

Education and Training in Autism and Developmental Disabilities

Focusing on individuals with
autism, intellectual disabilities and other developmental disabilities

Education and Training in Autism and Developmental Disabilities

*The Journal of the Division on Autism and Developmental Disabilities,
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Supporting families of young children with disabilities using technology. **Phil Parette**, Hedda Meadan, Sharon Doubet, and Jack Hess, Department of Special Education, Campus Box 5910, Illinois State University, Normal, IL 61790-5910.

Increasing skill performances of problem solving in students with intellectual disabilities. **Debra Cote**, Tom Pierce, Kyle Higgins, Susan Miller, Richard Tandy, and Shannon Sparks, California State University, Fullerton, Dept. of Sp. Education, College Park 570-24, P.O. Box 6868, Fullerton, CA 92834-6868.

Methods for increasing the intensity of reading instruction for students with intellectual disabilities. **Jill H. Allor**, Tammi M. Champlin, Diana B. Gifford, and Patricia Mathes, Department of Teaching and Learning, Southern Methodist University, P.O. Box 750381, Dallas, TX 75275-0381.

Effectiveness of video modeling to teach iPod use to students with moderate intellectual disabilities. **Diana L. Hammond**, Abigail D. Whatley, Kevin M. Ayres, and David Gast, The University of Georgia, Department of Special Education, 908 Lance Circle, Lawrenceville, GA 30043.

Newbery award winning books 1975-2009: How do they portray disabilities? Melissa Leininger, **Tina Taylor Dyches**, Mary Anne Prater, and Melissa Allen Heath, Brigham Young University, 340-F McKay Building, Provo, UT 84602.

An analysis of evidence-based practices in the education and treatment of learners with autism spectrum disorders. **Michael R. Mayton**, John J. Wheeler, Anthony L. Menendez, and Jie Zhang, Department of Special Education, West Virginia University, 508-C Allen Hall, Morgantown, WV 26506.

Functional curriculum = Evidence-based education?: Considering secondary students with mild intellectual disabilities. **Emily C. Bouck** and Sarah M. Flanagan, 5146 BRNG Hall, Purdue University, 100 N. University St., West Lafayette, IN 47907.

Emotional intelligence in Asperger Syndrome: Implications of dissonance between intellect and affect. **Janine Montgomery**, Adan W. McCrimmon, Vicki L. Schwean, and Donald H. Saklofske, Psychology Department, 190 Dysart Road, University of Manitoba, Winnipeg, R3T 2N2 CANADA.

Evidence-based principles and practices for educating students with Autism: Self-determination and social interactions. **Michael L. Wehmeyer**, Karrie A. Shogren, Dianne Zager, Tom E.C. Smith, and Richard Simpson, Beach Center on Disability, University of Kansas, 3136 Haworth Hall, Lawrence, KS 66045.

Research to practice in Autism and Developmental Disabilities. **Stanley H. Zucker**, Cindy Perras, Darlene E. Perner, and Emily C. Bouck, Mary Lou Fulton Teachers College, Arizona State University, Box 875411, Tempe, AZ 85253-5411.

Long-term Outcomes of Services for Two Persons with Significant Disabilities with Differing Educational Experiences: A Qualitative Consideration of the Impact of Educational Experiences

Diane Lea Ryndak
University of Florida

Terri Ward
College of St. Rose

Sandra Alper
University of Northern Iowa

Jennifer Wilson Montgomery and Jill F. Storch
University of Florida

Abstract: Though research exists related to effective services in inclusive general education settings for students with significant disabilities, there are no longitudinal investigations of adult outcomes for persons with significant disabilities who received services in inclusive general education settings. This study uses qualitative methods to describe two persons with significant disabilities across settings over time. After originally receiving special education services together in a self-contained special education class in middle school, these individuals then received services in different types of settings (i.e., one received services in self-contained special education settings and one received services in inclusive general education settings) for the remainder of their educational careers. Findings indicated that the individual who received services in inclusive general education settings appeared to have achieved better adult outcomes as reflected in performance in community living and work contexts, interactions with schoolmates and co-workers, independent participation in naturally-occurring activities, and quality and size of a natural support network. In addition, the findings suggest the importance of a “benefactor” on the quality of long-term outcomes achieved by individuals with significant disabilities.

The documented benefits of inclusive education for students with significant disabilities are many. Research reveals higher teacher expectations of students, increases in appropriate social behaviors, increased interactions with others, more positive affect, increased friendships, and improved communication skills, as well as improvements in academic behaviors and an increased likelihood of participation in other inclusive settings (e.g., McLaughlin, Ryndak, & Alper, 2008; Ryndak & Fisher, 2003). Although the literature includes critiques of various studies about inclu-

sive education and arguments suggesting that inclusive education may have a negative impact upon learners (e.g., Sandler, 1999), no investigations were found that provided performance data on students with significant disabilities or their general education classmates that argued against inclusive education. (For summaries of research regarding inclusive education for students with significant disabilities see Fisher & Ryndak [2001]; McGregor & Vogelsberg [1998]; Ryndak & Fisher.) In fact, Sharpe, York, and Knight (1994) found the opposite—that when serving students with significant disabilities in inclusive general education classes there was no detrimental effects on the educational outcomes of the general education students in the class. In addition, Peck, Staub, Gallucci, and Schwartz (2004) found that parents of general education stu-

Correspondence concerning this article should be addressed to Diane Lea Ryndak, School of Special Education, School Psychology, and Early Childhood Studies, 1403 Norman Hall, PO Box 117050, University of Florida, Gainesville, FL 32611-7050.

dents in classes that included students with significant disabilities indicated that placing their children in the inclusive classes resulted in several social benefits for their children.

Fisher, Sax, and Jorgensen (1998) noted that in the United States, the educational system is expected to contribute to the preparation of children for the demands of success as adults (see also Lipsky & Gartner, 1997). In addition, Turnbull, Turnbull, Wehmeyer, and Park (2003) suggested the use of a quality of life framework when considering post-school outcomes for adults with disabilities. Considering these concepts together the expectation is that, when students with disabilities exit school, they will be prepared for adult life, their lives will be enriched, and their participation in typical community activities, employment, and residences will be enhanced. Indeed, these assumptions still are reflected in current discussions about access to general education, curriculum, and assessment implications of No Child Left Behind and the Individuals with Disabilities Education Improvement Act (2004) (Browder, Spooner, Wakeman, Trela, & Baker, 2006; Lee et al., 2006; Wehmeyer, 2006).

Unfortunately, follow-up studies of special education graduates have indicated that the outcomes of schooling often were inconsistent with expectations for positive post-school adjustment (Blackorby & Wagner, 1996). The results of several researchers (e.g., Edgar, 1987; Haring & Lovett, 1990; Johnson et al., 1995) repeatedly have indicated that, following graduation, students with significant disabilities: (a) typically are socially isolated, with little contact with peers who do not have disabilities; (b) experience high rates of inactivity; (c) experience a low level of employment and that, even when they are employed, seldom work a full week and earn very low wages; (d) generally live with a parent, guardian, or relative; and (e) are seldom involved in activities outside of the home.

The National Organization on Disability (2000) issued a comprehensive report on adult outcomes for students with disabilities. The data cited in that report were dismal across all disability labels, but particularly for individuals with the most significant disabilities. These individuals were almost totally de-

pendent on IEP and transition teams during high school for present and future educational decisions, received limited instruction in decision-making, received very little training related to job skills either at school or in the community, and were uninformed about how to obtain continued services after exiting school. As a result, follow-up studies revealed social isolation, continued reliance on parents for residential needs, and unemployment or underemployment that resulted in reliance on Supplemental Security Income (SSI) and Medicaid waivers to bring incomes up to the poverty level.

Several researchers have identified strategies that can lead to more successful adult outcomes (Anderson-Inmann, Knox-Quinn, & Szymanski, 1999; Caldwell & Heller, 2003; Doren & Benz, 1998; Head & Conroy, 2005; McGlashing-Johnson, Agran, Sitlington, Cavin, & Wehmeyer, 2004; Wehmeyer & Palmer, 2003; White & Weiner, 2004). These strategies include access to general education settings (Ryndak, Morrison, & Sommerstein, 1999; Zafft, Hart, & Zimbrich, 2004), vocational training both at school and in community job settings (McGlashing-Johnson et al.; White & Weiner), instruction leading to self-determination (Caldwell & Heller; Head & Conroy; McGlashing-Johnson et al.; Wehmeyer & Palmer, 2003), and assistance to parents in learning how to advocate for their children and obtain and maintain services for them when exiting school (Wang, Mannan, Poston, Turnbull, & Summers, 2004).

Emphasizing access to general education settings and curricula, accountability, valued membership in peer groups, and facilitation of friendships that may lead to natural support networks, inclusive education has been considered not only a practice that is consistent with civil rights, but also a way to alleviate the shortcomings and discouraging outcomes of follow-up studies, such as those cited above. Although existing research indicates that inclusive education can benefit students with significant disabilities during their school years (Fisher & Meyer, 2002; Ryndak et al., 1999), there have been no longitudinal follow-up investigations of the lives of individuals with significant disabilities who experienced inclusive education over extended periods of time. There has been no research to date that

determines whether such individuals lead more satisfying lives after leaving school, than those whose educational experiences were in self-contained special education settings.

This investigation begins to address some of these questions by examining how two individuals with significant disabilities functioned across settings over time. These two individuals originally received special education services together in a self-contained special education class during Year One of this study. The last month of that academic year the young woman began receiving services in general education settings, and she remained in those settings during her last six years of educational services (see Ryndak et al., 1999, for a description of her services and performance in the self-contained and general education settings). The young man, however, remained in self-contained settings for the duration of his educational career. Having had no contact during the years they received special education services in different settings, these individuals met again as adults, developed a relationship, and married. Thus, this couple offered a naturally-occurring opportunity that might suggest long-term effects of instructional settings on their overall performance both immediately, 4 years, and 8 years after exiting school services.

Method

Two individuals with significant disabilities participated in this qualitative study. These individuals and the methods used to describe them and the services they received over time are described below.

Participants

Participants were selected using purposeful sampling because of their mutual experiences at different times in their lives. During Year 1 of this study the first author met both participants and the family of one of the participants, Melinda, because of her family's advocacy efforts for the development and implementation of effective services for her in general educational settings. At that time observations were conducted of Melinda's self-contained special education class, in which the other participant, Phillip, was also a student. At that time Melinda was 15 years of age

and was labeled as having cognitive disabilities or multiple disabilities, although school and district personnel consistently described her as having "severe disabilities." She was reading at a 2nd grade level, using math at a 3rd grade level, and used speech that was intelligible only to people who were familiar to her during interactions that frequently were inappropriate. Phillip was 16 years of age and was labeled as having cognitive disabilities, although school and district personnel described him as having "mild to moderate disabilities." He was reading at a 2nd grade level, using math at a 3rd grade level, and used speech that was intelligible to all peers and adults during frequent and appropriate interactions. During the observations field notes were written related to the services delivered to all of the students in the class, as well as the students' performances in the class.

Melinda and Phillip met again as adults when both were 25 years old, although Phillip was several months older than Melinda. Both were receiving support through the Medicaid Waiver. They and their parents and/or legal guardians were approached to determine whether they would be interested in participating in a study about: (a) the participants' educational experiences and performance during those experiences; (b) the participants' lives immediately after exiting school services; and (c) the participants' current lives. Great care was taken to ensure that the participants and their parents/guardians understood and approved every aspect of this study.

Data Collection

In his discussion of qualitative research methodology Patton (2002) stated that "meaningfulness and insights generated from qualitative inquiry have more to do with the . . . capabilities of the researcher than the sample size" (p. 245). Three of the researchers for this study have demonstrated expertise in qualitative research methodology, and two of these researchers were intimately involved with all aspects of this study. Three of the researchers collaborated to collect information on the participants using various qualitative methods.

First, consistent with qualitative research methodology related to the use of artifacts

TABLE 1

Summary Descriptors of Melinda Across Years (Note: Italics indicate more positive outcomes).

<i>Year 1: In Self-Contained Special Education Classes for 3 Documented Years</i>	<i>Exiting School After Inclusive Contexts for 6 Years</i>	<i>Meeting After Adult Living for 4 Years</i>	<i>After Adult Living for 8 Years, Married for 1 Year</i>
Walks with special education shuffle	<i>No longer walks with special education shuffle</i>	<i>Lives alone in own apartment</i>	<i>Shares an apartment with Phillip</i>
Needs high level of supervision	<i>Works independently</i>	<i>Has held part time job in the court system for 3 years</i>	<i>Has held part time job in the court system for 7 years; permanent employee with full benefits</i>
Demonstrates low maturity level	<i>Demonstrates excellent level of growth during high school and college years</i>	<i>Has an extensive natural support network</i>	<i>Has expanded her natural support network</i>
Is disruptive in segregated classroom	<i>Uses strategies to assist with processing difficulties</i>	<i>Uses coping strategies to assist with processing difficulties</i>	<i>Has increased the life spaces in which she participates</i>
Is regressing academically	<i>Growth/interest</i>	<i>Uses literacy at work and in daily life</i>	<i>Uses literacy at work and in daily life</i>
			<i>Is self-assured and confident across contexts</i>

and records (Hammersley & Atkinson, 1995; Mason, 1996), the researchers worked with the participants and their parents and/or guardians to obtain records and artifacts relevant to the participants' educational and adult services, as well as the participants' performance levels over time. For this study records were collected starting with two years prior to Melinda and Phillip being placed in the same self-contained special education class during Year One of this study, at the age of 15 and 16 years, respectively. Melinda's earlier records indicated that for the previous two years she had been in self-contained special education classes. Her records after Year 1 indicated that her placement changed and she was included in general education classes, with supports and services, for the remainder of her educational experiences up through age 21. Phillip's earlier records indicated that for the two years prior to Year 1 he had received services in self-contained special education classes. His records after Year 1 indicated that he remained in self-contained special education classes through the remainder of his educational career, until age 22. In addition to determining their educational placement, the

participants' records and artifacts were collected for analysis related to performance levels in academic content, functional activities, interactions with others, and overall behavior.

Second, consistent with the use of interviews in qualitative research (Kvale, 1996; Mason, 1996; Rubin & Rubin, 1995; Strauss & Corbin, 1998), the researchers conducted interviews with the participants, their families and, when possible, their current service providers. For the purposes of this study, only interviews conducted with school personnel related to the performances of all students in the self-contained special education class were used from Year 1 (see Tables 1 and 2). After Melinda and Phillip remet as adults, however, interviews were conducted with them and their parents and/or legal guardians, related to their services and performance levels over time. Both retrospective and current information was requested. In addition interviews were conducted with their current Medicaid Waiver personnel who provided support in their independent living situations and community access. At the participants' request, no interviews were conducted with their co-work-

TABLE 2

Summary Descriptors of Phillip Across Years (Note: Italics indicate periods of hope for positive outcomes).

<i>Year 1: In Self-Contained Special Education Classes for 3 Documented Years</i>	<i>Exiting School After Segregated Classes for 6 More Years</i>	<i>Meeting After Adult Living for 4 Years</i>	<i>After Adult Living for 8 Years, Married for 1 Year</i>
<i>Appearance and behaviors are age-appropriate and consistent with peers; looks average</i>	Is anxious with others and depressed	Lives with his family in the parents' house	<i>Shares an apartment with Melinda</i>
<i>Requires moderate level of supervision</i>	Demonstrates behaviors indicative of very low self-esteem	Has lost several jobs	<i>Has a part-time job in the community</i>
<i>Demonstrates moderate maturity level</i>	Fears making mistakes and displeasing others	Works in a sheltered workshop for tokens	<i>Has increased the life spaces in which he participates</i>
<i>Is compliant and not disruptive in segregated class</i>	Is reluctant to interact with others	Has only family members in his natural support network	<i>Uses members of Melinda's natural support network for his own support</i>
<i>Participates willingly in activities that require functional academics</i>	Is regressing academically	Has had difficulties in the community	<i>Uses advocates when in difficulty</i>
		Uses functional literacy only when necessary	Is anxious with others, requiring frequent reassurance

ers, employers, or employment support personnel.

Each interview was conducted by one or more of the researchers and audiotaped. While some interviews were conducted with one individual (e.g., a service provider), most interviews were conducted with more than one interviewee present. For instance, the parents and/or legal guardians participated in joint interviews. To accommodate for daily schedules and other responsibilities of the multiple interviewees, these interviews were conducted over two or three days, taking two to five hours to complete. Other interviews (e.g., interviews with single interviewees) were completed in one day, taking only one to two hours to complete. All of the interviews followed accepted qualitative research methodology guidelines (Creswell, 2003; Kvale, 1996; Rubin & Rubin, 1995; Strauss & Corbin, 1998). Each was conducted using guiding questions established in an initial protocol, but with several probing points per question to encourage the interviewees to give complete answers with meanings that were delineated clearly. Whenever possible the inter-

viewees were encouraged to expand their answers, give examples that illustrated a point being made, and reiterate answers in another way in order to clarify their points. The audiotapes then were transcribed, comprising over 400 pages of text. These transcriptions were submitted to the interviewees for verification and edits of the content. When appropriate, changes were made to the initial transcripts, reflecting feedback from the interviewees.

Third, consistent with case study research methodology (Bogdan & Taylor, 1975; Mason, 1996; Patton, 2002; Strauss & Corbin, 1998) the researchers conducted observations of Melinda and Phillip, and wrote field-notes during and after the observations. During Year 1 observations were conducted and field-notes were written by only one of the researchers in the self-contained special education class and other school contexts. After Melinda and Phillip remet as adults, three of the researchers observed them with their family 'members in the community, with friends in the community, and alone with the researchers both at dinner in the community and in their apartment. At their request, no observa-

tions were conducted at their work sites. In most situations observations were conducted with multiple observers present, each taking notes independently. Observations were conducted on multiple days, across multiple contexts, across two weeks. After each observation when multiple observers were present, the observers finished their independent notes and then discussed what they had observed. The observers then returned to their independent notes and made additional comments when appropriate.

Data Analysis

Trustworthiness was addressed via collaborative efforts amongst all the researchers involved in this study (Merriam, 1998) in relation to both content analysis and triangulation. The researchers developed two teams. One set of two of the researchers completed the initial analysis of content from the records, artifacts, interviews, and observations, and organized the records and artifacts for each of the two participants chronologically. The set of records for each participant then was read several times by the team responsible for the initial analysis and, consistent with qualitative methodology (Kvale, 1996; Rubin & Rubin, 1995; Strauss & Corbin, 1998), thematic codes were developed related to the content of the records. Members of the initial team independently coded the content of the records, and then met to compare their codes. A few times differences were found in the manner in which specific content was coded, resulting either in the addition of a new code or clarification of the meaning of an existing code. The coding procedure used with the records and artifacts also was used with the content of the final transcripts of interviews and field-notes.

Information from this analysis then was shared with the second team of researchers as a second step to verify the findings. Suggestions or concerns were shared with the team that had completed the initial analysis, and that team made any decisions necessary related to editing the findings. Once the initial team members had agreed on how the content would be coded, sections of the files with similar codes were grouped and analyzed for meaning. The researchers then submitted

their findings to the participants' parents and/or guardians for further verification of the findings (Mertens, 2005).

Once the coding and analyses were completed for the content of each set of data (i.e., records, interviews, field-notes of observations), the content was used for triangulation to look for consistencies (Hammersley & Atkinson, 1995; Kvale, 1996; Mason, 1996; Silverman, 1993). Overall findings then were articulated and written. These findings again were submitted to the parents and/or legal guardians of the participants for review, with the option of reviewing the findings with the participants. Whether reviewed independently or with the participants, the parents and/or legal guardians were encouraged to make edits, additions, and deletions that would ensure that the findings were accurate.

Findings

The following sections describe several variables related to Melinda's and Phillip's engagement in activities across contexts and time. These variables include their (a) interactions with peers and adults; (b) participation in instructional activities on both academic and functional content; and (c) acquisition and use of both academic and functional content. These sections include perceptions of their engagement in activities and how their engagement changed, as reflected in interviews, observation field notes, and records from four time periods: Year 1 of the study, which was the one school year they received services in the same self-contained special education class; six years later, which was their last year of educational services; four additional years later when they met again as adults; and four additional years later after they had been married.

Year One: Services in a Self-Contained Special Education Classroom

During Year 1 of this study Melinda and Phillip attended the same self-contained special education classroom in Melinda's neighborhood middle school. The class comprised eight students ranging from 13 years-10 months to 15 years-9 months of age. At the beginning of that school year Melinda was 14 years-6 months old and Phillip was 15 years old.

Melinda. During interviews both school personnel and family members stated that Melinda was the “lowest functioning” student in the class. Her records indicated that on norm-referenced assessments Melinda scored a 2nd grade 4th month performance in reading, and a 3rd grade performance in math. Upon reviewing the norm-referenced scores of her classmates, it was noted that Melinda’s scores were not the lowest; rather she had the third lowest score for reading and the fifth lowest score for math in the class of eight students. Her performance in class, however, gave the impression of a lower capability both because of her inappropriate behaviors and the tasks assigned to her. For example, Melinda consistently refused to do independent seatwork (e.g., math worksheets), read aloud, or summarize reading content. Records indicated that Melinda’s reading instruction incorporated the same materials, at the same performance level, for 3 consecutive years. Specifically, her reading instruction would begin at level 50 of Distar, progress to level 75, and then return to level 50 because of her inability to complete the tasks. Her work in reading, writing, and math incorporated 2nd grade worksheets, and her annual goals included reading at the 2nd grade 5th month level, writing short lists, memorizing math facts, completing simple computations, and adding and subtracting amounts of change. When comparing her current and past records a clear pattern of regression was observed in her use of reading, writing, and math.

