closely hand-in-hand with the diversity concerns addressed above. Perna (2005) showed that even after controlling for various demographic and professional characteristics, women were more likely to be in these non-tenure track positions than men, coinciding with what Toutkoushian (1999) had found earlier. Harper, Baldwin, Gansneder, and Chronister (2001) similarly found greater numbers of women in non-tenure track positions earning comparably lower pay and more likely to be teaching only undergraduate courses. By hiring non-tenure track faculty, Umbach (2007) has shown that institutions are in fact making a change that goes beyond simply efficiency; he argues that this change alters the way instruction is delivered. This will be a concern for faculty, particularly if they request tenure track lines and are continually denied them in favor of contract or contingent lines. While non-tenure track status may in some cases be desirable to new hires, the trend in this direction is not an insignificant one.

Sources of tension: Hiring. The areas mentioned above in hiring for both administrative and faculty lines offer many sources for tension among the two stakeholder groups. Control of administrators over hiring in the academic marketplace can be an area of contention (Caplow & McGee, 2001), particularly when there is an ongoing shift in the types of hires being pursued such as part-time faculty. As a result, negotiation over hiring lines, particularly given evidence of positions lost in times of retrenchment and unfilled lines combined with the current context, suggests this tension will continue to be apparent. Evidence also suggests disagreement and conflict exists between administrators and faculty over hiring standards or the lack thereof. On the other hand, Youn and Gamson (1994) discuss the frustration administrators have over protracted disagreement over recruitment standards. Yet the lack of clarity of standards identified by Twombly (2005) in hiring deans should perhaps be equally troubling.

The hiring of part-time and a more diverse faculty also needs to be addressed by both administrators and faculty and part of an intentional institutional plan rather than a haphazard direction that ends up becoming an unanticipated *fait accompli*. In terms of part-time faculty hires, administrators and faculty need to discuss the implications research suggests for following this trend. While faculty seem troubled by this, the lines extended by the administration do not necessarily match faculty requests. The faculty concerns over this direction in hiring will continue to be a source of possible conflict to watch carefully. Debates over the inclusion of the contingent faculty in programmatic decisions must also be resolved. Furthermore,

care should be taken so that part-time or non-tenure track lines do not become the bailiwick of minority or women faculty members to their exclusion in tenure track lines.

The literature seems to show some affiliated gains in diversity hiring which may or may not be attributable to affirmative action. More authoritatively, however, we can say that affirmative action does not solve the need for increased diversity. A firm commitment from upper administration must be focused on entry administrative hires, as well as using targeted hires to increase tenure track minority faculty inclusion and ensuring diversity of the search committee. Left to its own devices, the literature shows clearly that greater diversity in faculty and administration will not occur. To make the hiring useful in the long term resolution of support for minority and women faculty, effective socialization of new faculty requires the cooperation of administrators and faculty in developing mentoring and effective communication systems (Tierney & Bensimon, 1996; Tierney & Rhoads, 1994); these will need to be redressed to handle the part-time faculty concerns as well.

Contract and Reward Structures

Research has established that the reward systems that currently exist are not working (van Tassel, 1999), in part because of the relationship between faculty and administrators. Van Tassel's work (1999) suggests both administrators and faculty are dissatisfied with current reward systems. This does not mean they see the same areas as problematic however. The Sid W. Richardson Foundation (1997) study of 51 institutions found that administrators and faculty differed on the weight they believed should be placed on teaching and collaboration in reward structures. Particularly interesting was the belief on the part of administrators that the current reward system does not motivate faculty. The study found further that provosts, deans, and faculty alike thought the current system needed to change. Faculty were found to be much more likely to support merit pay and total evaluation system changes than were administrators.

Administrative rewards. By far the bulk of the work on contracts and rewards is focused on faculty. This does not mean that administrative contracts and rewards are not an important element to consider in the faculty-administrator relationship. Administrators face many concerns about their contracts as do faculty, although it has been looked at relatively recently and particularly with lower to mid-level administrators. A great deal of the issue deals with role ambiguity (Wolverton, Wolverton, & Gmelch, 1999); it is simply difficult for the contract to lay out what the expectations are and what the roles will be. This can make tailoring rewards equally difficult, yet the faculty have a relatively small role in this process for the president and the academic vice-president (Tierney & Minor, 2003). Johnsrud and Rosser (2002) suggest that midlevel administration is essentially composed of non-contract, non-exempt positions, with lowered satisfaction associated with role ambiguity and low salaries (see also Moore & Twombly, 1990). However, while administrators identify salary as their largest concern for their satisfaction,

Johnsrud and Rosser found that the problem is not as clear-cut as simple salary level. Instead of salary itself being the important factor for administrator satisfaction, it is instead the perception the administrators hold of their salary that matters. Essentially, if administrators view their effort is appreciated, they are more likely to be satisfied with their contract and reward structure. Thus, salary and other formal reward structures are not always the most important to consider; intrinsic rewards matter too in satisfaction (Ryan & Deci, 2000). Workplace relationships and collegiality (Johnsrud & Rosser, 1999; Volkwein et al., 1998; Volkwien & Parmley, 2000) have been found to be consistently important in administrator satisfaction (see also Hagedorn, 1996). As mentioned in the introduction, while salary may not be defining for administrators, salaries can be an issue for faculty. The literature has described the perception that increasing administrative salaries and positions come at a cost to the faculty (Bassett, 1983; Bergmann, 1991; Morphew & Baker, 2004; Hansen & Guidulgi, 1990).