In relation to social development there was a clear difference in Melinda’s behaviors in self-contained versus inclusive settings. When participating in activities within settings that included schoolmates who did not have disabilities (e.g., at chorus, during assemblies, in the hallways) Melinda modeled her schoolmates; therefore, her behavior was comparable to her non-disabled peers. In addition, she demonstrated independent functioning during school-related activities, such as navigating the campus to complete tasks. On the other hand, when in the self-contained classroom, Melinda demonstrated more age-inappropriate behaviors than her classmates with disabilities. She frequently disrupted instruction and learning. She would make off-task and age-inappropriate comments at any moment,

loudly enough for the entire class to hear; she would interrupt the seatwork of classmates who were near to her by kicking them under the table; she would sweep away her class materials to stop her instructional activities. In addition to these disruptive behaviors in the self-contained class, Melinda demonstrated no interest in using her knowledge, or in learning new knowledge, when she interpreted a situation as either academic or evaluative in nature. For instance, whether at school, at home, or in the community, when Melinda was asked a question or asked to complete an activity that required reading, writing, or math, she responded in a defensive and street-wise manner that extricated her from the situation. If she then was pushed to answer the question or complete the activity, Melinda would either tantrum (i.e., yell, gesticulate broadly, walk away briskly) or “shut down” by being totally unresponsive and unmovable. She might sit on the floor or sidewalk for up to 30 minutes, without speaking or responding to any verbalizations from others.

In response to Melinda’s inappropriate behaviors in the self-contained classroom, including refusals to do work, tantrums, and “shutting down,” her records indicated that she required a high level of adult supervision. Although Melinda demonstrated appropriate behavior when she was with classmates who did not have disabilities (e.g., chorus, physical education, lunch) her records indicated that she was not allowed to participate in additional activities with these classmates until she consistently demonstrated appropriate social and learning behaviors in the self-contained classroom.

In addition to challenging behaviors Melinda had significant difficulty with speech. Her speech was unintelligible to strangers and only fully understood by the few people who spent a great deal of time with her. Constant requests to have her repeat herself, frequently without better understanding of her speech, frustrated Melinda and resulted in her reluctance to respond verbally in most situations. In response, Melinda developed many coping mechanisms for her unintelligible speech, including the use of gestures and reliance on friends and family members to interpret her speech for others. She also used a handful of high frequency phrases and words that helped

her function more independently within her school and community. For example, when ordering food in a restaurant, Melinda would place her order with one clear word (e.g., hamburger) instead of using a complete sentence. She then would wait for questions from the wait person, to which she could respond in one or two words (e.g., yes/no; ketchup).

In physical appearance, Melinda had acquired over her 10 years in self-contained classes what her parents called “the special ed shuffle.” Specifically, she had poor posture, consistently looked down at the floor when walking, and shuffled her feet along the floor. Overall she projected a downtrodden appearance both at school and in the community.

Phillip. Phillip was described by both school personnel and Melinda’s family members as the highest performing student in the class. In several interviews he was described as the model learner with disabilities, the one that parents of other students with disabilities wanted their child to be like. Phillip’s records indicated that on norm-referenced assessments he scored a 2nd grade 6th month performance in reading, and a 3rd grade 9th month performance in math. He knew word families, used word attack skills, independently read and followed directions, and performed basic computation with a calculator. When compared with his classmates, Phillip’s norm-referenced scores for math were indeed the highest. In reading, however, his scores were the fifth lowest in the class of eight. In the self-contained classroom Phillip attended to the teacher, followed directions, remained on-task, and completed all assignments.

In relation to social development, records indicated that Phillip had a high self-concept and that his independent functioning during school-related activities was appropriate. When functioning within settings that included peers without disabilities, as well as in his self-contained classroom, Phillip’s interactions were described as “moderately appropriate” when compared with his classmates both with and without disabilities. There were no references to differences in his appropriateness or maturity across various settings.

In relation to behaviors, Phillip was described as compliant, very friendly, and always eager to help. His eagerness to help was so extreme, however, that at times adults were annoyed with

him. His behavior, however, did not interfere with instruction or learning. Instead, he was described as demonstrating “poor judgment” at times. With his appropriate social and instructional behaviors, Phillip rarely required adult intervention beyond initial directions for classroom activities. Because of his “poor judgment,” however, he was described as requiring “moderate adult supervision”.

Phillip’s speech was intelligible to everyone, demonstrating no easily recognized speech impairment. In addition he was very communicative with both adults and fellow students, whether or not he knew them. The content of his comments was perceived as relevant to the contexts in which he was interacting.

Physically Phillip was not distinguishable in appearance from his peers without disabilities. When walking down a hallway at school, Phillip was described as having an appropriate gait, wearing age-appropriate clothing, and making appropriate eye contact with those he passed. He also frequently stopped and spoke with others between classes.

Six Years Later: Last Year of Educational Services

For the following six years Melinda received special education and related services in inclusive settings. Five of those years she attended 8th–12th grade with the same set of students without disabilities. In the sixth year, as well as her first year of adult services, Melinda audited classes and lived in a dorm at a private four year college out-of-state. In contrast, during the remainder of his educational experiences Phillip continued to receive special education services for six years in self-contained academic and vocational classes.

Melinda. During her last year in educational services Melinda consistently used math and reading during activities that were meaningful to her both in the college courses she audited and throughout her daily life (e.g., shopping, navigating the community, work experiences, laundry, dorm activities). She was willing and able to read familiar content aloud across settings (e.g., reading aloud at a national conference a college newspaper article she had written with support, reflecting a 9th grade reading level) and to complete tasks independently in and out of class with accommodations. With support Melinda was able to write several paragraphs for reports, articles

for the school newspaper, and letters to her family and friends. For example, a peer or service provider would assist her in transforming independently-typed phrases and short sentences to hand-written sentences and paragraphs that expressed her thoughts, allowing her to copy the sentences in longhand or enter them into a computer. After using reading, writing, and math successfully to complete meaningful activities over several years in inclusive settings, Melinda accepted the idea that she did not know everything, and that it was alright. Her defensiveness about participating in academic or evaluative activities had changed to an interest in learning. Over the years she had acquired a lot of the common knowledge addressed in her classes. Because of these changes in her use of reading, writing, and math across inclusive educational and community settings, Melinda's parents decided to have her take a norm-referenced reading test. They expected there would be a dramatic increase in her scores, commensurate with her increase in use of reading across meaningful inclusive contexts. Her test scores, however, remained the same as those of her last norm-referenced tests seven years earlier.

Melinda's speech was intelligible both to people with whom she interacted regularly and to strangers. She was noted to have significant growth in her vocabulary and conversation skills when compared with her previous performance. Most notable was Melinda's willingness to interact verbally with peers and adults in both academic settings and social situations, as well as the ease with which she did so.

Melinda's maturity and responsibility were markedly improved. She was reported to make friends easily and to have a well-developed natural support network. Melinda volunteered twice a week at an elementary school, taught a class in country line dancing, and enjoyed watching movies with friends in her dorm. In most situations Melinda's activities, and interactions during those activities, were comparable to those of her peers. Her natural support network had determined that, when Melinda was irritable, she appeared to have difficulty responding to auditory information (e.g., verbal directions or questions). To accommodate for this, Melinda learned coping strategies to use when she needed more time

to respond to auditory information (e.g., saying "Give me a minute. I am thinking about that"). As part of her disability awareness presentations for dorm mates, classmates, and co-workers, Melinda described this difficulty and requested that when people gave her directions, provided feedback, or asked her questions, that they walk away and leave her alone for a few minutes. They then could return and anticipate a response from her. In addition, Melinda requested that, if she said something that was inappropriate, people offer suggestions of more appropriate things to say. This reaffirmed her own awareness of her difficulties and desire to improve her interactions with others. Her final IEP noted that Melinda had many strengths, including good nonverbal reasoning abilities, logical thinking, good common sense, and problem-solving skills.

Melinda's physical appearance also had changed significantly. She had lost the "special ed shuffle." She now walked with good posture, holding her head up and making eye contact with people she passed. Overall, she appeared confident, ready to interact with people, and ready to participate in any activity at school and in the community.

Phillip. During his last year of educational services, Phillip's records indicated that he was performing in reading at the 3rd grade 1st month level (an increase from 2nd grade 6th month), and in math at the 4th grade 6th month level (an increase from 3rd grade 9th month). Though math was considered a strength, records indicated that he continued to work on basic computations with a calculator. In addition, his IEP stated that he needed to improve word recognition, reading comprehension, and use of reading in his daily life. Most significantly, school personnel indicated that Phillip did not generalize the skills he learned in school to activities outside of school.

In relation to social development, Phillip's records indicated that he demonstrated "very low self-esteem" and a "poor self-concept". He was reluctant to interact with peers at school and was very depressed. He was fearful of making mistakes and demonstrated a lot of anxiety when doing assignments in school and when participating in activities in the community. Although he had a well-developed vocabulary and his speech was intelligible to others, Phillip was

reluctant to engage in interactions. Records indicated that he needed to improve the appropriateness of his interactions with adults and peers, as well as improve logical thinking, problem solving, and decision making. Records and observations reflected a major regression in his use of social skills over time. There was no information available in the records that was related directly to his need for supervision or his physical appearance.

Four Additional Years Later: Meeting as Adults

Four years after exiting school services, Melinda and Phillip met again as adults while riding a bus in their home community. Though neither of them remembered the other from the self-contained special education class they had attended together, they began to interact and establish a relationship.

Melinda. Upon returning to her home community after 2 years auditing classes at the out-of-state college, Melinda was living in her own apartment with periodic support through a Medicaid Waiver. When she and Phillip met again as adults, Melinda was taking the bus to her part-time job with the court system, which she had held for 3 years. Her job required the use of literacy and math skills on computers and in filing activities. In addition, Melinda used her literacy across many activities in her life in the community, including: (a) reading bus schedules, newspapers, and popular books and magazines; (b) using email; and (c) following and participating in activities related to WWF wrestling. She also used her math skills to manage her household budget, pay bills, travel by bus and train locally, and travel by air for special trips.

Upon returning to her home community, Melinda developed and used an extensive natural support network. With members of her support network, Melinda participated in preferred leisure activities (e.g., attending WWF wrestling matches; going to the movies), as well as less preferred activities (e.g., working out at the gym). Her support network was intimately involved in supporting her both during routine activities and in crisis situations (e.g., the death of a long-term friend). With her support network, Melinda continued to use and develop new coping strategies to assist her when she was having difficulty responding to verbal information. Melinda con-

tinued to model the behaviors of individuals with whom she had contact, and had begun to recognize the connection between diet, exercise, weight, grooming, and how others sometimes reacted to physical appearance.

Although self-sufficient when using the bus and train locally, as well as when participating in typical daily activities (e.g., shopping), Melinda required support through the Medicaid Waiver program for activities that were completed with less frequency, such as budgeting, cleaning, and caring for her clothing. She also had weekly support from a job coach who watched for changes in her tasks at work, and changes in co-workers or supervisors with whom she needed to interact. When such changes occurred, the job coach assisted Melinda in adapting to the new variables.

Melinda's speech across contexts in the community was intelligible, and her vocabulary had increased dramatically to reflect her experiences and interactions with others. Her appearance continued to reflect that of a confident and capable individual with erect posture and eye contact with others, though she periodically needed reminders about her self-care and clothing.

Phillip. When he re-met Melinda on the bus, Phillip was living in his parents' home. He had been terminated from numerous food service jobs in the community and was working in a sheltered workshop, earning five tokens a day. According to Phillip, the tokens could be spent at the workshop store for candy, toys, puzzles, or used clothing.

Phillip used literacy skills across every day activities, such as using lists and reading bus schedules. His activities at the sheltered workshop, however, did not require either literacy or math abilities. While Phillip might have used his math abilities in activities like riding the bus and purchasing items at stores, he frequently did not have money to spend due to unemployment. Since he was living with his family, Phillip also had no need to pay bills or maintain a household budget. In spite of these limitations Phillip had experience independently accessing resources that were beyond his local community. For instance, he had used a long distance bus company to get to an amusement park approximately one hour from his home community.

Phillip's natural support network consisted

of his family members and individuals who were paid to provide a service for him, such as the support personnel at the sheltered workshop. He had no friends or acquaintances with whom he regularly visited, conversed, or shared activities when at leisure. The only leisure activity in which he participated on a regular basis was going to BINGO with his parents once a week. Phillip continued to be very social, both with individuals he knew and with strangers. When interacting with others, however, he was anxious and eager to please others. Over time his interactions increasingly were described as immature, demonstrating a slow rate of growth in reading social cues and using social skills. Consistent with this, Phillip did not differentiate between (a) people who were trustworthy and untrustworthy, and (b) behaviors that were appropriate and inappropriate. This resulted in him using poor judgment and making decisions that frequently resulted in conflict with others in the community, in spite of the supervision he had at home and at the sheltered workshop.

In appearance Phillip had become distinguishable from those around him. Though he continued to have an appropriate gait and make appropriate eye contact with those he passed, his clothing was ill-fitting and mismatched, resulting in a consistently disheveled and unkempt appearance.

Four Additional Years Later: Married Life

After dating for three years, Melinda and Phillip married. As a result, they shared an apartment, along with all of the responsibilities inherent in maintaining a household, including budgeting, paying bills, cleaning the apartment, cooking, shopping, and clothing care. In addition, Melinda's parents had become the legal guardians for both Melinda and Phillip.

Melinda. By this time Melinda had been an employee of the court system for seven years. Because of her longevity in a part time civil service position, she had become a permanent part-time employee with full benefits. She continued to use her literacy and math abilities across activities at work, at home, and in the community.

Her relationship and marriage with Phillip resulted in two main changes in Melinda's life. First, her natural support network had been

expanded to include Phillip's family, while existing members of her network were shared with Phillip. Second, she was exposed to additional contexts, or life spaces, in which she participated in activities independently. Melinda continued, however, to receive periodic support for budgeting, cleaning, and clothing care through a Medicaid Waiver.

Phillip. Because of Phillip's relationship and marriage with Melinda, there were numerous changes in his life. One of these changes involved his employment status. At one point during the three years they were dating, Melinda was eating at one of the restaurants she frequented after work. She observed the owner putting a "Help Wanted" sign in the restaurant window, indicating that a dishwasher was needed. Melinda picked up the sign, took it to the owner, and said "I have a dishwasher for you." She then arranged for Phillip to be interviewed, after which he was hired. Phillip did not stay in this position long and, in fact, had held several jobs before and after he was married. During the last observation, Phillip recently had been offered a position at a local grocery store where he would assist patrons as they took groceries to their cars and retrieve carts from the parking lot.

A second change that occurred was in Phillip's living arrangements. He no longer lived with his family; rather, he shared an apartment with Melinda and, for the first time in his life, he shared responsibility for maintaining a household both financially and logistically. Like Melinda, Phillip received periodic support for budgeting, cleaning, and clothing care through a Medicaid Waiver.

A third change that occurred was in the composition of Phillip's natural support network. Although he had not developed his own network, he did participate with Melinda and members of her natural support network. As this progressed, however, Phillip increasingly initiated interactions and activities with members of Melinda's network and, while initially appropriate, his efforts to engage these members often were found to be objectionable. For example, he would call one individual 10 times a day to obtain reassurance that something he was doing (e.g., clothes he was wearing) was appropriate; he would call an individual and ask the same question repeatedly, to be certain he had the correct answer. These

behaviors were consistent with Phillip's anxiety and need for constant reassurance and approval; however, they began to have a negative impact on group members and they began to avoid Phillip and, therefore, avoid interactions with Melinda.

A fourth change for Phillip was in relation to the life spaces, or contexts, to which he was exposed. Since Melinda frequently participated in experiences that were complex and worldly (e.g., traveling overseas; attending concerts, plays, and formal parties), Phillip began to share these experiences when he and Melinda began their relationship.

Upon initially meeting Phillip, people usually perceived a very social and interactive person who wanted to please people. Only after observing Phillip in numerous contexts over time did it become apparent that his interactions often occurred in a stereotypic manner; that is, he consistently used phrases and sentences that others used or that he had used in the past. His speech had a repetitive and unimaginative quality that eventually irritated people. As people became irritated, Phillip then would begin to apologize profusely and repeatedly seek approval, exacerbating the discomfort and frustration of others.

Differences in Melinda's Engagement over Time

There are several ways in which differences were evident in Melinda's experiences and performance over time. First, in relation to appearance, Melinda initially walked with a "special education shuffle" and used unintelligible speech. This is in contrast to Melinda later walking with good posture and speaking in a manner that allowed strangers to understand her speech. Second, in her last self-contained special education class Melinda was disruptive, while when she was in inclusive settings she attended to verbal cues from her teachers and schoolmates without disabilities. She also modeled the behaviors of her schoolmates during instructional and noninstructional times. Third, initially Melinda demonstrated inappropriate behaviors that helped her avoid instructional tasks in the self-contained class, while she demonstrated an interest in learning and participated in activities across classes and community contexts with individuals who did not have disabilities. Fourth, initially Melinda was described as

needing a "high level of supervision across settings," while with schoolmates and co-workers in inclusive settings she completed instructional tasks and work activities with minimal or no supervision. She also lived independently in the community with periodic support from her natural support network and Medicaid Waiver personnel. In addition, Melinda worked for the same employer for seven consecutive years with only periodic job coach support. Fifth, while in her last self-contained special education class, Melinda showed regression academically and refused to use the academic skills she had acquired (e.g., reading, writing) in either instructional or functional activities. After transitioning to inclusive contexts, Melinda freely used academic skills in both instructional and functional activities. Finally, Melinda initially had a natural support network that was limited to her family, paid individuals, and a few friends from her activities in the community. While in inclusive contexts Melinda developed an extensive natural support network comprised of individuals from her ongoing educational, work, leisure, and community experiences.

When considering her educational experiences, two variables are significant. First, prior to being included in general education classes Melinda's IEP focused on the development of academic skills at the "next grade level" (e.g., from the 2nd grade 3rd month level to the 2nd grade 4th month level), behavior issues (e.g., compliance), and social issues (e.g., interacting appropriately with adults and classmates). Upon moving to inclusive general education classes, Melinda's IEP focused on the acquisition of general education content and skills acquired through participation with classmates during general education activities, and the use of both general education knowledge and functional skills during ongoing general education and real life activities. When receiving services in a self-contained special education class Melinda's educational records predicted that as an adult she would be placed in a sheltered workshop and in a congregate care living facility. After receiving services in inclusive contexts, Melinda's education program shifted to prepare her for supported competitive employment in the community and supported apartment living.

Overall, as there was an increase in Melin-

da's participation in general education and meaningful functional activities within general education contexts with classmates who did not have disabilities, she demonstrated a higher level of self-assurance and self-confidence. Melinda also responded to both instructional and social cues available from her classmates, resulting in more appropriate behavior and appearance. Throughout her inclusive educational experiences Melinda developed skills that allowed her to independently access the community-at-large through local, national, and international travel. Finally, Melinda developed the ability to use coping skills to compensate for her disabilities and to use good judgment when making decisions.

Differences in Phillip's Engagement over Time

There also were several ways in which differences were evident in Phillip's experiences and performance over time. First, in relation to appearance, Phillip initially was described in a manner that was consistent with that of his peers without disabilities (e.g., clothing, posture, speech, interaction style, confidence level). As he remained in a self-contained special education class over time, however, Phillip increasingly became disheveled, wore mismatched clothing, and was described as having low self-esteem. Second, when observed initially Phillip was attentive and compliant during both instructional and non-instructional activities. Through the remainder of his educational experiences and beginning of his adult life, however, Phillip was anxious, fearful of mistakes, and in need of constant reassurance. Third, when observed initially Phillip was described as needing a "moderate level of supervision" during unstructured times. Over time, however, he increasingly required constant supervision at work (i.e., in sheltered workshop), he lost several jobs in the community, he was involved in several problematic situations in the community, and he continued to live with his parents. Fourth, when observed initially Phillip appeared to be developing additional academic skills due to his attention and compliant behavior in school (e.g., reading, writing, math). Over time, however, it became apparent that his skill level was not increasing and he required encouragement to use his academic skills and constant

reinforcement across contexts. Finally, Phillip initially had numerous peers without disabilities with whom he interacted during school and school-sponsored activities. As an adult, however, Phillip's natural support network included only family members and paid individuals. As his relationship with Melinda developed, Phillip accessed members of Melinda's natural support network, instead of developing his own network. His inappropriate interactions with members of Melinda's natural support network led to their decreased interactions with both Phillip and Melinda.

When initially observed, Phillip's Individualized Education Program (IEP) focused on the development of academic skills to the "next grade level" (e.g., from the 2nd grade 3rd month level to the 2nd grade 4th month level). Over time, however, Phillip's IEP increasingly focused on appropriate behavior, following rules, and working with less supervision. His records consistently predicted and focused on preparing Phillip to enter a sheltered workshop and a congregate care living facility.

Overall, as Phillip continued in self-contained special education classes, he demonstrated a lower level of self-assurance and a higher level of anxiety across contexts. Phillip also increasingly required approval and reinforcement for the slightest behavior, resulting in more inappropriate behavior and interactions. Phillip developed skills that allowed him to independently access frequently used contexts in his community, but he did not develop the skills required to independently access other contexts in local, state, or international communities. Finally, Phillip's coping skills and poor judgment frequently resulted in negative outcomes, such as losing jobs, getting into trouble in the community, or alienating members of Melinda's natural support network.

Discussion

Providing special education services in inclusive general education contexts has had multiple goals for students with significant disabilities. First, it has been considered a practice that is consistent with civil rights, focusing on equal access to educational content, highly qualified teachers, instructional activities, and overall contexts for students with significant

disabilities. Second, it has promoted the modification of educational services so that they emphasize (a) facilitating the students' access to general education curriculum and contexts, (b) supporting the students' participation in district and state accountability systems, (c) fostering the students' valued membership in peer groups, and (d) facilitating friendships between same-aged peers with and without disabilities that may lead to stronger and broader natural support networks. Third, it has been considered a way to alleviate the shortcomings of self-contained special education services, as well as the negative long-term outcomes revealed by follow-up studies.

This descriptive study examined how two individuals with significant disabilities functioned across settings over time when, after receiving services together in a self-contained special education class in middle school, one remained in self-contained classes for the remaining six years of educational services, and the other changed to educational services in general education contexts. Melinda, the student who received services in inclusive general education settings, demonstrated more skills that were critical to interacting and functioning across contexts in her life, including at school, at home, at work, and in the community. As she became a young adult, she developed and maintained a life that more closely matched society's perceptions of a satisfying and high quality life, even though her IQ and achievement test scores were lower in comparison to many individuals served in self-contained special education settings. Melinda achieved more positive outcomes than Phillip in relation to her use of knowledge and skills in meaningful contexts, interactions and relationships with peers without disabilities, and access to and use of the various natural environments in her community. In conjunction with studies reported by Fisher and Meyer (2002) and Ryndak et al. (1999), this demonstration of better long-term outcomes adds support for the field's current focus on the provision of educational services in inclusive general education settings.

It must be considered, however, that the comparison of outcomes for the two participants addressed in this study was based on events that occurred naturally in their lives. That is, no effort was made to control for

other variables that might have accounted for differences between the two individuals' adult outcomes. For instance, limited information was gathered in relation to either the specific services provided in either the self-contained special education classes or the inclusive general education settings, or any activities completed by their school district to influence the quality, type, or amount of those services. It is possible, therefore, that the services provided at any point during the students' educational experiences in either setting were either exemplary or less than exemplary. Further research is needed to determine any differences in adult outcomes that might result from variations in quality, type, or amount of special education and related services across settings.

Similarly, no effort was made to control for the availability or quality of the adult services for Melinda and Phillip in their home communities. The same adult services were available for both, since geographically they lived in the same community. Although differences in services they were utilizing as adults were evident, these differences could not be interpreted as related to differences in their home community, county, or state.

It might be argued that the presence of a deeply involved parent advocate who was knowledgeable about inclusive education and the rights of students with disabilities could have accounted for differences between the educational experiences and progress made by Melinda and Phillip. In his classic study of adults with disabilities who had moved from institutional to community living environments, Edgerton (1967) discussed the influence of a "benefactor" on the lives of those individuals. The results of this study appear to support his concept. Undoubtedly, the ongoing involvement of parents and other advocates who ensure that special education, related, and adult services provided for individuals with significant disabilities reflect individual needs and preferences and assist individuals in acquiring and maintaining a high quality of life is critical. Additional research is required to understand the influence of the presence or absence of a "benefactor" in lives of individuals with significant disabilities.

Another variable that might have influenced the outcomes achieved by the individ-

uals in this study was their access to and participation in activities that fostered the development of self-advocacy and self-determination. While not specifically considered in this study, the individual included in general education contexts had access to role models without disabilities who were developing and using self-advocacy and self-determination in their daily lives. The mere access to these role models may have facilitated Melinda's development of these skills. Additional research, however, is needed to assist in our understanding of the role of such models in inclusive settings and the long-term outcomes achieved.

It seems probable that successful adult outcomes for persons with significant disabilities are not the result of any one factor. Rather, it is likely that best practices in inclusive education, the ongoing presence of a benefactor and/or advocate, training in self-determination, and the availability of quality adult services in the community all interact to produce more positive post-school outcomes.

While the findings of this investigation suggest that, when compared with services in self-contained special education settings, providing special education in inclusive general education settings may lead to better outcomes for students with significant disabilities, these results must be viewed with the limitations mentioned above. Considerably more research, involving many more individuals with significant disabilities over several years, is needed before widespread conclusions can be reached about the differential impact of inclusive general education and self-contained special education settings on adult outcomes. Until such research is conducted, however, this study suggests that the current trend to provide services for students with significant disabilities in inclusive general education contexts may be one factor that facilitates more positive adult outcomes.

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Family Perspectives on Post-Secondary Education for Students with Intellectual Disabilities

Megan M. Griffin, Elise D. McMillan, and Robert M. Hodapp
Vanderbilt University

Abstract: This study investigated the issues that families consider when making decisions regarding post-secondary education (PSE) for young adults with intellectual disabilities. Survey respondents were 108 family members of transition-aged students with intellectual disabilities. Although respondents were generally positive about PSE programs, they reported that educators' attitudes were less supportive. Respondents identified many barriers that prevent their understanding of PSE options, but a lack of information and guidance was the barrier cited by the most respondents. When considering PSE options, respondents were most concerned about student safety, and they considered a focus on employment to be the most important program component. Continued research is needed to investigate the factors critical in developing successful PSE programs for students with intellectual disabilities.

Although recent decades have seen a shift toward providing inclusive, age-appropriate educational opportunities for students with intellectual disabilities (Neubert, Moon, Grigal, & Redd, 2001), prospects after high school remain bleak for these students, many of whom experience segregation and social isolation (Chambers, Hughes, & Carter, 2004). In fact, of all students with disabilities, those with intellectual disabilities are the least likely to be involved in job training, paid employment, or education after high school (Wagner, Newman, Cameto, Garza, & Levine, 2005).

As an alternative to such poor post-school outcomes, a movement has arisen to provide these young adults with inclusive post-second-

ary education (PSE) options. Now numbering over 150 across the United States, PSE programs are located on college campuses and allow students with intellectual disabilities to continue their education alongside typical peers (Consortium for PSE for Individuals with Developmental Disabilities, 2009). In PSE programs, students learn academic material, expand social networks, gain employment skills, and develop independence. Although colleges have historically excluded students with intellectual disabilities, PSE programs offer these students an alternative to traditional college admission and participation (Hart, Grigal, Sax, Martinez, & Will, 2006).

As more PSE programs become available, families are increasingly considering this option (Neubert et al., 2001; Hart et al., 2006). Since families, particularly parents, are instrumental in transition planning, understanding their perspectives can improve the approaches taken by educators and service providers (Chambers et al., 2004; Lehmann, Bassett, & Sands, 1999; Morningstar, Turnbull, & Turnbull, 1995). In prior studies, researchers have focused on general transition outcomes for students with intellectual disabilities compared to typical students (Whitney-Thomas & Hanley-Maxwell, 1996) and to students with other disabilities (Polat, Kalamouka, Boyle, & Nelson, 2001; Wagner et al., 2005). Not surprisingly,

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parents of students with intellectual disabilities are among the most pessimistic about transition outcomes, including PSE participation (Wagner et al.).

A smaller literature has focused specifically on the perspectives of parents of students with intellectual disabilities. For example, Kraemer and Blacher (2001) found that the primary concern for these parents is determining what the young adult will do during the day after high school; however, this study did not discuss PSE programs as a transition option. Similarly, Cooney (2002) found that parents were very concerned about the transition process, but also did not address PSE options. In a more recent study of both parent and sibling perspectives, Chambers et al. (2004) found that respondents considered PSE an important outcome, but that their knowledge of programs was limited and they did not think their family member would pursue this option. Although PSE options are increasingly available to students with intellectual disabilities, no studies have investigated the issues that families consider when making decisions regarding PSE participation.

To examine such perspectives, we surveyed families of high school students with intellectual disabilities concerning PSE program participation. We had three goals for this study. First, we wanted to determine family perceptions of transition planning, as well as determine those barriers that families encounter in learning about PSE programs. Second, we wanted to identify those demographic characteristics that might correlate with differential expectations for students after high school. Third, we wanted to examine both the concerns that families have about enrolling students in PSE programs, and the program characteristics that families consider most important. Our goal was to attain an overall sense of families' knowledge and perceptions of PSE programs.

Method

Participants

Participants included 108 family members of transition-age students with intellectual disabilities in Tennessee. Survey respondents

were excluded if they lived in a different state, or if the student was not 14–25 years old.

Family members of students with intellectual disabilities. Of the 108 respondents, 94% were parents or guardians, and 91% were female; in all, 87% of respondents were the student's mother. The majority of respondents were White (88%); remaining respondents were 8% Black, 1% Hispanic, 1% Asian/Pacific Islander, and 2% other. The majority of respondents were 40 years or older (87%); from urban areas (81%); working part or full time (81%); and had completed college or a higher level of education (76%).

Students with intellectual disabilities. The respondents' family members with intellectual disabilities were 66% male and 34% female. The respondents reported diagnoses of the students, and in some cases selected more than one category. Their diagnoses were: 35% Mental Retardation; 35% Autism Spectrum Disorders; 29% Developmental Disabilities; 17% Down Syndrome; 10% Cerebral Palsy; and 1% Williams Syndrome. Respondents indicated the academic ability of their family member by estimating the student's reading level, with 32% indicating that the student reads at a First Grade level or lower; 32% between the Second and Fifth Grade level; and 36% at a Sixth Grade level or higher.

Procedure

This study was performed in collaboration with the Tennessee Task Force for Post-Secondary Education for Students with Intellectual Disabilities, a group that supports the development of PSE programs on Tennessee college campuses. The Task Force is composed of representatives from various stakeholder groups: the Vanderbilt Kennedy Center, the Tennessee Council on Developmental Disabilities; the Tennessee Division of Vocational Rehabilitation Services; community and disability advocacy groups; the public school system; higher education institutions; Tennessee's Division of Mental Retardation Services; and involved parents and community members.

In conjunction with the Task Force, we created and distributed a survey to learn more about family perspectives toward PSE programs. The survey was designed in both elec-

tronic and print formats; it was formatted electronically using web-based survey software (Survey Gold 8). Respondents who completed the online survey first read a description of the study and an explanation that they could choose to participate or not, withdraw at any point, and skip questions. Next, respondents were directed to the survey; finally, they were asked if they would like to submit their responses. Respondents could only submit answers to the secure website if they answered this question affirmatively. Approximately 94% of participants responded via the web-based survey. The remaining respondents completed and mailed print surveys, which were then manually entered into our database.

Participants were recruited in several ways. The survey was advertised through the Vanderbilt Kennedy Center's web-based Studyfinder; internal e-mail messages sent through Vanderbilt University Medical Center; and flyers distributed through local newsletters and at community events. In addition, various community agencies that had been involved with the Tennessee Task Force distributed the survey. Because we wanted survey respondents to be as candid as possible, we assured them that all answers would remain anonymous.

Survey Instrument

To develop the survey, we drew on prior research that had addressed post-secondary options for young adults with disabilities (Chambers et al., 2004; Kraemer & Blacher, 2001; Polat et al., 2001; Wagner et al., 2005). Survey development involved collaboration with Task Force members, including researchers, disability advocates, and family members of students with intellectual disabilities. Their feedback informed the final survey, which was composed of 50 items and divided into four sections.

1. Information about primary respondents. The first section of the survey asked 12 questions regarding demographic information about the respondent. Using either multiple-choice or open-ended formats, this section asked about the respondent's age, gender, ethnicity, relationship to the student, place of residence, level of education, employment sta-

tus, occupation, marital status, and number of children.

2. Information about the student with intellectual disabilities. Comprised of 22 questions about the student with an intellectual disability, questions in this section asked about the student's age, gender, ethnicity, place of residence and disability diagnosis. Other questions addressed the student's health, emotional well-being, and adaptive behavior. Questions also addressed functional abilities: respondents were asked to rate on a 5-point scale (1 = not at all; 5 = very well) how well students perform various activities (e.g. walking, speaking, eating, preparing meals, taking medications, grooming).

This section also included questions about students' academic history, attitude toward school, and transition plan. Items about academic history concerned the student's IEP, reading level, most recent school setting, and prospects for graduating with a regular diploma. Other questions asked respondents whether the student seems to like school, and whether the student seems interested in educational opportunities after high school. Finally, questions asked respondents how aware they are of PSE options, how they learned about them, and what barriers they encountered during this process.

3. Perspectives on PSE options. This section asked respondents about post-secondary options, and specifically about characteristics of PSE programs. Items asked respondents what their children would most likely do after high school, and whether they thought that PSE programs were a viable option. A series of questions asked respondents how concerned they were about various factors when considering PSE for their family member. On a 5-point scale (1 = not at all concerned; 5 = very concerned), respondents rated these factors (e.g. the student's health; cost of the program; the student's safety; the student's ability to function without parent; similarity to a typical college experience; focus on employment after program completion; and distance of program from home).

Another series of questions asked about the degree of importance of various program components. On a 5-point scale (1 = not at all important; 5 = very important), respondents rated the degree of importance that they at-

tributed to such PSE program components as residential options; inclusive learning environments; individual choice in curriculum; structured social activities; access to a college campus; certification in a vocational area; and a focus on employment after completion of program.

4. Open-ended questions. The final section was composed of open-ended questions, including: (a) "What would help you make decisions about the options available to your child after high school?" (b) "What advice would you give to parents of younger children with intellectual disabilities to better prepare them for the transition that their children will face after high school?" and (c) "If you could design a program for your child to participate in after high school, what would it look like? What would be the most important aspects of the program?"

Data Analysis

All survey data were transferred for analysis to the Statistical Package for the Social Sciences (SPSS) 16 for Windows. First, we used descriptive analyses to determine demographic information for both the primary respondents and the students with intellectual disabilities. Next, we performed analyses of variance (ANOVAs) to test hypotheses of group differences. Finally, we employed repeated-measures ANOVAs to analyze, within individual respondents, their ratings of relative concern about aspects of PSE participation and of relative importance of different PSE program components.

Results

Parental Perspectives on Transition Planning

Descriptive findings regarding students' transition plans indicated an inconsistency between parent and teacher perspectives. Compared to parents, who indicated that PSE opportunities would help their child transition to adulthood ($M = 4.0$, $sd = 1.25$), educators were perceived as being less encouraging of these children pursuing PSE ($M = 2.87$, $sd = 1.56$), $t(108) = 6.79$, $p < .0001$. In

addition, only 26% of parents affirmed that their child's IEP included a plan for the time immediately following high school; 53% reported that the IEP did not include this, and 21% were unsure.

Barriers to Parents Understanding PSE Options

Beyond inadequate transition planning, parents also reported many other barriers to understanding PSE options for their children. Most respondents (73%) reported a "lack of general information or guidance," and the next most-reported barriers were "school and other staff did not help me understand" (36%), and "financial constraints" (36%). Finally, many respondents reported barriers related to services: "different services did not work well together" (30%); "long waiting list for explanation of services" (26%); and "staff from different services gave conflicting advice" (25%). Thirteen percent reported that "written and online materials were difficult to understand;" 9% of all respondents reported that they did not encounter any barriers.

Student Reading Ability as a Correlate to Parent Perspectives

Although as a group parents were generally positive about PSE, parents of students with lower reading levels were less likely to think that PSE would help their children transition to adulthood, $F(2, 104) = 10.73$, $p < .01$. Parents of these students also thought their children were less interested in educational opportunities after high school, $F(2, 104) = 13.47$, $p < .01$; were less often encouraged by school staff to pursue PSE, $F(2, 104) = 10.40$, $p < .01$; and less likely to enroll their child in PSE, $F(2, 104) = 15.44$, $p < .01$. In each of these questions, major differences were found between parents of children at the First Grade reading level or lower compared to parents whose children read at the Second-to-Fifth Grade and Sixth Grade-or-higher levels (see Figure 1).

Parental Concerns and Priorities Regarding PSE Programs

Parents also differed in their concern over various aspects of PSE participation, $F(6,$

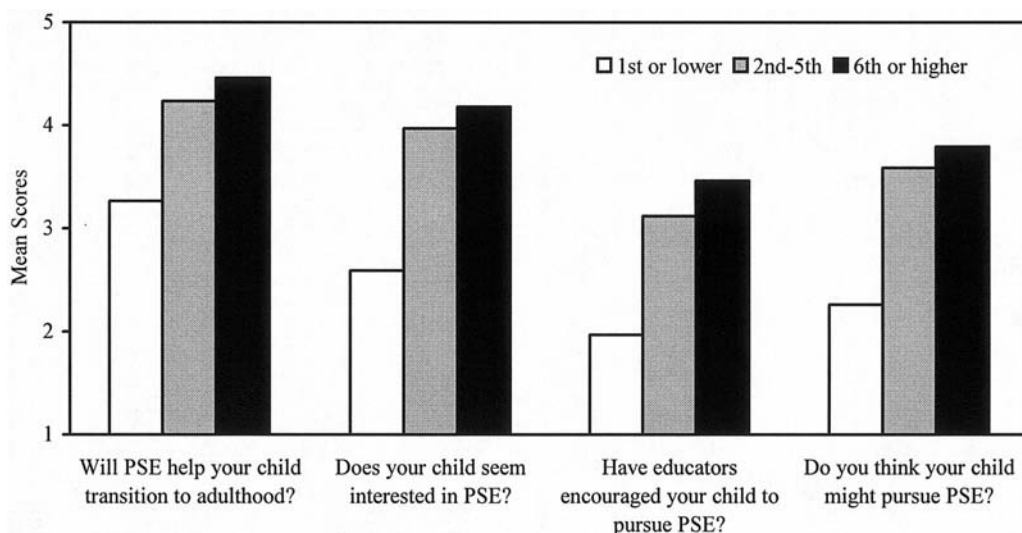


Figure 1. Differential parental attitudes toward PSE according to student reading level.

642) = 26.78, $p < .01$. Among 7 different items, parents were by far the most concerned about their child's safety; almost 9 in 10 respondents rated this item a "5" on a 5-point scale. Conversely, parents were less interested that the PSE program provided an experience similar to a typical college environment; this item averaged the lowest rating (3.44) and received the lowest proportion of "5" ratings (30.6%; see Table 1). Similarly, as shown in Table 2, respondents reported that the most important PSE program component involved a focus on employment, whereas the two least important program components involved access to a college campus and residential options, $F(6, 642) = 8.48$, $p < .01$.

Open-ended Questions

Of the 108 respondents, 94 (87%) answered at least one open-ended question.

Transition decisions. The first question asked respondents what would help them make transition decisions. Of the 92 respondents who answered this question, 57% answered that they needed more information to make educated decisions. Respondents noted that such information could come from a variety of sources, including teachers, service providers, PSE program representatives, and other parents. One respondent wrote, "It would be great if the school system had the information to give the parents on the options

TABLE 1

Mean Scores of the 7 Parental Concern Items, and Percent of the Sample Giving the Highest Rating (5 = Very Concerned)

Concern Regarding PSE Programs	Mean	Percent Highest
Your child's safety	4.72 (0.94)	88.0%
Your child's ability to function without you	4.34 (1.15)	64.8%
Focus on employment after completion of program	4.29 (1.35)	67.6%
Cost of the program	4.06 (1.41)	61.1%
Distance of the program's campus away from your home	3.94 (1.26)	47.2%
Your child's physical health	3.81 (1.56)	53.7%
Program similar to a typical college experience	3.44 (1.55)	30.6%

TABLE 2

Mean Scores of the 7 PSE Program Component Items, and Percent Giving the Highest Rating (5 = Very Important)

<i>Program Component</i>	<i>Mean</i>	<i>Percent Highest</i>
Focus on employment after completion of program	4.36 (1.15)	67.6%
Structured social activities	4.24 (1.09)	56.5%
Individual choice in curriculum	4.22 (1.12)	57.4%
Inclusive learning environments	4.08 (1.24)	53.7%
Opportunity for certification in a vocational area	4.01 (1.29)	50.0%
Access to a college campus	3.60 (1.43)	38.9%
Residential options	3.47 (1.45)	47.2%

for these children. The school system drops the ball with these children.” Many respondents (37%) also wrote about specific program characteristics (e.g. location, cost, safety, and employment training). Fewer (16%) mentioned student characteristics, and the importance of matching programs to the specific needs of students. Finally, 6% expressed the need for more options; as one respondent wrote, “Options should be offered. Opportunities should be everywhere, just like they are for the general public.”

Advice to other families. Of the 84 respondents that answered this question, 56% advised families to inform themselves about their rights and to plan ahead, for example, by placing the student on waiting lists for adult services early. A subset of this group (17% of respondents) advised parents to work with schools, community organizations, and other families. In contrast, 10% of all respondents advised parents not to rely on others. As one respondent wrote: “Do not wait for your guidance counselor . . . You need to be proactive and persistent in gathering this information.” A final group (15%) emphasized the importance of high expectations and individualized goals for students.

An additional 8% expressed their inability to answer the question at all, stating that they needed advice themselves. One respondent wrote, “There is not a good road map. Things have been pretty clear up to this point. Part of this is likely my own unwillingness to look at a future that feels pretty bleak. Also, I am just tired of advocating and creating opportunities out of whole cloth.”

Desired PSE characteristics. The final question asked respondents what an ideal PSE program for their child would be. Of the 85 respondents that answered this question, 21% mentioned practical skills development (e.g. training in handling money), and 19% emphasized the need for skilled teachers who can provide students structure and support. Other respondents (18%) emphasized employment training; another 18% expressed interest in social skills training, recreation, and socializing. Remaining respondents wrote about a variety of program components: academics, skills training, inclusion, and similarity to a typical college experience.

Discussion

As an initial step in determining the viability of PSE programs, our findings extend prior research by investigating the perspectives of families of students with intellectual disabilities. Findings emerged in three major areas: family attitudes toward PSE options; correlates with differential attitudes toward PSE; and families’ priorities and concerns about PSE programs.