Faculty contracts and rewards. As noted above, control of the number of faculty lines available, whether they are contracted as full-time tenure track lines, or part-time non-tenure track lines, is all part of the ongoing negotiation in which faculty and administrators will engage for the foreseeable future. Westmeyer (1990) argues for various levels of faculty involvement, i.e. collective bargaining, in employment-related concerns; and certainly there is ample evidence that faculty have strong concerns to voice in this area. Xu (2008) argues that moving resources to the middle levels of administration, such as deans and department heads, will allow those individuals to best apply available rewards for faculty retention taking disciplinary differences into consideration. However, even then evidence shows that there is not a consistency to administrative and faculty viewpoints on reward structures.

Institutional expectations of faculty are commonly governed by individual faculty contracts which often vary by faculty member and by institution type. The personal negotiation of individual contract can play a huge role in setting up success or failure of the individual; and there have been studies demonstrating differential levels of success in such negotiations. Issues requiring negotiation range from salary, to teaching load, to number of years brought to an institution toward promotion and tenure, and to computer replacement schedules. Research shows that those with poor mentoring in graduate school will be severely disadvantaged in such negotiations (Tierney & Bensimon, 1996). Women and minority faculty are disproportionately affected, leading to lower starting salaries. As a result, upper administrators need to ensure rewards and sanctions are in place to improve the environment for women in faculty positions (Bronstein & Farnsworth, 1998). Because salaries are often raised on a percentage basis, this lower starting salary is compounded over time (Hearn, 1999a; Perna, 2001a). As a result, some faculty may become predisposed to be less trusting of administration if they feel they have been taken advantage of in these negotiations, unfairly compensated for their expertise, or even undervalued by virtue of their areas of research.

As mentioned above, there is a move to non-tenure contracts rather than tenure-line ones (Baldwin & Chronister, 2002). In Canada, the move also involves steps toward a 12 month contract as opposed to a 9 month contract traditionally the term

for tenure track positions, at least in part because of the unionized faculty system there (Rajagopal, 2004). In summarizing across studies, Antony and Valadez (2002) suggest that part-time faculty are more likely to be women, have a lower level of qualification, and to receive lower pay and benefits (see also Clark & Corcoran, 1987; Davis, 1986; Weis, 1987). Antony and Valadez find that full-time faculty had concerns with benefits like job security, tenure, pay, and other benefits. While part-time faculty found these elements important as well, they were less likely to leave their current institution to improve them.

As with women, minority faculty members face challenges including a collective tendency to take on more joint or split appointments (Menges & Exum, 1983), leading to role confusion and conflict in the fulfillment of their contract. Johnsrud and Sadao (1998) however, find that minority faculty understand the normative expectations and roles, and the challenge instead is attempting to succeed within a reward structure that does not tend to appreciate or reward alternative perspectives. As the authors suggest, it is not a structural barrier to the rewards in this case, but a normative one and one that will likely be a continued source of tension as tenured faculty and administrators alike must reconcile how to evaluate and share appropriate feedback on career progress and status with these faculty members.

Another consideration discussed often in the literature is the balance of research, teaching, and service, although they are not equally of concern across all institutional types. Certainly the balance of the three is also a concern in promotion and tenure decisions as it has implications for merit pay and other rewards. Bess (1998) argues that it is important to acknowledge the existence of a very real need to divorce the concept that all faculty members should embrace equally the triumvirate of teaching, research, and service. Instead, the three components offer different rewards, he suggests, and thus the contract of each faculty member should take into account strengths and desires of that member to maximize efficiencies and strengths. Boyer (1990) as well, focuses the discussion around the need to more equally appreciate multiple forms of scholarship, including teaching, as more on par with research.

Prestige is of central importance in considering the balance of these activities in the reward structures that exist. Reward approaches are determined in part by institutional type, with research institutions rewarding research and the prestige that comes from it more strongly than teaching, for example (Blackburn & Lawrence, 1995; Fairweather, 1996; Melguizo & Strober, 2007). The literature shows research is rewarded more strongly than teaching, while service is lowest on the scale (Astin, Antonio, & Cress, 1997). As Antonio, Astin, and Cress (2000) argue, if marginalized faculty are the ones most engaged in service projects, then the effort itself will be marginalized so moving to shift from research rewards to other forms may be slow in coming. Edgerton (1993) found that even faculty believe teaching is undervalued in reward and promotion and tenure systems (see also Boyer, 1990). The bigger challenge is the lack of communication. The Sid W. Richardson Foundation study showed that while administrators likewise viewed teaching as an activity that should be important in reward structures, faculty did not believe that administrators valued teaching in this way. Padovan and Whittington (1998) found faculty and

administrator disagreement over the rewarding of scholarship in the 2 year system. These signs of disconnect are likely to continue to create tension in the relationship.