First, we found that parents considered PSE opportunities to be beneficial for their transitioning children, but that they did not think that educators encouraged this option. In comparing ratings of parent versus teacher encouragement of PSE options, parents rated themselves more interested than teachers. Most respondents (73%) lacked information and guidance about planning for PSE and, in the open-ended answers, parents wrote that school staff could do much more to facilitate

PSE planning. While poor communication has been well-documented as a general barrier to effective transitions to adulthood, our survey addressed this issue specifically within the context of PSE planning. Indeed, while other studies have found that families are generally positive about PSE (Chambers et al., 2004) and have documented poor communication between parents and teachers (Lehmann et al., 1999), this survey is the first to document the barriers to PSE planning and access.

Second, parents of students with lower reading levels were less likely to think that PSE would help their children transition to adulthood. In this study, the break point was between the group of students who read at the First Grade level or lower, compared to students reading at the Second Grade level and higher. This finding mirrors results of the *National Longitudinal Transition Study-2* (Wagner et al., 2005), which reported that youth with higher functional cognitive skills were more likely to participate in PSE. However, we also noted that parents of those students with the lowest reading abilities were not wholly negative about the prospect of PSE for their children. Although parents of students with the lowest reading abilities were less positive about this option, some of these parents still considered PSE for their children.

Third, we found that parents harbored both specific fears and specific expectations about PSE programs. Their major fear related to their child's safety. Indeed, from among 7 potential concerns that we surveyed, parents consistently reported their child's safety as the highest rated concern. As Table 1 shows, this single concern averaged close to 5 on a 5-point scale, was almost half of a standard deviation above all other concerns, and was rated the highest score by almost 90% of parents.

Although the salience of the students' safety was somewhat surprising to us, it makes sense that parents would be most concerned about this issue. In addition to parental concerns over their child's vulnerability (Fisher & Hodapp, 2009; Hanley-Maxwell, Whitney-Thomas, & Pogoloff, 1995), individuals with intellectual disabilities may actually be more likely to be abused and taken advantage of by others. As Fisher, Hodapp, and Dykens (2008) have recently noted, individuals with intellectual disabilities often display personal and fa-

miliar characteristics that predispose them to abuse and exploitation; recent studies report that such individuals suffer abuse at rates from 2–10 times those noted among non-disabled individuals. Thus, while no research has yet addressed this issue in the context of PSE, concerns over safety will undoubtedly influence parental decisions about their student's participation. PSE programs, in turn, will need to respond to parental concerns by taking appropriate measures to ensure student safety and by communicating these efforts to families.

Parents also reported a strong preference for certain PSE program characteristics. Compared to other program components, parents want PSE programs to focus on their child's employment; indeed, post-program employment was rated as a "5" by 68% of all respondents. While other studies have also found that parents consider employment to be a primary outcome (Chambers et al., 2004; Kraemer & Blacher, 2001; Whitney-Thomas & Hanley-Maxwell, 1996), none have yet addressed this issue in the context of PSE. Additionally, although many PSE programs currently include employment training, this component takes a variety of forms and is emphasized to varying degrees (Hart et al., 2006). Given our findings, PSE programs should prioritize preparation for employment as the primary outcome for their students.

In contrast, there were also program characteristics that parents did not prioritize. Most noteworthy in this regard were residential options and the program's similarity to a typical college experience. These views from parents contrast sharply with informal conversations that we have had with potential PSE students themselves. Considering this contrast, we wonder whether parental attitudes align with the priorities of their children, who are ultimately the participants in PSE programs. Given that these students are young adults transitioning to full adulthood, understanding and honoring their perspectives seems especially critical.

Taken together, the results of this study have implications for both families and practitioners. First, parents' limited knowledge of transition plans and PSE options is a major concern, one that needs to be addressed by high school educators, parent groups, service providers, and PSE programs. Second, given

that educators' and parents' post-school expectations for students may not align, there seems to be a need for more effective communication. Third, educators should offer more information about PSE options, even to families of students with lower academic skills.

Although an important first step in understanding parental perceptions of PSE programs, this study also has several limitations. First, responses were based on the reports of family members and not confirmed by school records, student observations, teacher reports, or other sources. Second, responses may reflect priorities that were specific to our sample. Although we are not certain that our respondents were more informed about PSE options than family members of other students with intellectual disabilities, their knowledge of the survey and choice to respond indicates that this may have been the case. Given that we may have surveyed a "connected" sample of parents, our findings regarding limited knowledge of PSE options are even more troubling.

Despite these limitations, this study extends the existing research by identifying barriers that families encounter when trying to understand PSE options, as well as identifying specific parental concerns and priorities regarding PSE programs. Such information has implications for families and professionals, both of whom strongly influence students with intellectual disabilities during the transition to adulthood. Our results can also inform PSE program development, providing much-needed research to guide what has become a growing national movement.

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Resilience in Families with an Autistic Child

Abraham P. Greeff and Kerry-Jan van der Walt
University of Stellenbosch

Abstract: The primary aim of this study was to identify characteristics and resources that families have that enable them to adapt successfully and be resilient despite the presence of an autistic child in the family. The study was rooted within the contextual framework of the Resilience Model of Stress, Adjustment and Adaptation of McCubbin and McCubbin (1996). Parents of 34 families whose children attend a special school for autistic learners in the Western Cape, South Africa completed self-report questionnaires and answered an open-ended question. Resilience factors identified in this study include higher socioeconomic status; social support; open and predictable patterns of communication; a supportive family environment, including commitment and flexibility; family hardiness; internal and external coping strategies; a positive outlook on life; and family belief systems.

Autism is a severely debilitating developmental disorder with potentially harmful effects on the entire family. It is a chronic disability that appears in all racial, ethnic, cultural and social backgrounds around the world and is more common than childhood cancer, cystic fibrosis and multiple sclerosis combined (Autism Society of America, 2003). A study conducted in the United States of America found that autism is now ten times more prevalent than it was in the 1980s (Blakeslee, 2003). Potentially, 270, 000 South African children under the age of six are affected by autism (Autism South Africa, 2005). Furthermore, the number of children affected is rising by 10 to 17% per year (Autism Society of America, 2003). Because of the severity of the disorder, many families struggle to come to terms with their child's diagnosis and to adjust to having a child with special needs in their home. The motivation for the present study rests on two factors, namely the increase in prevalence rates of the disorder and the potentially adverse effects the disorder may have on family functioning. Consequently, the aim of this study was to identify characteristics and resources that families have that enable them to adapt successfully.

The presence of an autistic child in the family may have adverse effects on various domains of family life, including the marital relationship, sibling relationships and adjustment, family socialisation practices, as well as normal family routines. Because of the demands associated with caring for an autistic child, parents do not have much personal time (Court Appointed Special Advocate (CASA) Programme, 2003). The result may be a weakened affectional bond between parents (Cantwell & Baker, 1984), depression, withdrawal of one parent from care-giving responsibilities, or even divorce.

Rivers and Stoneman (2003) noted that parental conflict and marital stress lead to behaviour problems, poorer adjustment, lower self-esteem and higher rates of depression in the siblings of children with autism. Other stressors for siblings include increased care-taking responsibilities, stigmatisation, the loss of normal sibling interaction (Dyson, Edgar, & Crnic, 1989), feelings of guilt and shame, and changes in family roles, structure and activities (Rodrigue, Geffken, & Morgan, 1993).

Family routines are often dictated by the autistic child and must often be changed at the last minute to accommodate the child's needs. Other factors causing families to isolate themselves may include difficulty in finding a reliable person to look after the autistic child, and fatigue or loss of energy due to the constant burden of care giving (Sanders & Mor-

Correspondence concerning this article should be addressed to Abraham P Greeff, Department of Psychology, University of Stellenbosch, Private Bag ×1, Matieland 7602, SOUTH AFRICA. Email apg@sun.ac.za

gan, 1997). Despite the challenges faced by the families of autistic children, some families are able to cope remarkably well, although others have considerable difficulty in dealing with these challenges.

Family Resilience Theory

In research on families over the last few years, there has been a shift from a deficit-based model towards a strengths-based model (Hawley & DeHaan, 1996), and the concept of resilience has been extended to include family resilience (Walsh, 2003). A family resilience approach aims at identifying those factors that contribute to healthy family functioning, rather than family deficits (Hawley & DeHaan; McCubbin, Thompson, & McCubbin, 1996). Definitions of family resilience encompass a number of common ideas. First, resilience appears to surface in the face of family difficulties or hardships (McCubbin et al.; Walsh), and inherent in resilience is the property of buoyancy.

In an attempt to illustrate and describe the complex notion of family resilience, McCubbin and McCubbin (1996) developed The Resiliency Model of Family Stress, Adjustment and Adaptation. The model distinguishes between two interrelated phases, namely adjustment and adaptation (McCubbin et al., 1996). The family's level of adjustment depends on numerous essential interacting elements, namely the stressor and its severity; family vulnerability; established patterns of family functioning or family typology; resistance resources; appraisal of the stressor; and family problem-solving and coping strategies (McCubbin et al.).

Family adaptation includes a series of adaptation-oriented components and resiliency processes (McCubbin et al., 1996). These incorporate (1) vulnerabilities, which may include additional life stressors and changes that undermine or restrict the family's capacity to achieve a satisfactory level of adaptation; (2) resources, which consist of the psychological, family, and social resources that families utilise in the process of adaptation; (3) appraisal, which comprises the factors that give meaning to the changes in the family and play a role in establishing new patterns, eliminating old patterns, affirming old patterns, creat-

ing and utilising resources, as well as problem solving, coping and adaptation; (4) support, including intrafamily and family-community support processes that facilitate adaptation; and (5) patterns of functioning, which involves the elimination, modification and establishment of patterns of family functioning to bring about balance and harmony, as well as adaptation (McCubbin et al.).

Walsh (2003) formulated a process model of family resilience and highlighted family qualities that may reduce stress and vulnerability during crisis situations. It includes family belief systems, approaching hardships as a "shared challenge" (Walsh, p. 407), maintaining a positive outlook in adapting to stress, and preserving a shared confidence through an adverse situation. Furthermore, most families are able to find comfort, strength and guidance through connections to cultural and religious traditions (Walsh). Social and economic resources, including kin and social networks, friends, community groups and religious congregations, are important contributors to family resilience, particularly where the stressor is ongoing (Walsh). Communication processes that entail clarity of contents, open emotional expression, collaborative problem-solving and effective conflict management are vital for family resilience (Walsh).

Limited research has been documented that contributes specifically to the understanding of the resiliency process in families, or which identifies resiliency qualities associated with family adaptation in families faced with a chronic condition. This study, therefore, contributes to the field of research on resilience in families with an autistic child, and serves to recognise health and resilient potential in families where previously there may only have been decay.

Method

The aim of this study was to identify the characteristics and resources of families that enable them to be resilient despite having an autistic child in the family. A cross-sectional survey research design was used. Mixed methods were used to collect data from one parent of each participating family. Qualitative data were obtained by asking an open-ended ques-

tion, while quantitative data were collected through the use of various measuring instruments based on the Resiliency Model of Stress, Adjustment and Adaptation (McCubbin et al., 1996).

Participants and Procedure

Permission to conduct this study was obtained from the Western Cape Education Department and the respective governing bodies of the three facilities through which participants were recruited. A letter was then sent via two of the facilities to the families that qualified for the study based on the following criteria: (1) the family structure—two-parent families where both parents are present in the child's life, (2) the age of the autistic child—not older than 10 years, and (3) the families should have known of their child's diagnosis for a minimum period of 18 months. The questionnaires were sent with a letter explaining in detail the procedure to be followed in answering the open-ended question and completing the questionnaires. Due to the low response rate to the letters, those families who had not responded were contacted telephonically in order to provide additional information and to request their participation. This technique proved more successful, as the majority of families agreed to participate.

The third facility was a private organisation that caters primarily for the needs of children with developmental disabilities. In order to recruit families for the study, the researcher met with a group of parents at an informal gathering held at the organisation's offices. After obtaining informed consent, ten questionnaires were handed out to those who were willing to participate and they were asked to return them to the facility offices at a later date.

Due to the small number of completed questionnaires received by the researcher, the decision was made to allow for the inclusion of single-parent families. An analysis of variance (ANOVA) revealed no statistically significant difference in scores between two-parent and single-parent families with regard to the dependent variable (family adaptation) ($F(1, 30) = 2.5480, p = 0.12$).

In total, 34 families participated in the study: 16 from facility 1, 15 from facility 2 and

three from facility 3. Twenty-four females and four males completed the questionnaires, while the remaining six parents did not indicate their gender. Most of the participating parents were aged between 34 and 43 ($n = 28$), with the mean age of the group being 36.21 ($SD = 6.36$). The mean age of the other parent ($n = 25$) in the family was 38.92 ($SD = 5.31$). Most of the families were two-parent families ($n = 27$), while four parents were unmarried, one was divorced, one was separated and one was widowed. The length of the parental relationship in most families ($n = 23$) was between seven and 13 years, with a mean length ($n = 34$) of 9.53 years ($SD = 5.00$). Thirty-one of the autistic children were male and three were female. The mean age of the autistic children ($N = 34$) was 6.48 years ($SD = 2.16$). Fifteen of the families had one other child apart from the autistic child, while 12 had no other children, five had two other children, and two families did not indicate whether there were other children. Most of the children ($n = 25$) had been diagnosed with autism between one and four years previously. The mean number of years since diagnosis ($n = 33$) was 3.24 years ($SD = 1.90$). Eighteen of the families were English speaking, 11 were Afrikaans speaking and five spoke another language at home. Four families were of a lower socioeconomic status, eight were of middle socioeconomic status and 21 were of a higher socioeconomic status. One parent did not indicate socioeconomic status.

Measures

Seven self-report questionnaires were used to measure various potential resilience variables. All questionnaires were available in both English and Afrikaans. A biographical questionnaire was designed to collect information on family composition, marital status and duration of the parental relationship, the age and gender of family members, level of education, employment, income and home language. The family's socioeconomic status (SES) was determined using an adapted version of the composite index derived by Riordan (cited in Tennant, 1996).

The dependent variable in this study is the family's level of adaptation, given the chronic stressful circumstances. This was measured us-

ing the total score of the *Family Attachment and Changeability Index* (FACI8), adapted by McCubbin, Thompson, and Elver. It is an ethnically sensitive measure of family adaptation and functioning that consists of 16 items to be answered on a five-point Likert-type scale. FACI8 has two subscales, namely attachment and changeability. The internal reliability (Cronbach's alpha) of the total scale and the two subscales varies between .73 and .80 (McCubbin et al., 1996), while the alpha values obtained in this study for the total scale and the attachment and changeability subscales are .75, .79 and .85 respectively.

The *Family Hardiness Index* (FHI), developed by McCubbin, McCubbin, and Thompson, was used to measure the characteristic of hardiness, which refers to the internal strengths and durability of the family unit. The FHI consists of 20 items to be answered on a five-point Likert-type scale. The overall internal reliability (Cronbach's alpha) of the FHI is .82, while the internal reliabilities for the three subscales (commitment, challenge and control) are .81, .80, and .65 respectively. The alpha values obtained in this study are .67 for the total scale, and .62, .34 and .82 for the challenge, control and commitment subscales respectively. The validity coefficients range from .20 to .23 for the variables of family satisfaction, time and routines, and flexibility (McCubbin et al., 1996).

The *Social Support Index* (SSI), developed by McCubbin, Patterson, and Glynn, determines the extent to which families find support in the communities in which they live. This instrument consists of 17 items to be answered on a five-point Likert-type scale. The SSI has an internal reliability of .82, a test-retest reliability of .83 and a validity coefficient of .40 with the criterion of family wellbeing (McCubbin et al., 1996). A reliability analysis of the data in this study yielded an internal reliability (Cronbach alpha) of .91.

The *Relative and Friend Support Index* (RFSI), developed by McCubbin, Larsen, and Olson, consists of eight items to be answered on a five-point Likert-type scale. The RFSI assesses the degree to which families make use of friend and relative support as a strategy to manage stressors and strains. The internal reliability (Cronbach's alpha) of the RFSI is .82, with a validity coefficient (correlating with the

original F-COPES) of .99 (McCubbin et al., 1996). The Cronbach alpha obtained in this study was .82.

The *Family Crisis Oriented Personal Evaluation Scales* (F-COPES) was developed by McCubbin, Larsen, and Olson to distinguish problem-solving and behavioural strategies used by families during times of hardship. The F-COPES consists of 30 items to be answered on a five-point Likert-type scale. The F-COPES has five subscales, representing two dimensions, namely internal and external coping strategies. Internal coping strategies are the use of resources within the family to manage difficulties, while external coping strategies are the behaviours the family engages in to obtain resources outside the family system. The F-COPES total scale has an internal reliability coefficient (Cronbach's alpha) of .77 and a test-retest reliability of .71 (McCubbin et al., 1996). The internal reliability coefficients for the subscales derived from the data in this study are .50 (passive evaluation); .72 (redefining the problem); .66 (seeking spiritual support); .70 (looking for social support); and .53 (mobilising community resources).

The *Family Time and Routine Index* (FTRI), developed by McCubbin, McCubbin, and Thompson, was used to explore the routines and activities used by families, and to evaluate the value placed by families on these practices. This measure consists of 30 Likert-type items, divided into eight subscales. The overall internal reliability (Cronbach's alpha) of the FTRI is .88, while the validity coefficients range from .24 to .34 with regard to family bonding, family satisfaction, marital satisfaction, family celebrations and family coherence (McCubbin et al., 1996). The reliability coefficients obtained from the data in this study are .77 for the total scale; .48 for the parent-child togetherness subscale; .61 for the couple-togetherness subscale; .33 for the child routines subscale; .78 for the meals together subscale; .70 for the family time together subscale; .83 for the family chores routines subscale; .60 for the relatives connection routines subscale; and .44 for the family management routines subscale.

The *Family Problem Solving and Communication Scale* (FPSC), developed by McCubbin, McCubbin, and Thompson, consists of ten items to be answered on a four-point Likert-type scale. The FPSC has two subscales—incen-

diary communication and affirming communication. The reliability (Cronbach's alpha) of the total scale is .89 and that of incendiary communication and affirming communication is .78 and .86, respectively. The reliability coefficients obtained for this study are .83 for incendiary communication, .87 for affirming communication, and .90 for the total scale. The test-retest reliability of the subscales, as well as of the total FPSC, is .86 (McCubbin et al., 1996).

The qualitative measure comprised an open-ended question regarding the family's perspective of the qualities that have helped them to adapt to the presence of the autistic child. The question was: "In your own words, what are the most important factors, or strengths, which have helped your family to adapt to living with your autistic child?" The parents were thus required to respond in writing by giving their own personal account of factors that have facilitated their family's adaptation.

Data Analysis

In analysing the qualitative data, a process of inductive reasoning was followed. Initially, preliminary codes were assigned to the data, after which the codes were refined in order to better depict the data (Lacey & Luff, 2001). These codes eventually become categories with which to identify various themes, which could then be used to report the results of the qualitative aspect of the study (Pope, 2000).

In order to identify possible independent variables that may be associated with the dependent variable (family adaptation), Pearson product-moment correlation coefficients were calculated. Multiple regression analysis was carried out in order to identify which combinations of independent variables could best predict family adaptation.

Results

In the comparison of the FACI8 scores of families with lower, middle and upper socioeconomic status, the ANOVA analysis indicates that those of middle and upper socioeconomic status adapted better. Except for one correlation (between family adaptation and incendiary communication), all other signifi-

TABLE 1

Pearson Correlations between Family Adaptation and Various Family Variables

<i>Variable</i>	<i>r</i>	<i>p</i>
Occupation classification of primary breadwinner	.56	<.01
Age of autistic child	.44	.02
Socioeconomic status	.53	<.01
Social support (SSI)	.45	.01
Family problem solving and communication (FPSC)	.65	<.01
Affirming communication	.68	<.01
Incendiary communication	-.57	<.01
Family Hardiness Index (FHI)	.76	<.01
Commitment	.59	<.01
Challenge	.71	<.01
Control	.47	<.01
Family Crisis Oriented Personal Evaluation Scales (F-COPES)		
Passive appraisal	.59	<.01
Family Time and Routine Index (FTRI)	.44	.01
Parent-child togetherness	.54	<.01
Family time together	.52	<.01

cant correlations were positive. Table 1 provides a summary of the correlations found between the dependent variable (family adaptation) and the various independent family variables. Only the results that are significant at a 1% level are presented.

According to Table 1, statistically significant correlations exist between family adaptation and the following variables: the occupation classification of the primary breadwinner, the age of the autistic child, the socioeconomic status of the family, social support, family problem solving and communication, affirming communication and incendiary communication (negative correlation), family hardiness (commitment, challenge and control), the coping strategy of passive appraisal, and family time and routines with the two aspects parent-child togetherness and family time together.

In order to identify which combination of independent variables would best predict the dependent variable (family adaptation), a best-subsets multiple regression analysis was carried out. Eighty-three percent of the variance is explained by the equation ($R = .9099$),

with the identified factors being relative and friend support (RFS total score) ($p = .02$), family problem solving and communication (FPSC total score) ($p = .000$), seeking spiritual support as a coping style ($p = .15$) and passive appraisal as a coping style ($p = .000$).