O'Meara (2002) suggests that dissatisfaction with reward systems is not just internal; she argues there is an external challenge for the reward structure as well, specifically, that there is increasing external pressure for faculty work to be linked to the community or public good. Following Welsh and Metcalf's (2003) logic, this would presume an administrative push in this direction which evidence suggests would be resisted by faculty. Indeed, research has shown that this type of service is less rewarded in the current academic rewards structure (Checkoway, 2001). Already the most marginalized of faculty, i.e., women, faculty of color, and junior faculty, are the ones most heavily involved in service of this kind, (Antonio et al., 2000; Bellas & Toutkoushian, 1999), with senior faculty and those with greater influence on the rewards structure less likely to value new forms of scholarship. O'Meara suggests it will take administrative leadership to consistently remind faculty to include service as an important factor in promotion and tenure, as well as other reward, decisions.

Salary, along with the collegiality of interactions, influences faculty stress, which Johnsrud (2002) suggests is a mediator for satisfaction. Salary differences between public and private institutions were not as pronounced in the 1970s, although Fairweather (1996) found that being in a private institution coincided with a higher salary. But with budget reductions and allocation cuts in the 1980s, academic mobility increased and faculty with the record and ability began to conglomerate in research and private institutions. This has been a continued collective advantage in salary and other rewards for these faculty over time. Fairweather found that in research institutions, rank, being male, being at a private institution, and being in a high-paying field all positively impacted salary. Research has shown that women receive lower salaries then men (Bellas, 1994; Hagedorn, 1996, 1998; Toutkoushian, 2000), a finding that is exacerbated by salary increase percentages over time (Hearn, 1999a; Perna, 2001a). Bellas (1994) and Seifert and Umbach (2008) demonstrate that the higher the percentage of women and faculty of color in a discipline, the lower the likelihood that the faculty had a sense of equitable treatment. The fact that the salary differential is so prevalent, however, and that salary is a vital element in faculty departure decisions (Hagedorn, 1996), suggest that this inequity is likely to compound the lack of women advancing in tenure track positions. Hagedorn (1998) argues that compensation for past inequities may cause tension over time and that perhaps this particular dispute between faculty and administrators can be mediated. Instead she suggests that women graduate students and faculty are mentored to ensure they are qualified to receive equitable salaries and increases.

Salary advantages may be compounded over time as the initial contract sets the base for future increases. There are three main systems of pay, contract or merit pay, standard raises, and hybrid models, although it is unclear which is the most commonly used (Sutton & Bergerson, 2001). Merit pay may be used as a separate motivator from the promotion and tenure system. As Hansen (1988) notes, the two most common approaches are flat dollar increments for performance while the other involves percentage raises. Wenger and Girard suggest in their work a percentage raise increase that may help avoid salary compression, something they

indicate administrators are keen to avoid. Van Tassel (1999) showed dissatisfaction with merit pay, among other reward decisions, given that the weighted balance remains focused heavily on research and thus causes a problem for those who focus on field-based settings or focus on teaching.

While salary is one of the strongest factors in faculty recruitment (Tierney & Bensimon, 1996), there are also other rewards that need to be considered as well. While faculty do view salary rewards as a form of recognition of their work, after salary has reached a base standard, it does not serve as the primary motivator of faculty (Hearn, 1999a; Moore & Amey, 1994). Instead, promotion and tenure, rank, and other sources are predominant. Fairweather and Beach (2002) found that policies not linked to department or college award systems are highly unlikely to influence faculty behavior. Furthermore, if the department in question is receiving external funds, even the connection of policies to rewards has a diminished return. Their work echoed the findings of Colbeck, Salerno, and Moran (1998) and Colbeck (2002). Hearn (1999a) suggests that while salary is not the most important item to all faculty, it is the one reward that is most easily manipulated by administrators, particularly considering the effort required to determine what reward faculty would need to help with their research timeline. As Alexander (2001) suggests, fringe benefits, tenure, family tuition waivers, retirement investment matches, graduate assistant support, and reduced teaching loads are all pieces of the contract and reward puzzle which can have similar effects, if at different levels. Support personnel, facilities, and supplies all can be viewed as rewards and leading to increased satisfaction (Bowen & Schuster, 1986).

Sources of tension: Contracts and rewards. The disagreement over which areas of the reward structure need change, handling lower salaries of woman and minorities in faculty positions, and the lack of understanding of what other stakeholders value in rewards discussions form the nexus of the problems that exist. Padovan and Whittington (1998) further found disagreement between faculty and administrators in the 2 year system on release time for conducting scholarship and the heavy teaching loads that prevented scholarship work. While administrators believe research and teaching are mutually supportive (Tang & Chamberlain, 1997), Shapiro suggests upper level administrators to be the ones to push the balance pendulum to weigh more heavily toward teaching in reward structures. They will have to take care in how they do so however, as faculty distrust in administrators increases with administrative position in the hierarchy (Austin & Gamson, 1983; Tucker & Bryan, 1991). As overarching changes to reward structures are considered, then, those layers of distrust will present hurdles for moving forward. Evidence suggests that reform of faculty reward systems (Diamond, 2002) will become an increasingly challenging collaborative activity as the academic profession continues to change (Schuster & Finkelstein, 2006b). Boyer, Altbach, and Whitelaw (1994) suggest a striking lack of confidence and understanding between faculty and administrators, something highlighted as well in the Sid W. Richardson Foundation (1997) report. The reports suggest communication is poor and leadership in forging mutual understanding is inadequate. Yet for faculty and administrators alike, positive and collegial relations are a benefit. This suggests the real challenge for the faculty-administrator

relationship is to work together often enough and openly enough to reach a point of collegiality (Johnsrud, 2002) to cooperatively address contract and reward reform.

Promotion and Tenure Processes

Promotion and tenure processes are a central element of institutional structures that can be used to influence faculty behavior (Fox, 1983). Once faculty have gained tenure they are better protected to question administrative positions and use of resources (Moody, 2000). Tenure therefore, provides faculty more than the assurance of academic freedom with due process; it also has been argued that the concept of lifetime employment via the protections offered is another way to recruit and retain faculty from going into other sectors (American Association of University Professors [AAUP], 1996; Finkin, 1996). Tenure also ensures that after building sound research acumen, faculty can be more adventurous in taking steps toward advancing their research agendas (Moody, 2000). Removing tenure, Moody argues, would put faculty even more in a state of dependence on administrative approval; this is the situation of part-time faculty and the direction the field is moving. Perhaps, then, it is no surprise faculty feel distrust of administrative efforts in this direction.

Challenges regarding tenure and promotion include not only the question of who should be involved in various aspects of assessment (Collins, 2003), but also differences in opinion over just how much influence faculty actually have (Tierney & Minor, 2003). Faculty are evaluated by faculty peers within their department and college via personnel committees, and also by administrators (Bronstein & Farnsworth, 1998; Kahn & Robbins, 1985). Tenure is thus a combination of faculty and administrative input (see also Minor, 2005). While administrators have voting power, they also have the power of framing the discourse of expectations (see Bean, 1998) which frame tenure.

While faculty historically have a great deal of sway over promotion and tenure decisions (Simplicio, 2006) and in many places this is still true (Kater & Levin, 2005; Tierney & Minor, 2003), in Youn and Price's study it becomes clear that administrators, particularly the president, can sway the weighting given to various tenure criteria. By the 1990s, external peer review was integrated into the process. Practices in selective liberal arts and research universities were incorporated into other institutions as a way of learning and gaining legitimacy from these other institutions' practices. Yet academic vice presidents often consider faculty to have far more control of the tenure and promotion standards than faculty themselves do by an 18% margin (Tierney & Minor, 2003).

Just as there are ambiguities to the roles of faculty and administrators in governance across personnel issues, there are likewise ambiguities in expectations for tenure (Tierney, 1998). O'Meara (2002) notes the often ambiguous and conflicting nature of tenure and promotion criteria; understanding what matters and to what extent can be difficult for faculty adding a component of stress at trying to hit an invisible target (see also Austin, 2002a; Rice, Sorcinelli, & Austin, 2000; Ward &

Wolf-Wendel, 2004). Austin (2002a) suggests the term "mixed messages" summarizes the experience well. Ambrose, Huston, and Norman (2005) likewise found that faculty were dissatisfied with promotion and tenure policies at two levels, with the lack of constructive feedback from senior faculty and the lack of departmentally stated clear expectations for tenure and promotion. Interestingly, they also found that faculty who had received tenure shared frustrations with the communication and overall promotion and tenure processes, even though they had succeeded within the model that existed. While ambiguity is high for all probationary faculty, it is even higher for those who operate outside institutional norms, compounding ambiguity and stress for minority and women faculty members (Tierney & Bensimon, 1996). Those who had received their terminal degrees from prestigious institutions, however, seemed to have gained a greater understanding of normative expectations and reported less ambiguity in the process.

As noted above, the movement in the field of higher education employment is away from tenured faculty and toward part-time faculty (Schuster & Finkelstein, 2006a; 2006b; Youn & Price, 2009). There are suggestions that the reasons for this change may be linked to the graying of the faculty, creating an increasingly more expensive set of faculty precipitating the need for cheaper part-time faculty, or perhaps the fixed nature of tenure hinders institutions' ability to respond to market changes (Baldwin & Chronister, 2001; Gappa, 2001; Hutcheson, 1998; Leslie, 1998). Umbach's (2007) findings suggest that the use of part-time faculty cannot be viewed simply as a cost saving measure but also as a different approach to delivery of undergraduate courses, with fulltime non-tenure track faculty interacting with students less and requiring slightly less effort. The move to more part-time faculty also increases turnover and possible disruptions to course offerings (Zhou & Volkwein, 2004).

Many traditionally discuss the weight given research in promotion and tenure decisions. Boyer (1990) demonstrates the rewards for research and publications in research and doctoral granting institutions but that those in the 2-year system, liberal arts, and comprehensive colleges and universities give greater weight to teaching in promotion and tenure decisions. Olsen, Maple, and Stage (1995) found that knowing the weight research is given is not enough; their findings showed a relationship between clarity of tenure expectations and women's satisfaction with their research. Clear communication of values from administrators and faculty alike is therefore important (Bray, 2008). However, this clarity, or even agreement over criteria, does not always exist. While research, teaching, and service are the three pieces of promotion and tenure articulated in many works, Mawsdley (1999) discusses the role that collegiality plays in promotion and tenure decisions. Court cases have provided that while discriminatory practices have no place in higher education employment decisions of any kind, collegiality is a legal consideration. As Mawsdley noted, much of the governance within departments requires a great deal of collegiality and the probationary period of tenure allows one's peers to get a sense of how one works.