Qualitative Results

Thirty-three parents responded to the open-ended question and their responses were analysed in order to identify categories of family resilience. The following five broad categories emerged: (1) professional help/education-factors such as school and treatment programmes, knowledge of autism and advice from experts, (2) personal factors relating to the parents—this category included factors like maintaining a positive outlook, hope, commitment and patience, (3) social support from family, friends, the community and parents of other autistic children, (4) factors relating to the child—treating the child as normal, listening to the child's needs, empathy for the child, recreational activities for the child, and (5) factors relating to the family unit—open communication, strong parental relationship, having other children in the household, and working together as a family.

The single factors reported most often by the parents as facilitating the adaptation process following the diagnosis of an autistic child were the school and treatment programmes (52%), knowledge of autism (45%), acceptance of the diagnosis (39%), support and involvement of extended family (39%), and faith in God (39%).

Discussion

The aim of this study was to identify resilience factors in families living with an autistic child. The parents reported that having other children in the home helped the family in the adaptation process. This supports Powers's (2000) view that involving the siblings of children with autism in the day-to-day care of the disabled child, as well as in the child's treatment programmes (Howlin & Rutter, 1987), leads to higher self-esteem and feelings of achievement in siblings and thus has a positive influence on the family's adaptation.

The socioeconomic status of families ap-

peared to play a role in the family's adaptation, with families of middle and upper socioeconomic status being better adapted (see Table 1). This may be accounted for by the increased ability of middle-and upper-class families to afford better treatment for their autistic child. This finding is supported by positive correlations between both socioeconomic status and the occupation of the family's primary breadwinner with family adaptation.

A family's level of adaptation is associated with the extent to which families find support in the communities in which they live (SSI score). Social support is an important resource in alleviating the difficulties associated with having a chronic stressor, such as an autistic child, in the home, and promoting successful adaptation (McCubbin et al., 1996; Walsh, 2003). Social support has also been associated with positive family and child outcomes in families with an autistic child (Rivers & Stoneman, 2003). The results of the qualitative data support this finding.

Family adaptation is associated with the patterns of communication utilised by the family. It is enhanced by affirming communication, while it declines when incendiary patterns of communication are used (see Table 1). The quality of the communication in the family provides a good indication of the degree to which families manage tension and strain and obtain a satisfactory level of family functioning, adaptation and adjustment (McCubbin et al., 1996). Open communication was reported in the qualitative data ($n = 4$) as a factor that helped families to adapt to the presence of an autistic child.

Families with a supportive environment and a high degree of cohesion typically demonstrate higher degrees of commitment to and help and support for one another. Such families are also more likely to adapt successfully to the presence of a child with autism (Bristol, 1984). The parents in this study reported that being committed to helping their autistic child, working together as a family (family hardiness, commitment, seeing crises as challenges), and making their children their top priority were all family strengths contributing to better adaptation. Families who were willing to experience new things, to learn and to be innovative and active showed higher levels

of family adaptation. Such flexibility is an essential process in family resilience (Walsh, 2003). It involves the ability of families to adapt to the stressor through the reorganisation of patterns of family interaction to fit the new demands faced by the family (Walsh). Families with an internal locus of control show higher levels of family functioning than those who perceive their lives as being shaped by outside influences (hardiness–control). This finding concurs with those obtained by Bristol, and Henderson and Vandenberg (1992), who found that people with an internal locus of control are more likely to engage in behaviours to overcome the adverse effects of the chronic stress of raising an autistic child, and are thus more likely to achieve successful adaptation.

A healthy parental relationship leads to better adjustment in families with an autistic child (Rodrigue et al., 1993). This is confirmed by the parental reports in this study (see qualitative results). Powers (2000) argues that parents should not feel that they must be with their autistic child at all times and do everything for him/her. Rather, the child should be encouraged to develop skills that will enable him/her to function as independently as possible. The parents in this study shared this view and believed that making the child as independent as possible was an important step in the adaptation process.

Families that make use of the internal coping strategy of passive appraisal appear to exhibit higher levels of family adaptation (see Table 1, as well as results of regression analysis). Passive evaluation involves accepting the stressful situation (the presence of the autistic child) and not doing anything about it (McCubbin et al., 1996). This finding is interesting, as it would be logical to think that families would achieve higher levels of adaptation by actively pursuing solutions to the stressful situation. The participants in this study might have felt that they were doing all they could for their autistic child and therefore resolved to accept the situation. This finding supports that of Dyson et al. (1989) and Powers (2000), who state that acceptance of the child and his/her disorder is an important factor contributing to adaptation to that child.

Information seeking is a coping strategy often employed by the parents of autistic chil-

dren. It enables the parents to take positive steps towards helping their autistic child (Rodrigue, Morgan & Geffken, 1990). In this study, the parents highlighted their knowledge of autism as a positive factor resulting in increased resilience. This coping strategy is adaptive, as it assists parents in learning how to help their child and prevents the use of maladaptive coping strategies (Rodrigue et al.).

Children with autism have a need for strict adherence to routines (Aarons & Gittens, 1999). Any disruption to their known routines often leads to panic, fear or temper tantrums (Sadock & Sadock, 2003). This aversion to changes in routines results in disruptions in family life, as the child may refuse to carry out any activities unless their specific routine is followed (Mash & Wolfe, 2002). Parents of children with autism have emphasised the importance of routines in the process of successful adaptation (Howlin & Rutter, 1987). Routines assist parents in organising their time so as to make time for the autistic child, their other children, their spouse and themselves. McCubbin et al. (1996) have also identified family routines as an important resource in the adaptation process. This is supported by the findings of this study, which suggest a positive correlation (see Table 1) between the routines and activities used by families and family adaptation. In terms of the qualitative data, only two parents reported that sticking to a basic routine was helpful in terms of achieving successful adaptation.

This study found that families that emphasise family togetherness showed higher levels of family adaptation (see Table 1, family togetherness). The Resiliency Model of McCubbin et al. (1996) highlights family celebrations and family time together as important resources that facilitate family adaptation. It is also important for parents to have time together for themselves, without any children, as this allows them to invest in their relationship (Bristol, 1984; Powers, 2000). Time away from the autistic child was reported as being important to the adaptation process by one parent in this study.

Parents reported that maintaining a positive outlook and remaining hopeful were factors that helped them to adapt to having an autistic child (qualitative results). The importance

of a positive outlook has been documented in resilience theory. Families become resilient when they actively pursue solutions to their problems, look beyond the hardships surrounding their situation, and focus on making the best of the options available to them (Walsh, 2003).

Faith in God was rated by the families in this study as an important factor contributing to adaptation. Bristol (1984) found that belief in God and/or adherence to clear moral standards mediates the family hardships by giving meaning and purpose to the sacrifices they make in caring for the autistic child.

Conclusions

The families that took part in this study were privileged in the sense that they all had access to educational services for their autistic child. The importance to the adaptation process and of having access to schools and other community resources is evident from previous research (Bristol, 1984; Powers, 2000), in resilience theory (McCubbin et al., 1996; Walsh, 2003), and in the results of this study (see Table 1). Due to the limitations of the sample because of their homogeneity in terms of access to educational services, it is proposed that further research is undertaken to identify resilience factors in families that do not have access to such services. The majority of the families in this study was employed and had a high socioeconomic status, which means that it might be access to funds to invest in educational services, rather than access to the services themselves, that is the true mediating factor. It is further recommended that families from lower socioeconomic backgrounds be investigated in order to identify the factors that facilitate their adaptation to having an autistic child.

Several family qualities described by the Resilience Model of Stress, Adjustment and Adaptation (McCubbin et al., 1996) as being important in family adaptation were supported by this study. These include social support and the mobilisation of community resources, open communication, and family hardiness, including commitment and an internal locus of control. The Resiliency Model, therefore, provides an effective contextual framework to

understand resiliency factors specific to families with an autistic child.

This study is characterised by a number of limitations. Only 34 families took part, which calls for caution in generalising the results to all families with an autistic child in the home. A further limitation is the geographic location of the participants. All the families participating in the study reside in the Cape Town Metropolitan area, Western Cape Province, South Africa. This means that additional care should be taken in generalising the results, particularly with regard to families not residing in urban areas. People from rural areas are likely to experience greater difficulty in accessing educational services and may have a lower socioeconomic status than the families participating in this study.

The findings of this study serve a dual role in terms of their utility in facilitating family adaptation. Firstly, this study confirms that factors such as accessing social support, taking time away from their child, accepting the diagnosis, open emotional expression, family activities and routines, and family commitment are all important resilience factors. As such, they are beneficial for the child's wellbeing and for successful family functioning. Secondly, the findings may be used to provide both professionals and parents with insight into how to create a family environment that will benefit the autistic child, without being detrimental to the total family system.

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Professionals' Attitudes on Partnering with Families of Children and Youth with Disabilities

Jamie Bezdek, Jean Ann Summers, and Ann Turnbull
University of Kansas

Abstract: The purpose of this study was to examine the professionals' perspectives regarding characteristics of effective partnerships with parents. The sample involved 20 professionals representing the backgrounds of occupational therapists/physical therapists/speech-language pathologists, special education teachers, paraprofessionals, and health professionals. The following three themes were identified through qualitative analysis: (a) gap between family-centered language and actions; (b) "Goldilocks" perception (i.e., the perception that parents may be involved too much, too little, or just right); and (c) parental blame. Future directions for research and practice are suggested.

The idea of partnerships is not new in the field of special education, particularly partnerships between the families of the children being served and the providers who serve them. Since 1975, IDEA has recognized the benefits of family participation for parents, teachers, and students as best educational practice in the education of children with disabilities (Turnbull, Zuna, Turnbull, Poston, & Summers, 2007). One of the primary purposes of the 1997 amendments to IDEA was to increase the opportunities for partnerships between parents and professionals (Turnbull & Turnbull, 2000).

Summers and colleagues (2005) defined partnerships as "...mutually supportive interactions between families and professionals, focused on meeting the needs of children and families, and characterized by a sense of competence, commitment, equality, positive communication, respect, and trust" (p. 3). These types of partnerships, based on mutuality and equality, are the primary focus of this study.

Research and practice guidelines address the benefits of quality partnerships for professionals (e.g., to better do their jobs), families (e.g., to be empowered, to be satisfied) and students individuals with disabilities (e.g., to

have more appropriate goals, services, and equipment and more opportunity to reach their goals (Dunst, 2000; McWilliam, Tocci, & Harbin, 1998; Park, Turnbull, & Park, 2001; Turnbull, Turnbull, Erwin, & Soodak, 2006; Turnbull, Turnbull, Summers, & Poston, 2008).

Despite the importance of partnerships, the limited evidence available on professionals' perceptions of partnerships suggests they do not view families as equal partners. In some cases this may be attributed to barriers such as professional attitudes, lack of training and knowledge, and/or lack of experience (Croll 2001; Lee, Ostrosky, Bennett, & Fowler, 2003; Luckner & Hanks, 2003; Penney & Wilgosh, 2000; Shapiro, Monzo, Rueda, Gomez, & Blacher, 2004). Hilton and Henderson (1993) specifically found that teachers appeared to value parent involvement in one section of their questionnaire; yet when asked if they engaged in specific family-centered practices, a limited number of practices were reported as being used, and others were not used often. The authors concluded, "If parent involvement is to become a best practice that is implemented, rather than recognized, it appears some modifications [are necessary]" (p. 210).

While researchers have reported barriers to parent involvement in the attitudes and behaviors of teachers, teachers themselves tend to attribute barriers to family characteristics (Bhering, 2002; Dinnebeil & Rule, 1994; Fyl-

Correspondence concerning this article should be addressed to Jamie Bezdek, Haworth Hall, 1200 Sunnyside Avenue Room 3136, The University of Kansas, Lawrence, KS 66045-7534.

ling & Sandvin, 1999; Penney & Wilgosh, 2000). Researchers focus on professional barriers that teachers may or may not have seen in themselves (Bhering, 2002; Campbell & Halbert, 2002; Croll 2001; Hilton & Henderson, 1993; Lee et al., 2003; Luckner & Hanks, 2003; Penney & Wilgosh). Most of the teacher barriers were related to a lack of understanding or training. For example, Luckner and Hanks point out that what teachers perceived as parental apathy or indifference could be attributable to the fact that families may be (a) exhausted, (b) unable to coordinate logistics, (c) uncomfortable interacting with professionals, (d) feeling and/or disempowered due to cultural differences.

Given that policy, research, and practice guidelines highlight the usefulness of partnerships, there appears to be various barriers related to the implementation of partnerships. We conducted this study to elucidate professionals' perceptions of parent-professional partnerships. It was done in the context of a larger study in which a family-professional partnership scale was piloted with a group of professionals. For purposes of this article, the primary research question is: What are professionals' perceptions about characteristics of effective partnerships with parents?

Method

This qualitative study reflects a constructivist approach to grounded-theory development (Charmaz, 2006), utilizing a constant comparison analysis (Anfara, Brown, & Mangione, 2002). We extracted themes which became the basis for a theory describing how professionals perceive family partnerships. In the sections that follow, we describe the purposive sampling plan and resulting participants, data collection approach, and analysis. We conclude with a description of the study's limitations.

Participants

We utilized a purposive sampling approach (Patton, 2001), meaning that we created a sampling grid to recruit respondents with diverse characteristics expected to represent different viewpoints about family-professional relationships. In this case, the characteristics

included different disciplines and different age groups served. Thus, the sampling grid was a 4×4 matrix. This represented four disciplines: occupational therapists/physical therapists/speech-language pathologists; special education teachers; paraprofessionals; and health professionals. The four service ages were: early intervention (0–3), early childhood/elementary (ages 4–10), middle school (ages 11–14), and high school (ages 15–21).

To locate respondents fitting these characteristics, the senior author contacted administrators or colleagues in area schools, an extended-school-year camp, a county Part C early intervention program, and a developmental clinic in a large teaching hospital. After agreeing to participate, the collaborating administrator or colleague distributed letters describing the study and contact information to enable prospective respondents to reach the senior author signaling their interest in participating. When contacted, the senior author explained the study further; and, if the respondent was interested, made an appointment for an interview. Twenty-two professionals contacted the investigator, one declined to participate (primarily because of scheduling difficulties), and one interview was lost due to a defective audio tape. The final sample consisted of 20 professionals. Table 1 includes specific demographic information.

Data Collection

Information letters distributed by the collaborating administrator or colleague contained a description of the study and consent procedures. The senior author arranged appointments with interested professionals who made contact. Participants were told that the scale was expected to take 15 minutes or less to complete, and the interview was expected to last an additional 30 minutes. The interviewer and respondent agreed to meet at a mutually convenient time and setting that was comfortable for the participant. The interviews took place in a variety of locations, including the participants' workplace, home, a library, and the interviewer's home. The senior author conducted all interviews.

Participants first completed the pilot partnership scale and then the open-ended inter-

TABLE 1

Demographic Characteristics of Participants

1. What is the discipline where you have received the most training?	Education (5) Special education (4) Occupational therapy (3) Speech-language pathology (4) Physical therapy (1) Psychiatry/Psychology (2) Nurse (1)
2. What educational level describes you best?	Associates degree (1) Bachelor's degree (2) Some graduate school completed (4) Master's degree (9) Doctoral degree (4)
3. What is your job title?	Paraprofessional (2) Certified teacher (7) Therapist (5) School psychologists (1) Clinical instructor (3) Professor (1) Nurse (1) Mean = 9.79
4. How many years of experience do you have in your field?	
5. How many years of experience do you have in your current position?	Mean = 5.43
6. What setting do you spend most of your work week in?	School setting (13) Client's homes (1) Clinic (4) University (2) Early childhood (5) Elementary school aged (6) Middle school/junior high/high school (5) All ages equally represented (4)
7. What age of clients do you typically serve/work with?	

view. The six “grand tour” questions (Miles & Huberman, 1994) focused on asking participants to (a) talk in general about their experiences working with families, and (b) consider the characteristics of the best and least effective partnerships. For each question, the interviewer used different probe or follow-up questions as appropriate to encourage the respondent to explain her thoughts fully. The open-ended process was intended to gather any unanticipated perspectives or other information the professionals might have (Rubin & Rubin, 1995).

Data Analysis

We used a constant comparison method (Patton, 2001) to analyze the open-ended comments in the interviews using verbatim tran-

scriptions. For purposes of this study, we removed responses related to the pilot partnership scale. Transcripts were divided so that all the responses to the first grand tour question were gathered together for reading and analysis, all of responses to the second grand tour question were gathered, and so forth. The section of the transcript for respondent one/question one was read and the main points were summarized as bullet points. Then, the section of the transcript for respondent two/question one was read and any new points were added to the working document. Eventually the points seemed to naturally group into themes which evolved as more responses were read. The investigator proceeded through the all the responses to question one in this manner and then began again with question two and so forth until a majority

of the comments had been put under the themes.

This analytical procedure is termed a constant comparison method because the data are compared from one transcript to another, and “categories and their properties emerge or are integrated together” (Patton, 2001, p. 32). As data are being coded, responses are compared not only within categories, but between categories as well (Anfara et al., 2002). A second investigator (the second author) checked the first investigator’s coding process and indicated agreements and disagreements. Following this review, the two investigators jointly reviewed the coding and resolved any discrepancies. This procedure is termed a credibility check and is analogous to the reliability process utilized in quantitative methods (Anfara et al.). Furthermore, to ensure transferability, we involved participants from different professional backgrounds who worked with individuals with disabilities and their families at different life span stages (Lincoln & Guba, 1985).

Limitations

As with every study, there were limitations and barriers encountered. In this case, the sample recruited was somewhat unbalanced, with more representation of professionals from educational settings. In addition, the health setting accessed was a university teaching hospital; the participants may have been atypical compared to those in a more typical health setting. More participants, as well as greater diversity among the participants, would have made the study more beneficial.

Also, the qualitative interviews with these participants followed their completion of a draft measure of family-professional relationships. Because of this, it is possible that participants were influenced or predisposed by the scale’s contents and, therefore, may have spoken in a different manner regarding partnerships than they would have otherwise. Interviewing participants without an initial exposure to the contents of the scale might have produced different results. Also, a qualitative study of this nature ideally would include more extensive interviews as well as the use of other data sources, such as observations

of the professionals as they interacted with families.

Findings

In answer to the question, “What are professionals’ perceptions about the characteristics of effective partnerships with parents,” three themes emerged. These were: gap between family-centered language and actions, the “Goldilocks” perception (i.e., the perception that parents may be involved too much, too little, or just right), and parental blame.

Gap Between Family-Centered Language and Actions

Participants made many statements that can be characterized as family-centered in the sense that they spoke in alignment with a family-centered philosophy or in support of partnerships. For example (I is for interviewer and R is for respondent):

I: What are some of the skills and responsibilities that families need to have to have good partnerships?

R: . . . to also provide ideas, because sometimes the parents know their kid better than the teachers even, and I think parents can be very valuable in that, in their suggestions.

Another participant spoke about how to increase communication by using a notebook sent home daily.

R: They can read it, or if they have comments or questions, they can write back. They don’t have to write every single day because it’s probably not a lot of stuff, if there isn’t anything to say. But if they do have concerns, they should be able to write them in there.

This comment demonstrates that the respondents saw value not only in letting the families know what was going on in their child’s day but also saw value in comments or information the parents can provide, all the while keeping in mind the families’ time constraints.

Though over 90% of respondents used family-centered language in their interviews, it is important to note that these were almost al-

ways in the same interviews where statements reflecting limited actions that could be characterized as family-centered. Examples of these language-action contradictions are given by two respondents:

R: I think the parents should be able to list out exactly what they would like to see their child achieve, whether it is personal goals. You know, basically lay it out in lists they can give to the teacher that really help them know the student as the child, as a personal individual. . . . I don't know what else the parents would provide.

The second example of a contradiction involves the professional speaking in a family-centered manner about communication notebooks being sent home to families. During the same interview, the respondent made this comment: "R: The other kid I work with, his mom is in due process, so I try to be as vague as possible because I don't want things used against us . . ."

Goldilocks Perception

We refer to the second theme as the "Goldilocks perception" because it appeared the professionals who participated in the study had very specific ideas regarding the "just right" amount of involvement in which they believed was appropriate for parents. They noted definite lines that parents might cross, resulting in too much involvement. However, they also described cases in which they believed parents were not involved enough. From their point of view, parents had only a narrow window of involvement that might be considered "just right."

Too much involvement. If a parent crossed over into the professionals' area of expertise, that parent was often considered "too involved." This sub-theme of too much involvement included both *amount* and an unwanted *type* of involvement. In some cases, professionals were frustrated when a parent entered the academic realm or frequently questioned what they did. The following comments suggest that professionals may be threatened by parents who participate to the extent of acquiring expertise about interventions for their child:

R: She's up there all the time wanting to know . . . well why haven't you worked on this. And his therapist says he needs to be doing this, and why haven't you been doing this, and why haven't [you been doing that] . . . So it seems like we are bending over [backwards]. Like I've ordered several books just to make this parent happy just so I can be like, look I am doing research on this, you know. And a lot of times the parents will go to the Board. So we've always got to watch our back . . .

R: They might read something coming out in a journal and why aren't you doing that for my child? And then you're like, Holy cow, I have eight years of experience, and I keep up on that too. Let me do my job! They are making progress. This is what we're doing.

Some respondents thought that parents' involvement meant that the parent did not trust them to do their jobs.

I: Do you think there is such thing as being too involved?

R: Yes! Definitely I do! Like earlier, working as a team, not saying I'm the expert; you're not. I think some parents won't trust the teacher, so they'll want to be there for everything, be involved for everything, every decision.

R: I think it is great when families are very involved—as long as they aren't totally running the show. And I have seen that happen where they try to do that, and it doesn't work . . . they become a big pain . . . it's a subtle message that maybe you're not competent enough . . .