Several inequities have been apparent in the promotion and tenure system, inequities that can be shared by faculty and administrators given the role both play in promotion and tenure decisions. Harper et al. (2001) found that the pay of

non-tenure track women is less than that of comparable non-tenure track men. Brenemen (1997) argues the need to protect and reward those in non-tenure positions; this can be accomplished via increased salaries, professional development opportunities, or parallel systems of rank. Gaps in inequity are greater for Black faculty than administrators, although both face inequity (Perna et al., 2007). For example, Black faculty have found their work devalued and characterized their work environments often as tense (Turner, Myers, & Creswell, 1999; Johnsrud & Sadao, 1998). Thus, not only is research weighted more heavily than teaching, but some kinds of research are weighted more heavily than others as well, with Black faculty commenting upon the pressure they feel to publish in "White journals" (Johnsrud & Sadao, 1998). Women too were far more likely than men to experience discrimination, and because males fill the roles of those providing promotion and tenure, women face greater challenges to reaching those goals (Bronstein & Farnsworth, 1998; Kahn & Robbins, 1985). Bronstein and Farnsworth argue that as such cases of uncomfortable and intimidating procedures continue unchecked by upper administration, a message is sent that it is acceptable behavior to discriminate. These inequities must be made clear in training programs so faculty and administrators alike are aware of possible discrimination and its impacts on tenure and promotion.

Sources of tension: Promotion and tenure decisions. Promotion and tenure policies and decisions are a point of conflict and tension for both administrators and faculty, with personnel decisions like tenure a main stress point for deans (Gmelch, Wolverton, Wolverton, & Sarros, 1999; Holton & Phillips, 1995). Johnsrud (2002) found similarly that department heads also had higher stress in personnel decisions. Conflict over promotion and tenure is likely to be found in departments where instructional loads are higher, those organized around "soft" disciplinary categories (see Biglan, 1973), and those with lower levels of women and senior faculty (Hearn & Anderson, 2002). Thus, demographic differences in the faculty and paradigmatic differences in discipline comprise other possible sources of conflict.

In one sense, tenure should help ensure a healthy amount of conflict on campus. Moody (2000) notes that tenure provides protection to faculty who challenge administrative decisions. O'Meara (2002) suggests that tenure decision criteria can in reality be other than what is suggested by policy leading to power struggles in setting expectations as well. As a result, departments need to unpack policy for faculty and articulate acceptable forms of scholarship and appropriate performance expectations.

Faculty need both formative and summative review; trying to conduct both in the same evaluation process, however, can cause problems (Mills & Hyle, 1999). Both depend upon open communication and clear criteria from one's peers and administration. This points to another evaluation related tension—the question of post-tenure review, which can be seen as a very helpful accountability measure by administrators but as an attack on tenure by faculty (O'Meara, 1994; Wood & Johnsrud, 2005). Baldwin, Lunceford, and Vanderlinden (2005) found that faculty post-tenure show lower engagement suggesting perhaps something is required to spark engagement. Little yet is known about post-tenure review practices and implementation (O'Meara, 1994). On the other hand, one source of the tension in

post-tenure review was the sense that faculty wished to hide certain activities, or lack thereof, from administrators, providing yet another example of a low level of trust in the relationship.

Conclusions

Our examination of the evidence in the literature supporting the tension in the faculty-administrator demonstrates both the importance, and intractability, of this relationship. We have examined several contexts framing the necessity for faculty and administrators to collaborate, and yet the contexts explored represent only a sampling of those within which they interact. This no doubt suggests additional complexities should be explored. Nonetheless, it is incumbent on us, and indeed it was our direction when we began this exploration of the literature, to use what we have learned here as a way to stimulate additional research on this complicated topic. There is little doubt that follow-up research is needed given the immense changes occurring in higher education today, changes which are placing added demands on shared governance processes and the needed collaboration which drives them. To contribute to the advancement of further study of the relationship we will close our examination of this topic with first, a brief discussion of two significant influences we believe are critical to its investigation—institution type differences and variations in academic discipline. The literature demonstrates the broad influence of academic discipline (Becher, 1981; Becher, 1989; Biglan, 1973; Braxton & Hargens, 1996; Del Favero, 2001; Fuchs, 1992; Neumann, 2001; Oloyede, 2002; Toma, 1997) and institutional type (Austin, 1996; Boyer, 1990; Braxton, 1996; Bray, 2008; Ruscio, 1987; Tang & Chamberlain, 1997) particularly on faculty work and institutional authority patterns (Ruscio) so their influence on this relationship necessarily follows. Secondly we will review what has been learned from the work represented here, what additional knowledge is needed to further our understanding of this relationship, and make recommendations for further study.

Effects of Institutional Type

Given the differences in the missions generally attributed to the different institutional types, and the differing role expectations for deans (Cote, 1984; Mercer, 1997; Montez, Wolverton, & Gmelch, 2003; Patti, 1997; Smart & Elton, 1976; Wolverton, Gmelch, Montez, & Nies, 2001) and other academic leaders (Bensimon, 1991; Cote, 1984; Smart & Elton, 1976) within these institutions as a result, perhaps it is not surprising that there are some important institutional considerations when it comes to the faculty-administrator relationship. Differences may not even be across institutions but within them as well (Fairweather & Beach, 1992). As with many of the rest of the findings presented in the research included here, though, issues themselves are often not inherently contentious. Even times of trouble show faculty and administrators working together well (Eckel, 2002). Instead, the relationship tends

to become contentious when administrators and faculty too violate expected patterns of behavior. Stress arises in public institutions particularly as mandates for change seem to become associated with administrators who must focus on meeting the expectations for continued institutional functioning while faculty tend to desire the status quo, and challenge things that impinge on their academic freedom and perceived current structures, which they believe strongly have been established in the way that supports best student learning and achievement. Bray (2008) found multiple differences in faculty expectations for deans' behavior based on institutional type. His research suggests that the liberal arts college faculty hold normative expectations for a greater level of collegial leadership (see also Birnbaum, 1988) than do faculty in research institutions. These expectations include higher levels of communication, clarity of goals for promotion and tenure, and so on.

Institutional differences know no bounds; they pervade across each of the areas we have discussed in this chapter. They impact programmatically, as Colbeck (2002) showed institutional differences for policy implementation of undergraduate standards among faculty and administrators. Levin (2006) has shown expectations growing in community colleges for external funds to make programmatic changes. The hiring process itself bears some differences across institutional types, with differing levels of authority and administrative inclusion in the process of decision-making (Twombly, 2005). Prestige is not a central element of community college hires, while it tends to be in 4-year institutions (Twombly). This is not combined with a finding that these structures or modes are less effective for greater levels of administrative inclusion or even more contentious; it is simply an explanation of what exists. More contentious is the rising challenge over the hiring of non-tenure track faculty which is a growing concern across institutional types. Sex differences (Perna, 2001a,b) and racial differences (Jackson, 2004) will both continue to be a point of contention as merits in each individual hiring decision will compete with overall institutional goals to increase representation and inclusion in both faculty and administrator ranks alike.

The fact that certain institutional types pay higher salaries (Hearn, 1999a) does not indicate necessarily that there is a stronger or less contentious operating arrangement at these institutions. Indeed, Hearn argues that higher salaries do not equate with better performance either. Combined with the findings presented above that many administrators and faculty feel that reward structures are in need of an overhaul, that faculty are not necessarily driven by salary rewards beyond a certain point, and that recognition or perception of salary rewards as a form of recognition, this seems to indicate that higher base salaries are not necessarily a root of tension between faculty and administrators. Instead, across institution types it is the process for awarding monetary rewards that matters.

In promotion and tenure matters, the added component of whether research is a main element of the review process provides increased levels of complexity and opportunities for disagreement over quality and worth. To this end, research institutions value research and debate its merits while 2-year institutions at the opposite extreme value teaching more heavily with the question of the value and compensation of online teaching a possible point of contention (Bray et al., 2007).

Effects of Academic Discipline

Braxton and Hargens (1996) collected evidence of disciplinary differences across multiple areas of institutional functioning and concluded that the differences are "profound and extensive" (p. 35). Given their conclusion, the way things are done within each discipline may be important, with soft sciences tending to be more collegial and discussion oriented and marked by higher levels of ambiguity than hard sciences. As Krahenbuhl (2004) suggests, the process by which decisions are made is often just as important as the end decision itself. Beyer and Lodahl (1976) showed that social science faculty with collegial decision-making processes were more subject to administrative influence than were natural science faculty who had greater autonomy. They suggested in their work that discipline type affects not only expectations but also how faculty carry out administrative tasks. Indeed, Del Favero (2005) found that the social dimension of academic discipline is more likely than the cognitive to influence administrative behavior although she found that unit size, may have a stronger effect than discipline type. So even where such influence is not primary, it seems likely that disciplinary differences may well have some effect upon the faculty-administrator relationship. Faculty have historically been considered split if not more closely affiliated with their discipline over their institution as the discipline is the source from which much of their recognition and acceptance of their work stems. Getting faculty to move to value institutional concerns ahead of discipline can thus be a challenge for administrators.