Too little involvement. Though participants in this study were specific about too much involvement, they also expressed frustration when families had too little involvement. Parents were considered "to have too little involvement when they chose to not participate in activities or did not see the same value in the activities the professionals deemed important. One participant expressed this idea when she said: "Here's what you can do to address these at home, and then they don't follow through. I ask the girl, and she is pretty reliable, and she wouldn't lie, and I ask "Have you done this with mom?" "No."

In the next quote, a respondent expresses her perspective that parents are not participating because they do not feel it is their responsibility.

R: I try to, you know, touch base with the parent at least once a month and let them know what we are working on and sending homework home. And I think that [it] is important that the families first be able to read what I want them to do and have the time to sit down and actually do that with the kid. I think so much think 'that it is not my responsibility'.

Similarly, another participant felt that an ineffective partnership was one where the families "don't listen to suggestions that are made."

Most participants who made these types of comments did not discuss anything that might be keeping the family from implementing goals at home, such as time (e.g., siblings, work, other responsibilities), lack of understanding or confidence, or perhaps that the parents disagreed with the goal altogether (and more discussion is needed). None of the participants expressed an opinion that parents might have an option to opt out of following the professionals' advice.

Just right involvement. While professionals clearly expressed statements of concern with too much or too little involvement, they also described what makes a good family partner. Comments about positive partnerships included the opinion that parents needed to be *assisting* the professional, rather than engaging in a true two-way partnership. Just right participation most often involved following the professional's lead and taking responsibility in follow-through (i.e., home activities). This was demonstrated in the following quotes:

I: What are some things that they do that you're like, okay this is a great family to work with?

R: Oh well, when they ask questions. When you model an activity and show them a couple of varieties, and when the next time you see them they've incorporated that into functional routine and generalized it to different settings you are like, wow!

Another participant made a similar comment:

I: What are characteristics of good partnerships you've had versus less effective partnerships?

R: Fortunately, I have never really had bad situations. Most of the parents I have had have been really supportive.

I: In what ways were they good?

R: Whatever modifications I came up with, they are very willing to help.

In these cases, families were agreeing with professionals on priorities and ways to work with the child. Families were pitching in by working with the child on any "homework" or extra therapy at home with the child to help generalize it. In general, these participants felt that "good families" were those that supported the professional's guidance about how to work with the child. When families did their own research and shared suggestions, the involvement was perceived as too much; and when they did not follow through, the involvement was perceived as too little. The just right involvement appeared to be a narrow band on the continuum from too much to too little.

Parental Blame

The third theme, parental blame, refers to professionals who blame parents for problems in carrying out partnerships. An example of this given by one participant who described her frustration when a family lost materials needed to work on an activity at home:

R: following though with a home-based program that the professional worked on after hours, because they don't have time during the day to make-up activities for the child. But then they don't follow-through at all. "We lost them. Can you make them again?" "NO!" It took me four hours. Following through with the things that you go out of your way to do. Um, those things are big. A lot of my families do that. A lot don't care.

In this example, the professional said that the family wanted to work on the activity at home and follow-through; however they lost the cards. The professional, having worked hard on the cards, did not want to spend the time again. This person equates losing the cards with not caring.

In a number of comments, respondents did not appear to give the parent the benefit of the doubt:

I: So you are saying that the partnership is failing because the teachers are pulling their weight, but the parents aren't meeting you in the middle?

R: Right. And that is in general. I have a few parents who are very, very good about that and some that I never see . . .

R: I am one of those people who believes that that is usually the missing ingredient in schools—parents/guardians not being involved enough.

In this situation, reasons were not stated about why it might be extremely difficult for parents to be involved because of other responsibilities or stressors in their life. Rather, when this professional “never sees” parents, it does not appear that there is reflection on what the barriers might be and what some creative options might be for working around those barriers.

Given this situation, the interviewer tried to prompt the participants to consider some other possibilities for parents' lack of partnership:

R: If your child is dismissed from a service, it is a celebration. Not a “Well, why is he being dismissed? He needs that!” Well, you're taking away his help. No, it's a celebration. . .

I: Do they take it as you're giving up?

R: Yes. Absolutely that is exactly what it is. You're giving up on them.

I: They don't qualify any more because they. . .

R: because they have made minimal or no improvement over one academic year.

I: I guess I can understand why they don't necessarily want to celebrate because they plateaued for over a year.

R: Yeah. Right. But you see what I am saying.

It was not uncommon for participants to speak about parents who just don't “accept” the diagnosis rather than seeking alternative reasons for the parents' behavior (e.g., such as not agreeing with an intervention) or consid-

ering how they might feel in the parents' position. For example, one participant noted:

The ones that don't want to accept it give pretty much just, they don't want anything to do with it. You know, and that makes it really hard when the parents won't accept it, and then they don't back you up.”

Another participant appeared to agree that parents are “in denial”: “To be open, to have ideas, to be accepting of it, because I think sometimes parents want to push it off that it is some other problem.”

Alternatively, some respondents particularly sought to “stand in parents' shoes” seeing things from their perspective as contrasted to blaming them. One more experienced professional believed that colleagues who held opinions like those expressed above were not realistic about the emotional impact a diagnosis has on the family. She said, “I am fascinated by the idea that we think that families shouldn't be upset, like of course they are going to be upset! Why are we surprised by that?”

It is important to note a few of the more experienced professionals spoke of what they have learned during the span of their career and/or as a result of having children.

R: . . . I remember being real snippy early on, “Well why wouldn't you keep this appointment?” since I knew they weren't working so . . . why can't they get here for this appointment or that? And then it is funny when you finally figure out what really goes on in their lives, how you can be empathetic and have compassion, because it is so difficult sometimes to get these kids that have multiple handicaps up. And then when we hear their schedules, about how many different appointments they have with how many different health care providers, how they even manage to get it all done! So, I think that has made me a better person and a better health care provider.

Another professional thought back on her own growth and change in perspective:

R: I was so frustrated and annoyed with them for their lack of ability to follow-through, and I think more experience and being a parent made a huge difference in my tolerance, and so I think knowledge of

the disability area that you work in and tolerance and understanding that parents have skills on a spectrum just like everybody else does help you relate better to most parents.

Discussion

Summary

The overall purpose of this study was to explore professionals' attitudes about partnerships with families. Three themes emerged in the analysis. These were (a) gap between family-centered language and actions, (b) "Goldilocks" perception, and (c) parental blame.

First, professionals made family-centered statements in the sense that they spoke in alignment of a family-centered philosophy or in support of partnerships. Over 90% of participants made these types of comments, although these same participants also made comments that fell in to one or both of the other themes, which were less aligned with that philosophy or described actions that were not family-centered. The implication is that these professionals may have learned to "talk the talk" of a family-centered philosophy but not to "walk the walk."

Second, participants had very specific ideas of the continuum from too much to too little involvement. Professionals' perceptions that parents could be both over- and under-involved suggested that "just right" partnerships ("Goldilocks" theme) might be rather narrowly defined in terms of following teacher recommendations.

Third, parental blame describes comments made by professionals who appeared to be unable to see the situation from the families' point of view; rather, they saw problems as outside themselves or with the family (i.e., the family is in denial, the family doesn't care). The participants, in short, appeared to be unaware of or unwilling to consider changes in their own behavior that might result in improved family-professional partnerships.

Implications

Much valuable information was obtained from this study that leads to implications for future research and practice.

Future research. The findings of this study present some implications for future research. Professionals repeatedly expressed a narrow idea of what was an acceptable amount and type of family partnership, which is in conflict with published recommended practices. This is similar to what Campbell and Halbert found in their research. While most professionals in their study displayed an awareness of the concepts of family-centered practice, more in-depth comments about actual examples tended to conflict with family-centered intervention and other best practices. Similar to Campbell and Halbert (2002), we found that professionals were unhappy with parent partnerships, particularly the amount of follow-through. Hilton and Henderson (1993) also found inconsistencies in family-centered language or between language and actions. These findings do not question that some professionals truly held a philosophy of partnering with families; this is precisely why further research specifically on this concept needs to occur. Perhaps a deeper understanding may be gained by collecting multiple sources of data (observing the professionals interacting with parents) for a more objective and comprehensive understanding.

More research is needed to understand why professionals have this narrow view of what is appropriate as well as to provide insight into understanding professional's perceptions of appropriate boundaries and what parents do that might cross those boundaries. It is important to learn what professionals perceive as threatening and why. In this regard, further research on the role of experience might shed light on this apparent contradiction. Our data suggest that professionals with more years experience tended to express less judgmental attitudes and to have, perhaps, more flexible boundaries in relating to families. Our study was too limited to allow development of any definitive conclusions about this possibility; future research should focus more specifically on experience as a moderator of attitudes toward families.

One theme from this study, parental blame, compares to literature finding that professionals attributed partnership barriers to family characteristics rather than any professional behaviors or structural barriers. Specifically Campbell and Halbert (2002) found that

practitioners assigned both issues and solutions to parents (and therefore out of their control). Further research is needed to understand why professionals have come to form these opinions. Rather than to criticize professionals, it is necessary to understand how they form their opinions, and why they feel the way they do.

Practice. Professionals in the field have long been concerned about observed gaps between recommended practices and the actual implementation of those practices (Carnine, 1997; Carta & Greenwood, 1997; Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000; Turnbull, Friesen, & Ramirez, 1998). The findings of this research suggest that professionals may be verbalizing a commitment to family-centered principles and at the same time taking a controlling approach that directly contradicts their own statements. The apparent lack of awareness that they are engaged in this conflicting dialogue may lend some insight into the reasons for the gap between ideal and actual practices. An implication of this finding is that effective professional development might need to incorporate some strategies to aid professionals to identify their own conflicts in attitude and behavior.

This study also found that professionals with more experience appeared to recognize the impact of their previous attitudes about parents and to have more consistent beliefs about partnerships with families. This suggests that professionals' perceptions of under- or over-involvement by parents (i.e., "Goldilocks" theme) may reflect discomfort or defensiveness on the part of less experienced professionals, who may view family partnerships as a threat or as a questioning of their competence. An implication is that less experienced professionals might profit from a more experienced mentor who is able to model a more non-defensive and positive attitude toward working with families.

The message needs to be conveyed to professionals that there is an option for parents to not participate. Most importantly, there needs to be initial communication, formal or informal, that enables families and professionals to get to know each other and to reach consensus on expectations as preferences.

We include here, again, the definition of

Summers and colleagues (2005) of partnerships as "... mutually supportive interactions between families and professionals, focused on meeting the needs of children and families, and characterized by a sense of competence, commitment, equality, positive communication, respect, and trust" (p. 3). In summary, the themes of this study—gap between family-centered language and actions, Goldilocks perception, and parental blame converge to suggest that we have "miles to go" as a field in implementing family-professional partnerships.

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Deinstitutionalisation and Adaptation of Adults with Intellectual Disabilities: Results from Québec

Hubert Gascon
Université du Québec à Rimouski

Pierre Morin
Centre de réadaptation en déficience
intellectuelle de Québec

Abstract: During the past twenty years, an important body of research has examined the different impacts of deinstitutionalisation on the adaptation and quality of life of persons with intellectual disabilities. This empirical study was conducted with 136 persons with intellectual disabilities following the closure of the Hôpital Saint-Julien (Québec, Canada). Various questionnaires relating to adaptive and maladaptive behaviors, mental health problems, medication and to the relocation were completed. The measures were taken following the exit from institutions and subsequently after 27 months. Improvements are observed on adaptive and maladaptive behaviors, and on mental health. The relation between medication's evolution and the one noted for the maladaptive behaviors and mental health is examined. The relocation variable should be considered in future studies.

Since the beginning of the 1980s, the support offered to people with intellectual disabilities has positively evolved within the context of a broader movement, in which the social integration of people with disabilities in general has been promoted (Mansell, 2006). The progressive closing of the institutions and the reorientation of almost all people with intellectual disabilities in the community, with the contribution of support and adapted services, allowed a progressive transfer of human and financial resources that were previously assigned in only some institutional contexts towards a variety of accessible support measures in the community. Since then, a consid-

erable number of scientific studies conducted throughout the world and summarised in literature reviews edited in the United States (Kim, Larson, & Lakin, 2001; Larson & Lakin, 1989; Lynch, Kellow, & Wilson, 1997), in the United Kingdom (Emerson & Hatton, 1996) and in other countries, demonstrated the positive impacts of the deinstitutionalisation process on people who are experiencing social rehabilitation.

With the aim of contributing to the enrichment of the data that presently exists on the subject, an empirical study with repeated measurements was conducted in the Province of Quebec (Canada) with 136 people with intellectual disabilities, following the closure of *Hôpital Saint-Julien*. This institution was founded in 1870 by the religious congregation of the *SŒurs de la Charité de Québec*. Located in a rural small town in the south of the province, and composed of a population of less than two thousand habitants, this institution accommodated people for various reasons: intellectual disabilities, mental or physical health problems or loss of autonomy due to ageing.

In 1997, the decision was made to transform this hospital to ensure the deinstitutionalisation of its residents. A transformation plan was then elaborated (*Hôpital Saint-Julien*, 1999). At that time, 83% of the residents were diag-

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nosed with intellectual disabilities. The deinstitutionalisation plan recommended the exit of all the residents ($N = 487$) in four successive cohorts spread out over a period of four years between 1999 and 2002. It was planned that the residents would be integrated in the community and benefit from various services developed by two rehabilitation centers, specialized in intellectual disabilities, in surrounding areas. The province of Quebec contains 23 of these public rehabilitation centers. These centers offer adaptation, rehabilitation and social integration services to people with intellectual disabilities or with Pervasive Developmental Disorders (PDD), as well as support services to their families.

Three distinct types of residential services are available: *resources of family type* (RFT), *intermediate resources* (IR) and *continuous assistance residences* (CAR). The RFT is a foster family that accommodates people in their home. The CAR is a residence in which a high level of support (24 hours/7 days a week) is provided by employees of the establishment. The IR is a mixed model. It is distinguished from the RFT by the expertise and the extent of services required by the person, which are beyond that offered in the RFT yet below that found in the CAR. In both the IR and RFT, one person is in charge. Staffs are also present in the IR but do not intervene on a 24 hours/7 days basis.

In the transformation plan, the development of an evaluation and monitoring model was conceived to ensure follow-up of the residents' progress. Consistent with this aim, the focus of the present study was to understand the evolution of the residents who had been reoriented in community-based resources following a long stay in an institution. Variables studied were relocation, adaptive and maladaptive behaviors, mental health problems and medication. This study was based on the approach in which data is provided from questionnaires, completed by advisors others, systematically collected and linked to medication and relocation.

Method

Participants

The sample was composed of 78% ($n = 136$) of the residents that left the institution to be

directed towards a service center of the surrounding area. Of this group, 83% were women ($n = 113$) and 17% men ($n = 23$). The mean age at time of discharge from the institution was 52 years old ($SD = 9.05$). The severity of the deficit related to the adaptive behavior was measured with the *Échelle Québécoise des comportements adaptatifs* (ÉQCA) (Atelier québécois des professionnels sur le retard mental, 1993). Based upon this measure, 76.5% of people presented a profound deficit ($n = 104$), 14.7% a severe deficit ($n = 20$), 5.9% a moderate deficit ($n = 8$) and 1.4%, a mild deficit ($n = 2$).

Measures

Relocation. All changes of residence that took place following exit from the institution were recorded. Each one was characterized according to the difference in the degree of support offered by the two residential resources involved. The person could be either directed towards a model offering less support (CAR towards IR, CAR towards RFT, IR towards RFT), same degree of support (CAR towards CAR, RFT towards RFT, IR towards IR) or more support (IR towards CAR, RFT towards IR, RFT towards CAR). The reasons given for relocation were regrouped in categories and then consigned according to whether they were related to the person (health, behavior, autonomy, getting closer to the family) or independent of the person involved (reason related to the RFT or to a reorganization of the residential service).

Adaptive behavior. Adaptive behaviors were measured with the *Échelle Québécoise des comportements adaptatifs: ÉQCA* (AQPRM, 1993) questionnaire with the aim of obtaining an accurate sense of the persons' adaptive skills. This questionnaire contains 324 items, separated into two distinct sections. The first section, which contains 225 items divided into seven spheres, measures various aspects of adaptive behaviors (autonomy, domestic skills, health and sensorimotor skills, communication, pre-school and school skills, socialization, work skills). Each item is assigned a score from 0 to 2 (0 = does not do it; 1 = do it . . . but only when told to do so, sometimes, not completely . . .; 2 = do it). The ÉQCA has good test-retest

reliability ($r = .92$) and good inter-rater reliability ($r = .83$) (Tassé & Maurice, 1993).

Maladaptive behavior. The second section of the *ÉQCA* measures maladaptive behavior. This section contains 99 items divided into seven dimensions. These dimensions are related to stereotyped behaviors and odd postures, withdrawal and carelessness behaviors, unacceptable practices and habits, antisocial or inappropriate interpersonal manners, inadequate or divergent sexual behaviors, violence or aggression behaviors, and self-mutilation behaviors. Each item is assigned a score from 0 to 3 according to the severity of the inadequate behavior (0 = does not exhibit the behavior; 1 = mild; 2 = moderate; 3 = severe). A mild inadequate behavior refers to an occasional or benign behavior that may require an isolated intervention from caregivers. The moderate type behavior is the one that requires a generalized or concerted action leading to the application of a treatment strategy to modify the presented behavior. Finally, a severe behavior is considered to be so when it may constitute a danger to the person or other people, or lead to the rejection of the individual.

Mental health problems. The translation and transcultural adaptation section (Lecavalier & Tassé, 2001) of the questionnaire *Reiss Screen for Maladaptive Behavior* (Reiss, 1988) was used with the intention of creating a portrait of the mental health condition of the participants. The instrument was originally developed to detect the presence of mental health problems of teenagers and adults presenting intellectual disabilities. The instrument is composed of 36 items describing the symptoms of one or more mental health issues, as described in the DSM-III. For each item, the respondent must indicate if the behavior does not represent a problem (0); a problem (1); a major problem (2); a problem that can be identified by one of the multiple criteria defining psychopathology: the frequency, the intensity, the circumstances of appearance and the impact for the evaluated person or for his environment. It is composed of eight sub-scales: aggressiveness, autism, psychosis, paranoia, depression (behavioral signs), depression (physical signs), dependent personality and avoidance disorder. In addition to these eight sub-scales, six items describe problem-

atic behaviors: drug abuse, self-mutilation, suicidal tendencies, robbery, inappropriate sexual behaviors and hyperactivity. A positive score is obtained with this evaluation if the total score measured by the eight subscales exceeds a cutoff or when a major problem is detected on one of the six items. The translation and French adaptation of this instrument was made up by two committees composed of bilingual professionals with expertise in the field of mental retardation. The internal coherence indices for the eight sub-scales of the original version of the instrument vary between .57 and .84 and that associated with the total score is .84 (Reiss). As is mentioned by Lecavalier and Tassé (2001), the translated French version of the instrument adapted to the Quebec reality obtains similar internal coherence indices, that is, between .53 and .83 for the eight subscales and .80 for the total score.

Medication. The data related to psychoactive drug medication were collected and recorded on cards designed for this purpose. The drug's name and its posology, as well as the dates related to some modifications in the regulation of medication, were recorded. This type of drug could either be in the nerve sedative (antipsychotic) or anxiolytic (benzodiazepines) families. With the intention of obtaining a measurement common to the various prescribed drugs, equivalences were calculated: the amounts of drug prescribed in the nerve sedative family were converted in CPZ (chlorpromazine) and the amounts for those in the anxiolytic family, in Diazépam (or Valium).

Procedure. The questionnaires used to measure the adaptive and maladaptive behaviors and mental health problems were completed by caregivers who knew the person, in collaboration with a member of the staff in charge of the residence where each resident lived. Each person was evaluated at two time points: at the third month (Time 1) at the 27th month (Time 2) following discharge from the *Hôpital Saint-Julien*. For each person, a specific personal observation file entitled *Individual observation file* (IOF) was created. This IOF included the instruments, the grids of notation and the instructions to be followed with every person evaluated. The original data were recorded in this file and, in some cases,

the compilation of the scores obtained were also preserved. At each evaluation, each person's IOF number, the data collection date and the name of the person in charge were registered on each page for each completed file. The IOF's management was ensured by a counsellor in charge of the process, who adhered to a calendar to manage the evaluation follow-up. Concerning medication, a nurse had the responsibility of reading the data and converting the drugs into equivalence CPZ or Diazépam for each file. The data capture related to medication (type and posology) was taken at the time of exit from the institution (Time 1) and on the 27th month (Time 2).

Results

In this section, only the results obtained at Time 1 (or at discharge from the institution) and at Time 2 are presented. Statistical analyses were carried out with SPSS software (Windows' version 11.5). Only the values for the bilateral thresholds of significance appear, with the intention of gaining a better overview of differences between measures revealed by the application of *t* tests with repeated measures for data obtained with *ÉQCA*'s and *Reiss Screen for Maladaptive Behavior*'s scales.

Relocation. At the time of the initial exit date, 52.2% of the people (*n* = 71) did not change residence. Among the 47.8% of the relocated individuals (*n* = 65), 26.5% were relocated once (*n* = 36); 14% twice (*n* = 19); 5% three times; less than 1% four times (*n* = 1); and 1.5%, five times (*n* = 2). Changes in the type of residence between Time 1 and Time 2 indicates that 47.7% of the relocated people (*n* = 31) were directed towards a model offering a lower level of support, 40% towards a model offering comparable level of support (*n* = 26), and 7.7% towards a model offering more support (*n* = 5). Table 1 indicates the distribution of people according to the type of residence they lived in at Time 1 and at Time 2.