To consider faculty member discipline is especially pertinent given Cohen and March's (1974) finding that social scientists were much more likely to progress into the academic administrator ranks. Therefore, faculty in the low consensus fields may perceive academic deans to behave in an appropriate fashion more often than their colleagues in high consensus fields. Part of the social science bias may be the very nature of the dean's job, which involves building relationships and dealings with people (Del Favero, 2005; Martin, 1993; Morris, 1981; Tucker & Bryan, 1991; Wolverton et al., 2001) as well as negotiating situations for which there is not a set answer and involve various interpretations of meaning and reality. Lodahl and Gordon (1972) have found that faculty in low consensus fields have a greater influence on some administrative issues, such as faculty appointments, salaries, and promotions than do faculty in high consensus fields, while those in high consensus fields enjoy a greater amount of influence in teaching decisions. As a result, faculty may differ on their perceptions of what constitutes appropriate administrative behavior based on their academic field. On the other hand, and perhaps surprisingly, Bray (2008) found no differences in faculty expectations of administrative behavior based on discipline type. Thus, while institutional type may make an overall difference in how faculty view deans' performance, discipline type does not seem to make a difference at this prevalent level. That does not mean to imply discipline type does not create different tensions in the faculty administrator relationship. Faculty often feel at odds, it is suggested, with deans or administrators from other disciplines, as the administrator may not understand the faculty members' field. Yet they also might not be comfortable with an administrator from their own discipline as

that "former colleague" might now have to make resource allocation decisions that reward other programs above their own, raising once again the possibility of the sense of distrust and distance between the two in spite of or because of their disciplinary backgrounds. Discipline differences have been seen in the way faculty use technology and its classroom utility (Lin & Ha, 2009), for example, raising possible tension points as administrators must decide about allocating extra funds for what some view as important technology and others (even possibly administrators) view as less helpful. Yet the literature still has many gaps, as we have suggested above. Kezar (2000) shows emphatically the desire of practitioners to know more about specific areas of higher education functioning, areas research has yet to cover more than sparingly. This includes things like the use of technology just mentioned, or assessment, program indicators, and so on.

Lessons Learned

In concert with our previous examination of how the faculty-administrator relationship has been characterized in the literature (Del Favero & Bray, 2006), the foregoing assessment of contextual issues impacting this relationship has reaffirmed its fragility and complexity.

The functional contexts within which faculty and administrators interact, such as those studied here, offer issue-rich examples of the tension-laden environment characterizing the relationship. These exemplars collectively demonstrate that the tension existing in the relationship is a normative condition which is present across a variety of functional sub-contexts in colleges and universities. Further, as explicated in literature on variations in organizational functioning across academic discipline and institution type, the idea of differing approaches to faculty work as an artifact of institutional mission and disciplinary values and practices indeed manifests in how faculty engage with the institutional environment and the administrators in it. We conclude from our review of the bodies of literature presented here that tension in the relationship in each of these sub-contexts, is at base related to issues of authority, motivation and job satisfaction, scarce resources, and cultural values. While these concepts have been studied variously in numerous bodies of literature (e.g. education, sociology, psychology, management), knowledge is lacking on the implications of each in the faculty-administrator dynamic. Suggestions for remedying this void in knowledge follow.

Knowledge Needed

We are suggesting here that knowledge needed to advance our understanding of the faculty-administrator relationship might be informed by four frameworks: (1) ambiguity as a characteristic of academic organizations (Cohen & March, 1974; Weick, 1976; Wolverton et al., 1999) and a fundamental condition of institutional culture (Bess, 1999; Bess, 2006; Cohen & March, 1974; March & Olsen, 1976;

Martin, Frost, & O'Neill, 2006), (2) leadership as key to transforming the culture to one of mutual understanding, (3) faculty-administrator relationship types, and (4) individual work role problems/concerns. We will address each of these in turn.

Ambiguity is generally thought to hinder the mutual understanding necessary for productive working relationships. Given the ambiguity characterizing institutional cultures, greater understanding of ambiguity as a fundamental source of tension may lead us to a more nuanced understanding of the relationship. Specifically, the relationship as problematic has become a fundamental, widely accepted principle in our knowledge of how college and universities function, and certainly where dysfunction in the relationship impacts decision-making processes it can be aptly termed problematic. Yet because this dysfunction is largely associated with ambiguous structures, processes, priorities, and communications which can negatively impact rationality in decision-making (Birnbaum, 1988; Blau, 1994), some insights possibly can be gained by treating ambiguity, as a primary source of dysfunction, i.e. tension and conflict, in the relationship, as an opportunity.

Ambiguity also serves important organizational functions. According to Bess (2006, p. 498) ambiguity "saves the system from the extremes of excessive rationalism" that threaten the essence of colleges and universities and the participation of faculty in governance. Ambiguity also serves to alleviate stress in that there are few strictures on who may exercise power (Caplow & McGee, 2001). As a condition within which rational decisions about academic programs, faculty work, and appointment, promotion and tenure systems must be made, Bess believes ambiguity should be preserved and enhanced. He suggests its preservation is dependent on a different kind of communication—one focused on understanding the differences between the participating parties as opposed to communication focused on compromise. The principle of understanding differences (as opposed to situational communication which seeks compromise) suggests to us the benefits of ambiguity as a useful concept for learning more about the faculty-administrator relationship. If ambiguity is accepted as beneficial, mutual understanding of the interests of the two parties on any given issue (Del Favero & Bray, 2006) in the short run, and increased understanding of the substance of their differences (Bess, 2006) in the long run, have an increased chance of occurring. Supporting this contention is the idea that conflict, as a byproduct of ambiguity, can be productive (Dodd, 1939; Findlen, 2000; Harman, 2002; Hearn & Anderson, 2002; Holton, 1995). Thus we propose that identification of the sources of ambiguity in the relationship will enable a reframing of its dysfunctional attributes as having a positive role in diminishing tension, stress, and conflict.