We observed 109 changes of residence. Seventy percent of these changes (*n* = 77) were associated with the person (health [*n* = 15], behavior [*n* = 57], autonomy [*n* = 4]) and 27.5% (*n* = 30), to a reason independent of the person (reason related to the RFT [*n* = 7] or to the service's orientation [*n* = 23]).

TABLE 1
Distribution of the Participants According to Residence's Type

	Time 1		Time 2	
	<i>n</i>	%	<i>n</i>	%
Resources of family type (RFT)	48	35	51	38
Intermediate ressources (IR)	22	16	44	32
Continuous assistance residences (CAR)	66	49	38	28
Other	0	0	3	2
Total	136	100	136	100

Three transfers were due to a combination of these reasons.

Adaptive behaviors. Table 2 reveals the results of the *ÉQCA* obtained at Time 1 and Time 2 for all the participants and for the same participants but gathered according to whether they were or were not relocated following their exit of the institution (relocated, not relocated).

The results obtained by participants indicate a significant improvement in the domestic skills' sphere. No other significant difference is observed; the results are quite stable. However, for people that remained at the same place (not relocated), significant improvements in the fields of autonomy, domestic skills, communication and socialization are observed.

Maladaptive behaviors. Table 3 presents the results for all participants that are related to the *ÉQCA*'s scale for the maladaptive behaviors' section for Time 1 and Time 2. When all participants are considered, a significant diminution in serious behavioral problems is observed. However, it is noted that this improvement is especially observed in people that didn't experience relocation. For those persons, intermediate behavioral problems also tend to decrease. No other difference is noted for each dimension of this *ÉQCA*'s section.

Mental health problems. Table 4 reveals results obtained on the *Reiss Screen for Maladaptive Behavior*'s scale for all participants. In Table 5, the same results are presented but adapted according to whether residents were or were not relocated following their discharge from the institution. When all partici-

TABLE 2

EQCA Adaptive Behaviors: Means, SDs, and *t* Test

	N = 136			Not Relocated (n = 71)			Relocated (n = 65)		
	Time 1 M (SD)	Time 2 M (SD)	<i>t</i>	Time 1 M (SD)	Time 2 M (SD)	<i>t</i>	Time 1 M (SD)	Time 2 M (SD)	<i>t</i>
Global EQCA	2.92 (2.01)	2.87 (1.69)	.60	2.70 (1.89)	2.82 (1.74)	-1.43	3.15 (2.11)	2.92 (1.65)	1.53
Autonomy	4.05 (2.27)	4.00 (2.09)	.42	3.62 (2.32)	3.83 (2.26)	-2.09*	4.51 (2.15)	4.19 (1.89)	1.73
Domestic skills	2.48 (3.15)	2.87 (3.23)	-2.32*	2.19 (3.06)	2.75 (3.21)	-2.10*	2.78 (3.25)	2.99 (3.28)	-1.04
Health and sensorimotor skills	2.65 (1.89)	2.65 (1.76)	.09	2.4 (1.84)	2.49 (1.80)	-1.01	2.94 (1.91)	2.82 (1.72)	.83
Communication	2.90 (1.99)	2.97 (1.95)	-1.06	2.66 (1.93)	2.86 (1.91)	-2.50*	3.16 (2.04)	3.10 (1.99)	.50
Pre-school and school skills	1.64 (2.31)	1.46 (2.09)	1.46	1.52 (2.18)	1.35 (2.07)	1.19	1.76 (2.45)	1.59 (2.12)	.91
Socialization	3.06 (2.15)	3.20 (1.93)	-1.55	2.83 (2.12)	3.08 (2.01)	-2.08*	3.31 (2.16)	3.32 (1.86)	.98

* *p* < .05.

pants are considered, it can be observed that the number of people whose scores exceed the cutoff decreased on the total scale and on the subscales. More specifically, a significant reduction in mental health problems is observed in two sub-scales of the *Reiss Screen for Maladaptive Behavior* (aggressiveness and autism).

Similar to the adaptive behaviors, improvement was more considerable for people that were not relocated. In their situation, significant improvements are observed on subscales related to aggressiveness, psychosis and paranoia and on the euphoria item. For people that were relocated, a significant improvement is observed on the autism subscale.

The observation of the correlation between the scores noted at Time 1 on the total scale of the *Reiss Screen for Maladaptive Behavior's* scale (26 items) and on the of the maladaptive behaviors' part of the *EQCA's* scale, indicates a significant correlation *R* = .535, *p* < .000.

Personal characteristics and relocation. Taking into account the differences observed, whether there was or was not an impact related to relocation on the evolution of adaptive and maladaptive behaviors and mental health problems, we wanted to verify if two distinct groups could be identified following their departure from the institution. The results of the univariate variance analysis with one factor (relocation) applied to the major

TABLE 3

EQCA Maladaptive Behaviors: Means, SDs, and *t* Test

EQCA- Maladaptive Behaviors	N = 136			Not Relocated (n = 71)			Relocated (n = 65)		
	Time 1 M (SD)	Time 3 M (SD)	<i>t</i>	Time 1 M (SD)	Time 3 M (SD)	<i>t</i>	Time 1 M (SD)	Time 3 M (SD)	<i>t</i>
Mild	7.27 (7.15)	7.37 (6.88)	-.17	7.63 (7.6)	6.96 (6.18)	.97	6.88 (6.66)	7.82 (7.59)	-1.07
Moderate	5.11 (5.92)	4.43 (5.40)	1.20	5.1 (6.48)	3.97 (4.97)	1.74	5.12 (5.3)	4.94 (5.82)	.19
Severe	0.59 (1.64)	0.21 (0.97)	2.64**	.55 (1.49)	.17 (.76)	2.78**	.63 (1.81)	.25 (1.16)	1.453
Maladaptive behaviors score	19.26 (15.2)	16.85 (14.16)	1.89	19.48 (17.02)	15.41 (13.62)	2.77**	19.02 (13.07)	18.43 (14.67)	.28

* *p* < .05. ** *p* < .01.

TABLE 4

ERDCP: Means, SDs, and *t* Test, Number of Participants Above the Suggested Cut-off (*N* = 136)

ERDCP Sub-Scales	Time 1		Time 2		<i>t</i>	N of Participants Having Signs of Mental Health Problems	
	Mean	SD	Mean	SD		T1	T2
Agressiveness	1.33	1.97	0.94	1.69	2.07*	6	4
Autism	0.67	1.06	0.44	0.78	2.23*	1	0
Psychosis	0.52	1.21	0.35	0.99	1.67	2	1
Paranoia	0.65	1.17	0.46	1.03	1.68	2	1
Depression (behavioral signs)	0.92	1.43	0.70	1.22	1.61	2	1
Depression (Physical signs)	0.64	1.07	0.63	1.04	.07	3	2
Dependent personality	0.86	1.23	0.69	1.11	1.45	0	0
Avoidance disorder	0.66	1.22	0.55	1.03	.90	1	0
ERDCP items (<i>N</i> = 136)							
Alcohol/Drug abuse	0	0	0	0	–	0	0
Hyperactivity	0.13	0.44	0.07	0.28	1.68	5	1
Self-mutilation	0.24	0.52	0.26	0.49	.28	6	3
Inappropriate sexual behavior	0.07	0.31	0.04	0.21	1.42	2	0
Robbery	0.18	0.49	0.15	0.43	1.00	6	4
Suicidal tendencies	0	0	0.01	0.12	1.42	0	0
Total ERDCP scale (26 items)	5.58	7.07	4.32	5.59	1.93	23	19

* *p* < .05.

scale of the *Reiss Screen for Maladaptive Behavior* (total scale, subscales, items), to the *ÉQCA* (adaptive behaviors) and to the *ÉQCA* (light, moderate and serious maladaptive behaviors) indicate that the two groups are quite different on two variables: *autonomy* on the *ÉQCA* $F(1, 134) = 5.331, p = .022$ and *hyperactivity* on the *Reiss Screen for Maladaptive Behavior's* scale $F(1, 134) = 4.646, p = .040$. People that were relocated seemed more autonomous and more hyperactive. Also, on each sub-scale of the *ÉQCA*, we observe an average score a little higher for this group. With the intention of examining the predictive value of certain personal characteristics on the relocation variable, correlations between this variable and others measured with subscales of three instruments (*ÉQCA*/adaptive behaviors, *ÉQCA*/maladaptive behaviors and *Reiss Screen for Maladaptive Behavior*) were examined, followed by a regression analysis. At Time 1, the variables *ÉQCA*/autonomy ($r = .196$), $p = .022$ and *Reiss Screen for Maladaptive Behavior*/hyperac-

tive ($r = .183$), $p = .033$ were significantly related to relocation. However, these two variables predicted less than 10% of relocation (yes/no) when they are both treated with a logistic regressions model.

Medication. Table 6 presents the evolution of medication. For those in the nerve sedatives family, analysis indicates an increase of 22% of posology prescribed at departure from the institution ($n = 30$). Concerning the type of medication taken by people at that same moment, a similar rise is also observed 18% ($n = 24$). For the drugs in the anxiolytic family, Table 6 reveals an increase of 8% ($n = 11$) related to the number of people that received a prescription for that type of medication at Time 2, compared to the number at Time 1. In total, 14% of people started receiving a prescription for that last type or saw their medication's posology increase.

The Marginal homogeneity test (using SPSS procedure) shows that changes between Time 1 and Time 2 are significant for the drugs of

TABLE 5

ERDCP: Means, SDs, and *t* Test, Number of Participants Above the Suggested Cut-off According Relocation

ERDCP Sub-Scales	Not Relocated (N = 71)			Relocated (N = 65)		
	T1	T3	<i>t</i>	T1	T3	<i>t</i>
Agressiveness	1.28 (1.93)	.69 (1.3)	2.74**	1.38 (2.03)	1.2 (2.01)	.58
Autism	.53 (.93)	.39 (.70)	1.76	.82 (1.18)	.49 (.85)	1.90
Psychosis	.41 (.97)	.23 (.75)	2.10*	.64 (1.42)	.48 (1.18)	.87
Paranoia	.59 (1.0)	.31 (.73)	2.79**	.71 (1.32)	.62 (1.25)	.41
Depression (behavioral signs)	.69 (1.17)	.58 (.97)	.76	1.16 (1.64)	.84 (1.43)	.35
Depression (physical signs)	.48 (.89)	.53 (.96)	.30	.8 (1.21)	.74 (1.12)	.35
Dependent personality	.72 (1.11)	.53 (.94)	1.45	1 (1.34)	.85 (1.25)	.76
Avoidance disorder	.58 (1.01)	.51 (.02)	.53	.75 (1.41)	.61 (1.04)	.71
<i>ERDCP Items</i>						
Alcohol/Drug abuse	0	0	–	0 (0)	0 (0)	–
Hyperactivity	.05 (.23)	.04 (.26)	.58	.22 (.57)	.09 (.29)	1.59
Self-mutilation	.21 (.48)	.20 (.4)	.24	.28 (.57)	.32 (.56)	–.52
Inappropriate sexual behaviors	.11 (.4)	.06 (.23)	1.42	.03 (.17)	.03 (.17)	–
Robbery	.2 (.52)	.14 (.42)	1.27	.15 (.44)	.15 (.44)	–
Suicidal tendencies	0	0	–	0 (0)	.03 (.17)	–1.45
Total ERDCP scale (26 items)	4.75 (6.09)	3.38 (4.52)	1.93	6.46 (7.93)	5.31 (6.42)	1.00

* *p* < .05, ** *p* < .01, *** *p* < .001.

the nerve sedatives family (*MH* = 15, *p* < .001). Furthermore, a Wilcoxon test reveals that the two related distributions are different (*Z* = –5.446, *p* < .001). For the anxiolytic medication family, analysis reveals that changes between Time 2 and Time 1 are also

significant (*MH* = 14, *p* < .05). The Wilcoxon test also shows in that case that the two distributions are different (*Z* = –2.416, *p* < .05).

Medication and maladaptive behaviors or mental health problems. The relation between medication’s evolution (difference between Time 1

TABLE 6

Evolution of Medication Between Time 1 and Time 2

Drugs Type and Daily Posology in Miligram		Number of People		Medication Evolution		
		Time 1	Time 2	Decrease	Stable	Increase
Nerve sedative (antipsychotic) CPZ equivalence (Daily posology)	0 mg	98	68	5 (3.8%)	74 (55.6%)	54 (40.6%)
	1–15 mg	8	7			
	16–59 mg	6	12			
	60 mg or +	24	46			
	Total	136	133			
Anxiolytic (benzodiazepine) Diazépam equivalence (Daily posology)	0 mg	119	108	8 (6%)	107 (80%)	19 (14%)
	1–15 mg	10	16			
	16–59 mg	4	7			
	60 mg or +	3	3			
Total	136	134				

Note. At Time 2: Missing data for three participants concerning nerve sedative and for two participants concerning anxiolytic.

and Time 2) and the one noted for the maladaptive behaviors and mental health problems were evaluated by measuring the Pearson correlation coefficient. It was possible to detect the existence of a statistical inverse significant relation between the evolution of the nerve sedative's drugs and the one noted for the variable *Serious maladaptive behaviors* of the *EQCA* ($r = -.397$), $p < .000$. A relation is also noticed between the anxiolytic medication family's evolution and the one related to the *aggressivity* variable of the *Reiss Screen for Maladaptive Behavior* scale ($r = -.201$), $p = .026$.

Discussion

The few studies that observed the impacts of deinstitutionalisation provided no information on changes of residence following departure from the institution. As revealed by our results, a significant proportion of people are relocated in such circumstances, and sometimes more than once. In 1993, a Quebec study conducted by Lalonde and Lamarche with 21 persons leaving the *Hôpital Louis-H.-Lafontaine* revealed that all residents that left the institution re-located in the 45 months following their exit. The authors concluded their discussion on the potential repercussions of such movements by insisting on the importance of ensuring that people who integrate in the community benefit from more stable living conditions. Recently, in a text about psychopathology and intellectual disabilities, Ionescu (2003) mentions some work completed in the 1970s that was interested in the *syndrome of relocation*. Because half of our participants were relocated, it seemed to us quite pertinent to distinguish in our analyses those who were relocated from those who were not.

Efforts required to ensure a good quality adaptation to a new residential medium can influence the final results of individuals' evolution related to several variables of interest. This distinction, which we believe to be quite important, will be present throughout this discussion. Although residential stability can be an interesting objective to be attained, it is, however, quite interesting to note that in our study people were relocated mainly towards resources with less intensive support. Only

7.7% of removals were towards resources with more intensive support. At first view, this tendency leads us to believe that people skills are improving or that the initial orientation resource over-estimated their need for support. The majority of residence changes were motivated by reasons related to the person's condition and 30% for different reasons.

On the adaptive behaviors dimension, and when all participants are considered, the domestic skills' variable represents the dimension that most significantly improved. It can be supposed that the fact of staying in a regular residence, of being exposed daily to domestic activities, and of being possibly encouraged to take part in those activities, supports the progressive development of such skills. Other authors have also noted improvements from this perspective. In their literature review of 11 studies related to the evolution of adaptive behaviors, Lynch et al. (1997) observed that this dimension is the one that reveals more consistent positive improvement from one study to another.

For individuals who stayed at the same place following their exit, the improvement noted touches a wider variety of adaptive behaviors. In addition to domestic skills, we notice improvements on the three dimensions of autonomy, communication and socialisation.

These results are quite similar to the conclusions revealed in literature reviews conducted on the same subject in the United States (Kim et al., 2001; Larson & Lakin, 1989; Lynch et al., 1997) and in the United Kingdom (Emerson & Hatton, 1996) and in research more recently conducted in England (Ager, Myers, Kerr, Myles, & Green, 2001; Golding, Emerson, & Thornton, 2005), Australia (Young & Ashman, 2004; Young, 2006) and in the United States (Lerman, Hall Apgar, & Jordan, 2005; Spreat, Conroy, & Fullerton, 2004). In Kim et al. (2001) literature review, almost all of the 33 studies retained by the authors according to pre-established scientific criteria, and published between 1988 and 1998, revealed results indicating a significant improvement in adaptive behaviors of people following deinstitutionalisation. Two of these previous authors found similar results in another literature review in which 21 American studies published between 1978 and 1988 were analyzed (Larson & Lakin, 1989). Nine-

teen of these studies (90%) revealed significant improvement in adaptive behaviors. For their part, Emerson and Hatton (1996) analyzed 71 studies carried out in the United Kingdom and published between 1980 and 1994, among which 24 measured adaptive behaviors. Skill improvements on that dimension were observed in 16 studies and any difference in the eight other studies, which led the authors to conclude that deinstitutionalisation is generally accompanied by an improvement in adaptive behaviors, a conclusion also shared by Lynch et al.

For maladaptive behaviors, as measured by the *ÉQCA*, results indicate a significant reduction in serious inadequate behaviors and in behaviors judged of a moderate gravity, albeit non-significant, when all participants are considered. However, the reduction observed in serious behaviors is especially associated with people who were not relocated, for whom the reduction in these behaviors is more important than that revealed for those individuals who were relocated. These data are consistent with those obtained with the *Reiss Screen for Maladaptive Behaviors* scale, as supported by the correlation between the two instruments. The results revealed by that scale indicate a reduction in the number of people presenting indices of mental health problems. This means that those person's scores exceed the critical points on each subscale, on the total scale (26 items) and on each item. If we more precisely consider these results, significant improvements are revealed for autism and aggressiveness dimensions and, although non-significant, for the total scale (26 items) and for scales related to the psychosis, paranoia, hyperactive and euphoria variables. As for the inadequate behaviors variable measured by the *Reiss Screen for Maladaptive Behaviour* scale, stronger improvements are shown by people that were not relocated.

Concerning the evolution of behavioral problems following transfer from the institution towards more integrated settings, the scientific literature has not revealed consistent findings. Of the 33 studies analyzed by Kim et al. (2001), 10 studies revealed a significant or tending-towards-significance improvement, six a deterioration, with the others not revealing any difference. In Emerson and Hatton's (1996) literature review of 14 studies

evaluating these behaviors with a questionnaire, two investigations indicated an improvement, three a deterioration and nine no difference. These results are not consistent, similar to the findings of the three following studies published more recently. A Norwegian study conducted during an eight years period by Nøttestad and Linaker (1999) with a sample of 109 individuals noted a deterioration of behavioral problems, in particular with behaviors related to aggressiveness, to breaking material and to passivity. However, in the Australian study undertaken by Young, Ashman, Sigafoos, and Grevell (2001) with 95 individuals one year following their departure from the institution, an improvement of these behaviors was observed. Improvement was also noted in the study undertaken with 12 people in England by Golding et al. (2005). Various reasons have been proposed. First, as McGillivray and McCabe (2005) noted, it is possible that in institutions, several behaviors pass unnoticed that are not tolerated in integrated services. This argument is valid when measurements are taken before and following the transfer. However, what has been said about repeated measurements taken only following transfer? According to Kim et al. (2001), the variation could be attributable to the fact that from the beginning of the movement in favour of integration, a tendency to transfer people presenting good capacities first existed. This means that during the last years of deinstitutionalisation, transferred people could have presented more important incapacities. This might explain differences observed among various studies. Obviously, non-comparable samples may also explain such variations in results related in the studies considered. However, when we examine the literature reviews more precisely, the listed studies indicate the number of people, their age and the severity of their intellectual disabilities. Variations between studies do not seem to be attributable to sample differences. Kim et al. also underline that the selection of the participants can involve a bias because people whose condition worsens on the adaptive behaviors or behavioral problems are re-institutionalized. Indeed, excluding from studies people that were re-institutionalized

involves a bias and represents missing information from studies selected.

These various reasons can explain such variations. However, changes in people's condition are not only attributable to the fact of being transferred from an institution towards integrated services offered in the community. The nature of services offered in their social environment also plays a determining role. With the exception of residential facilities, all other services are not well described in the scientific literature.

Such information might well explain the differences observed. In our study, the presence of a mobile team composed of educational counsellors especially trained to ensure the clinical follow-up of each person presenting behavioral difficulties or mental health problems can explain, partly, the improvement noted in behaviors of person or, at least, the absence of deterioration. Their support role with staff from the different residential resources and from the daycare centers, their collaboration with the health department, their willingness to promote interventions based on principles related to a positive approach (Fraser & Labbé, 1993; Kroegel, Kroegel, & Dunlap, 1996) combined with a pharmacological intervention, might explain some of the positive results of our study.

Following exit from the institution, an increase in medication also was noted. More precisely, this increase is related to a rise in the number of people to whom drugs were prescribed (nerve sedatives or anxiolytic) or in the posology taken, in some instances. However, the nerve sedative family medication remains stable or decreases for 59.4% of individuals. For medication in the anxiolytic family, this percentage is calculated at 86%. This medication contributed to improvements in people's condition, as proved by the statistical inverse significant relation revealed between medication and results obtained on the *behavioral problems* component of the *ÉQCA* and on the *aggressiveness* component of the *Reiss Screen for Maladaptive Behavior* scale.