The type of communication Bess (2006) advocates comports with an idea advanced by Del Favero (2003) of the need for informal communication between faculty and administrators to promote mutual understanding and fits with Bray's (2008) faculty normative expectations as well. In agreement with the need to refocus communication efforts on discussions of differences, we assert that a new kind of administrative leadership is required to enact such a change. We believe it is the role of administrators to assume the kind of leadership needed to stimulate faculty-administrator dialogue toward the end described by Bess. In developing an investigative framework for such change and the role of leadership in this change,

new theoretical paradigms are needed. Leadership paradigms based on a functionalist paradigm relying on hierarchical authority as a central organizing principle are not relevant given the dominance of autonomous professionals in colleges and universities (Bess, 1999; Clark, 1991; Etzioni, 2000; Weick, 1976). Leadership theories based in the study of a relationship which occurs at the intersection of two different, if not competing, cultural domains are more relevant to the context and promise to be more fruitful. We refer specifically to process and relational theories. According to a recent review of leadership theories and their relevance to the study of higher education, process theories can be described as "approaches to understanding leadership that are grounded in local conditions and take into account the complexity of meaning in social systems" (Association for the Study of Higher Education, 2006, p. 31); relational theories enhance the process approach by focusing on (a) building cognitive complexity through interconnectedness and, (b) participant commitment to understanding the organizational dynamics of decision making. Such theories can illuminate this relationship in that they consider the unique context within which the relationship exists, the social dimension which is fundamental to organizational reality (Feldman, 1987), and the complexity of meaning upon which the notion of ambiguity is based.

Toward the objective of communication for mutual understanding, areas to examine might focus on the *content* of communication/interaction (e.g., cultural differences, institutional priorities; perceptions of decision making, etc.), *format* (e.g., formal or informal), and *timing* (e.g., as a part of faculty socialization to the institution; in concert with key decision making processes at institutional or college levels) as well as differential interpretations. It is in this last area we have our least knowledge – empirical tests of both groups on the same topic comparing their perspectives with an eye toward shared understanding. In terms of understanding the role of leaders in framing and enacting such communication, it would be useful to understand what leadership looks like in situations where this relationship is relatively effective. Useful questions are: How do these leaders emerge? What process defines their success in building bridges between faculty and administrators? How do faculty and administrators in relatively successful relationships come to a mutual understanding of their inherent and perceptual differences? How do they perceive the importance of leadership to this success? How does institutional history influence the achievement of mutual understanding?

We also suggest a model we have posed in a previous writing on this relationship as viable for exploring its improvement. The Dispositional Contexts Model (Del Favero & Bray, 2006) posits four relationship types which are defined by a combination of two factors—the extent of faculty cohesion, and the attitude faculty and administrators have regarding their relationship. The relationship is defined by symbiotic functioning, wary collaboration, fractured dissension, or aggressive discord, depending on the extent of cohesion and the level of trust and mutual respect which exists. Research applying this model which couches findings in terms of the type of relationship found might be particularly useful in understanding exemplars of relatively effective relationships. Such research might examine participants' perceptions of cohesion and their relational attitudes as a way of defining change or improvement in the relationship as well as providing a common discussion point for

understanding empirically tested existent relations across higher education. Given the model's attention to unique contexts, it will facilitate an intimate look into how each of these two factors contributes to positive change in mutual understanding.

Caplow and McGee's (2001) juxtaposition of the problems of individual scholars versus the problems of administrators offers another useful framework for understanding the ambiguities associated with the roles of each. According to Caplow and McGee, faculty concerns are related to balancing teaching and research, economic and emotional insecurity associated with academic employment, inequitable treatment relative to their peers, and inadequacy of information. Incongruity between their job assignment, i.e. teaching, and the work they perceive reaps the greatest professional and institutional rewards, i.e. research is a persistent problem throughout the academic career. Pre-tenure faculty are beset with insecurity related to their progress toward achieving tenure while tenured faculty are only secure to the extent that they enjoy a modicum of local and disciplinary prestige which affords them bargaining power both locally and in the academic marketplace. Somewhat related to the concern for security, faculty can be apprehensive that they might be treated inequitably, e.g. their scholarly performance is judged as less meritorious than that of another, whose work in their view is inferior to their own. Faculty are also concerned about their lack of information pertaining to their status and advancement (e.g., bases for promotion and tenure) within their institution and their potential mobility as an academic (e.g. knowledge of the academic marketplace such that accurate comparisons to one's current position can be made). While in the case of inadequacy of information certainly with the advance of information technology this has become less a concern, nonetheless to the extent such information is imperfect, faculty insecurities are heightened.

In conclusion, we believe that the tension in the faculty-administrator relationship can no longer be taken for granted given its implications for effective institutional governance. We believe our work here has enhanced the knowledge base available to stimulate further research and for making improvement in practice by furthering mutual understanding between the two groups. Not only is more research needed to provide a foundation for improvement in this dynamic, but the attention of both faculty and administrators to its necessity is an imperative if colleges and universities are able to engage successfully in the kind of strategic decision making required to address the escalating pressures predicted for higher education the twenty-first century.

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