To this medication component, the analysis of studies undertaken elsewhere revealed quite variable results. Some recorded an increase in psychotropic medication (Conroy, 1996; Hill, Balow, & Bruininks, 1985; Intagliata & Rinck, 1985). These studies' findings

are consistent with those related by Spreat et al. (2004). These authors compared the evolution of percentages of people taking drugs according to whether they lived in institutions ($n = 279$) or were deinstitutionalized ($n = 167$) between 1994 and 2000. The increase in the percentage of people taking drugs of various categories (anxiolytic, antidepressants and atypical antipsychotic) was higher than that observed in people that remained in institutions. In 2000, 41.3% of integrated people took psychotropic medication. This percentage decreased to 30.5% for those who remained in institution, a percentage which is even lower than that revealed in a study conducted in Oklahoma in 2000, which considered the entire population selected. Effectively, 34% of the 3 187 individuals evaluated took at least one type of psychotropic drug. Other studies have not mentioned any change. Thinn, Clarke and Corbett (1990) did not find any difference between the medication taken two years before the exit and six months after for 34 individuals. In a recent Norwegian study interested in the medication of 109 people (Nøttestad & Linaker, 2003), no significant change was observed after eight years for the nerve sedative consumption. As mentioned earlier, Nøttestad and Linaker (1999) observed deterioration in maladaptive behaviors for this same group of people. In a comparative study interested in the difference between medication taken according to the residential medium where 873 participants lived, McGillivray and McCabe (2005) recognized that the transfer in the community can be associated with an improvement of people's living conditions but that such a change is not necessarily accompanied by a reduction in medication. In their study, they did not observe any difference between consumption in institutions or in the community.

Conclusion

The present study tracked the evolution of various indicators for individuals with intellectual disabilities following their departure from an institution. In this perspective, the tendencies related to deteriorations or improvements observed in certain people's evolution, and revealed by our analysis, were then transmitted to counsellors in annual meetings. This

practice may have had an influence on the interventions, but it would be quite difficult to measure the intensity and influence that monitoring could exert on the results. However, we believe that such a difference is quite minimal since the decisions concerning services provided to a person or a small group of people are often determined by rules defined in a clinical process distinct from one establishment to the other. The results of such a study, which are related to the transformation of only one institution, cannot be generalized. The sample is not representative and each transformation of institution constitutes in itself a unique case. The allocated resources, the qualification and the preparation of the staff involved, the support given, the organization of services and the clinical programming are some of the many factors that can influence the results, in one direction or another. As well, the history of the intramural services from which a person can benefit also has to be considered.

This being said, the contribution of this study made it however possible to isolate an important variable that should be considered in future studies: Indeed, relocation has insufficiently been mentioned in studies. It is also important to mention that results obtained are not only attributable to the fact of being transferred from an institution towards services integrated into the community, but are quite possibly mainly due to the particular characteristics of the new services offered. Negative prejudices related to people presenting intellectual disabilities remain present and strong. With respect to deinstitutionalisation, these attitudes can represent huge obstacles. The results of this study made it possible to show that deinstitutionalisation is beneficial to people. As others have mentioned, impacts are also noted in other dimensions of person's condition and more particularly in their quality of life. The many studies that have focused upon the evolution of the quality of life of these individuals are quite unanimous: the benefits are real and important. In several countries, there still exist an important number of great institutions (World Health Organization, 2007). Results that emerge from studies on deinstitutionalisation can lead to an important reflection on their futures.

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Training Teachers to Use an Inquiry-Based Task Analysis to Teach Science to Students with Moderate and Severe Disabilities

Ginevra R. Courtade
University of Louisville

Diane M. Browder, Fred Spooner,
and Warren DiBiase
University of North Carolina at Charlotte

Abstract: Federal mandates as well as the National Science Education Standards call for science education for all students. IDEA (2004) and NCLB (2002) require access to and assessment of the general curriculum, including science. Although some research exists on teaching academics to students with significant disabilities, the research on teaching science is especially limited. The purpose of this investigation was to determine if teachers of students with moderate and severe intellectual disabilities could learn to use a task analysis for inquiry-based science instruction and if this training increased student responding. The findings of this study demonstrated a functional relationship between the inquiry-based science instruction training and teacher's ability to instruct students with moderate and severe disabilities in science.

In 1983 the National Commission on Excellence in Education published *A Nation at Risk*, calling for reform in science education. The report claimed that the educational performance of American students in scientific areas was mediocre and would lead to competitors (e.g., Japan, South Korea, Germany) overtaking the United States' dominance in scientific areas. Following the report, the American Association for the Advancement of Science (AAAS) began an initiative entitled *Project 2061: Science for all Americans* (1985). The purpose of the initiative was to develop a scientifically literate society by the year 2061. Both *A Nation at Risk* and *Project 2061: Science for all Americans* used inclusive terminology that

called for the scientific education of *all* students. Similarly, when the National Research Council (NRC) published the National Science Education Standards (NSES) in 1996 the focus was "... science standards for all students ... regardless of age, gender, cultural or ethnic background, disabilities, aspirations, or interest and motivation in science." (NRC, 1996, p. 2)

Although these science initiatives targeted "all students," there were few discussions of applications for students with severe intellectual disabilities until *No Child Left Behind* (NCLB, 2002) required the assessment of all students in science. To meet this requirement states could include students with significant cognitive disabilities in large scale testing through the use of alternate assessments, described by the U.S. Department of Education (2003) as "an assessment designed for the small number of students who are unable to participate in the State assessment even with appropriate accommodations (p. 3)." Although states have been required to develop science assessments, and by default teachers have needed to provide science instruction to prepare students for these assessments, there has been almost no research on teaching science to students with severe disabilities. A comprehensive literature review of science in-

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struction for this population uncovered a limited number of studies (Courtade, Spooner, & Browder, 2007). Of the 11 studies that were discovered, eight dealt with concepts that related to only one content area of the National Science Education Content Standards (Content Standard F: Science in Personal and Social Perspectives). While these studies were designed to address daily living skills they had content that overlapped with science.

Although the number of studies that address some aspect of science is limited, they do offer guidance for developing effective instructional strategies. In general, these studies followed principles of applied behavior analysis methodology of operationalizing behavior, using procedures to promote and transfer stimulus control from teacher prompting to stimulus materials, and the use of feedback and reinforcement of correct responses (Alberto & Troutman, 2009). One common feature of several of the studies identified by Courtade et al. (2007) was the use of a task analysis to break skills down into the steps required to complete a response chain (e.g., Gast, Winterling, Wolery, & Farmer 1992; Marchand-Martella, Martella, Christensen, Agran, & Young 1992; Spooner, Stem, & Test, 1989).

None of the studies analyzed by Courtade et al. (2007) addressed one of the most fundamental aspects of science: the process of inquiry. The National Research Council asserts that "inquiry is a set of interrelated processes by which scientists and students pose questions about the natural world and investigate phenomena; in doing so, students acquire knowledge and develop a rich understanding of concepts, principles, models, and theories (NRC, 1996, p. 214)." Within the National Science Education Standards, inquiry is described as a critical component of a science program. Inquiry-based instruction requires more than hands-on activities. Students also learn to follow a problem solving process that can be applicable to the real world. Some research suggests that the use of an inquiry-based approach *vs.* a traditional science curriculum (i.e., one based on facts, laws, and theories with the secondary use of hands-on activities) reveals a positive impact on student performance criteria that includes: achievement, process skills, analytic skills, related

skills (e.g., reading, math), and other areas (e.g., creativity, logical thinking; Shymansky, Kyle, & Alport, 1983). Some research also suggests that students with mild disabilities may improve performance when taught with an inquiry method as compared to a more traditional textbook approach (Scruggs, Mastropieri, Bakken, & Brigham, 1993).

In contrast, there may be limitations to the use of an inquiry approach. The first is that many teachers do not have training to use this approach. Even science teachers within general education have expressed a lack of preparation for inquiry-based instruction (Roehrig & Luft, 2004). Second, some experts have questioned the whole premise of minimal guidance during instruction as being inconsistent with research on how students learn (Kirschner, Sweller, & Clark, 2006). Learners may need guidance until they have sufficiently high prior knowledge to self-direct their learning. Scruggs and Mastropieri (1995) also found that students with intellectual disabilities need "something more" than an inquiry-based instruction alone such as reductions in vocabulary demands, the use of graphic organizers, the use of multiple presentations, carefully structured questioning, familiarizing students with science materials, and guided coaching.

When students with moderate and severe intellectual disabilities participate in an inquiry process, this "something more" for an inquiry-based lesson may be instruction on each step of a task analysis. The questions that could be raised are whether this is still inquiry and what benefit this would have over the traditional task analysis of a specific daily living skill that includes some science. A task analytic approach would still be considered inquiry if the instruction contains the essential features of classroom inquiry. However, this variation involves less learner self-direction and more direction from the teacher and materials used (NRC, 2000). That is, students would be using strategies to derive some information about the materials to be explored, but would do so through interaction with the teacher. According to the National Research Council, the essential features of classroom inquiry include: (a) the learner engages in scientifically oriented questions, (b) the learner gives priority to evidence in respond-

ing to questions, (c) the learner formulates explanations from evidence, (d) the learner connects explanations to scientific knowledge, and (e) the learner communicates and justifies explanations. Each of these essential features can be simplified and defined as a task analysis for inquiry.

There are at least two advantages to using a task analysis of the process of inquiry versus of a specific daily living skill. First, an inquiry task analysis may have applicability across changing science content. That is, students may learn a generalized method for interacting with materials during a science lesson. Second, this generalized method can be used for science content that goes beyond daily living skills such as fossils, volcanoes, and chemical reactions. These broader topics are not only part of the general content standards that states are required to assess, but also may foster leisure interests (e.g., volcanoes), future career options (e.g., work in a lab or museum), or safety skills (e.g., avoiding mixing chemicals) for students with intellectual disabilities.

The purpose of this investigation was to determine if training teachers of students with moderate and severe intellectual disabilities in the use of a task analysis for inquiry-based instruction could be applied across science content. Further objectives of this study were to determine if training the teachers would increase students' participation in an inquiry-based lesson.

The independent variable was an inquiry-based instructional training package based on reviews of research studies involving training staff who work with individuals with developmental disabilities (Demchak, 1987; Jahr, 1998). Demchak reviewed behavioral staff training in special education settings and compared antecedent, contingency management, and multi-faceted procedures. Antecedent procedures focus on training staff before the skills are to be applied. Antecedent procedures include instructions, modeling, and role-playing. Contingency management focuses on following certain staff behaviors with consequences. Feedback techniques (i.e., written, verbal, video, posted), performance lotteries, and monetary contingencies were all contingency management techniques. Most

research has used multi-component procedures to change staff behaviors.

An antecedent strategy that Jahr (1998) found to be effective was modeling. Modeling is a procedure during which the supervisor demonstrates the correct procedures and then the staff member applies the same procedures to a specific individual. Like Demchak, Jahr found that modeling was most often used as part of a multi-component staff training intervention.

Kazdin, Kratochwill, and VandenBos (1986) propose the use of standardized manuals to train staff in research-based methods. They propose that manuals provide detailed, explicit guidelines that are cost effective, and can be updated based on new findings. One of the studies reviewed by Demchak (1987) included the use of a training manual as part of an effective multi-component training package (Reid et al., 1985). The use of the training manual combined with investigator feedback and praise, produced improved behaviors for both the teachers and students involved.

In the current study, a multi-component treatment package including a video model, role play, feedback, and a specific script (the task analysis) was used to train special education teachers to use an inquiry method. The task analysis was based on Magnusson and Palincsar's (1995) phases of an inquiry-based approach that include: (a) engage, (b) investigate and describe relationships, (c) construct an explanation, and (d) report. Each phase was divided into specific steps for the teachers to use during instruction.

The primary research question was: What is the effect of a multi-component teacher training approach on teacher acquisition of steps to implement an inquiry based science lesson? The second research question examined the effect of this teacher training on generalization across content of the science lessons. A third research question was: What is the concurrent effect of teacher's use of an inquiry-based lesson on student acquisition of inquiry skills needed to participate in science lessons? The final research question was: What is the effect of participation in inquiry-based science lessons on the concurrent effect of use of science terms?

TABLE 1

Demographic Information for Students

<i>Student</i>	<i>Age</i>	<i>Gender</i>	<i>Grade</i>	<i>Race</i>	<i>IQ</i>	<i>Verbal</i>
1	13	F	7	AA	40 (WISC-III)	yes
2	12	M	7	C	40 (WISC-III)	yes
3	12	F	6	H	54 Leiter-R	yes
4	15	F	8	AA	35-49 FS (verbal-46, nonverbal, 46)-WISC-III	yes
5	13	M	8	AA	41-LIPS-R	yes
6	14	M	8	AA	49-LIPS-R	yes
7	13	F	8	AA	39-SBIS	yes
8	11	M	6	C	no IQ score (unable to calculate)	yes (1 to 2 word vocalizations)

AA = African American, C = Caucasian, H = Hispanic.

Method

Participants and Setting

Teachers. Four teachers were recruited to participate in this investigation who met the following inclusion criteria: (a) teacher of a middle school class for students with moderate and severe intellectual disabilities (b) minimum of one year of teaching experience, (c) minimum of two students who met student eligibility criteria, (d) intent to continue teaching in his/her particular classroom for the remainder of the school year, and (e) agreed to teach science a minimum of three times per week. All teachers were female. Their ages ranged from 34 to 44. The teacher’s years of special education teaching experience ranged from 1½ to 13 years. All teachers had at least a Bachelors of Arts degree. Two teachers also had a Masters of Education degree. All teachers were licensed to teach special education, specifically students with intellectual disabilities.

Students. Each teacher recruited two of their students ($n = 8$ students) to participate in the investigation. Students were eligible for participation if they met the following selection criteria: (a) an IQ score that characterizes the student as having a moderate intellectual disability (40–55) or severe intellectual disability (25–39), (b) adequate vision and hearing to interact with the materials, (c) an ability to communicate verbally or with an augmentative communication system, (d) enrolled in

grades 6–8, and (e) consistent attendance (absent less than two times per month). One student did not have a calculable IQ score but had been classified with moderate intellectual disabilities based on his developmental level. Student demographic information is presented in Table 1. All students were verbal and none were English Language Learners (ELL). For further information about student participants (see Table 1).

Setting. The study took place in a large, urban district located in the southeastern United States. The teachers were recruited from a pool of teachers in the school district’s Specialized Academic Curriculum (SAC) classrooms. Three of the SAC classrooms were located in inclusive public schools within the district. The remaining SAC classroom was housed at a public separate school. The SAC classrooms were designed for students with moderate to severe intellectual disabilities who need specialized adaptations to access the general curriculum. The SAC classrooms typically served eight students with one teacher and one paraprofessional. This investigation took place as part of the ongoing instructional program implemented by the teacher. All science instruction took place in the students’ special education classrooms and was conducted by the classroom teachers in a small group with the two target students. Some teachers also included other members of their class in the science lessons. The lessons were conducted with students seated or standing

around a small instructional table (depending on what was needed to access the materials). The teacher stood behind or beside the table to demonstrate with the materials and provide students opportunities to respond.

To introduce the research and middle school science concepts, a teacher workshop was held at a central office building located in the school district. The individual teacher trainings occurred in meeting spaces (e.g., conference rooms) at each teacher's school.

Dependent Variables

Checklists for an inquiry based science lesson. The task analysis of inquiry instruction used in this research was called the *Checklist for an Inquiry Based Science Lesson*. A member of the research team was present for direct observations of the teachers implementing science lessons in their classrooms and used this checklist to score the task analysis. Each teacher's performance was measured as the number of steps the teacher implemented correctly. To promote reliable data collection, the criteria for performance of each step was operationalized as shown in Table 2. Each teaching step could receive one of four codes. If the teacher completed a step independently and correctly, with no prompting, the step was marked with an "I." If the teacher completed the step correctly after she was reminded by a member of the research team, the step was marked with a "P." If the teacher attempted the step, but did not meet the criteria for performance, the step was marked with an "E." If the teacher did not perform a step, the step was marked with an "O (see Table 2)."

Because this measure was developed by the first author, its reliability and validity were evaluated as part of this research. In this study interobserver agreement was established by piloting the instrument with the two observers who were trained to collect data for this study (a research associate and a doctoral student in special education). The first author provided each individual with *Checklist for an Inquiry-based Science Lesson*. The operational definitions and coding procedures were explained to each individual. The individuals were then asked to watch a videotaped inquiry-based science lesson that included a participant with severe disabilities and code the teacher's use

of the steps of the inquiry-based science lesson as defined for this investigation. The first author examined the results of the observation and modified the instrument as recommended by the two observers. The same two individuals were then asked to observe and code a second videotaped lesson. The interobserver agreement was above 85%; therefore, the operational definitions were accepted for use in the study.

In single subject research, the social validity of a measure also is means to support the appropriateness of the measure (Kazdin, 1977; Schwartz & Baer, 1991; Wolf, 1978). This was especially important in the current investigation to determine that the task analysis met the criteria for inquiry, but still targeted responses that would be meaningful for students with intellectual disabilities. The researcher asked an expert in science education, two science curriculum specialists, and an expert in the education of students with severe disabilities to review the task analysis and make suggested changes. The content specialists were asked whether it met the principles of inquiry and the special educator was asked to review the types of responses as appropriate and meaningful for the students. All agreed that the task analysis met the stated goals (inquiry; appropriate and meaningful responses) and had no revisions.

The data collected on the checklist were summarized as the number of steps correct for teaching. Interobserver agreement for the task analysis checklist was obtained by having a second observer (doctoral student) observe in the classrooms and independently score a subset (36%) of lessons. Coding of each step was compared for exact agreement and interobserver agreement was computed as agreements divided by total number of steps $\times 100\%$.

Generalization of inquiry across science content. The second research question examined the variation in science content taught by the teachers to determine if teachers generalized the inquiry approach across multiple contents in science. This dependent variable was measured by creating a code for each science content area identified in the National Science Education Standards (e.g., Physical Science, Earth & Space Science, Science & Technology), and then assigning the code for the

TABLE 2

Steps in Task Analysis for Teachers and Criteria for Correct Completion of Steps

Phase A: Engagement	
1. Show the students a picture or material related to the science skill being taught	
Correct Response-Shows the student a picture, picture symbol, or object related to the science skill	Incorrect Response-Discusses the skill being taught without showing a visual
2. Ask the students to tell you what the picture/material is	
Correct response-Requests that a student tells what he/she thinks the picture/material is; if the student is not verbal, gives a choice of symbols for the student to use to make a comment; leads the student by asking questions	Incorrect response-Tells the student what the picture/material is; does not offer a student who is not verbal choices to make a comment; tells the student his/her identification is wrong
3. Ask the students what they think the picture/material does (what they know about it)	
Correct response-Requests that a student tells what he/she thinks the picture/material does; if the student is not verbal, gives a choice of symbols for the student to use to make a comment; guides the student by asking questions	Incorrect response-Tells the student what the picture/material does; does not offer a student who is not verbal choices to make a comment; tells the student his/her identification is wrong
4. Ask the students what they would like to find out about the picture/material	
Correct response-Requests that a student tells what he/she would like to know about the picture/materials; gives picture choices if necessary to elicit a response, guides the student by asking questions	Incorrect response-Responds for the student; does not provide choices if needed; discounts a student's answer
Phase B: Investigate and Describe Relationships	
5. Ask students how they will gather information about the subject	
Correct response-Requests that a student tells what he/she will find out more about the picture/materials; gives picture choices if necessary to elicit a response, guides the student by asking questions	Incorrect response-Responds for the student; does not provide choices if needed; discounts a student's answer
6. Ask students to tell you what is the same (pattern)	
Correct response-guides students to observe patterns by pointing out characteristics to observe; gives choices of patterns if necessary	Incorrect-Points out the pattern immediately; does not guide students; does not give choices
7. Ask students to tell you what is different (pattern)	
Correct response-guides students to observe patterns by pointing out characteristics to observe; gives choices of patterns if necessary	Incorrect-Points out the pattern immediately; does not guide students; does not give choices
Phase C: Construct Explanation	
8. Explain relevant accepted scientific knowledge	
Correct response-Explains knowledge using pictures, symbols, etc.; knowledge is relevant and may help students explain what they have observed	Incorrect-explains knowledge without showing a visual; knowledge is irrelevant to what students have observed; connection to explanations of what students have observed is cannot be discerned

TABLE 2 (Continued)

9. Guide students to explanations (prediction) Correct response-points out characteristics and relevant facts verbally and with visual materials to help students create explanations	Incorrect response-uses no visual materials; tells the student what the explanation is
10. Test explanations (if possible) Correct response-guides students through an experiment using their explanations; allows students to perform some steps of the experimentation independently	Incorrect response-does not involve students in experimentation; does not gives students the chance to make an independent response during experimentation
Phase D: Report	
11. Give each student a turn to report what he/she has found Correct response-allows students to express what they found; if student is not verbal, provides choices for student to respond	Incorrect response-reports for the students; does not give a student who is nonverbal a way to respond
12. Reinforce concept learned using literal questioning Correct response-asks all students at least one question about the concept learned; provides answer choices if necessary	Incorrect response-does not ask literal questions; questions do not reinforce concept (e.g., Did you have fun?); does not provide answer choices if necessary

concept taught during each science lesson (e.g., a lesson addressing the concept of properties of matter would be coded as Physical Science). The topics for each lesson, also, were submitted to a science curriculum specialist who coded the science standard for each lesson independently to check for interobserver agreement. At the end of data collection, the total number of lessons coded in each content standard for each teacher was added, divided by the total number of lessons coded for each teacher in all content standards, and multiplied by 100%. This number represented the percentage of lessons taught in each content standard. Interobserver agreement for coding content was computed by comparing for exact match codes and computing the number of agreements over total codes and multiplying by 100%.

Checklist for student acquisition of inquiry skills. The third research question examined the students' acquisition of inquiry skills during a science lesson as shown in Table 3. This dependent variable was a task analysis of student responding measured using the *Checklist for Student Acquisition of Inquiry Skills*. This assessment occurred during direct observations of the students participating in science lessons. In order to ensure reliable data collection, the criteria for performance of each step was op-

erationalized. A member of the research team coded each step using one of four codes. If the student independently participated in the step, regardless of a correct or an incorrect answer, the step was marked with an "I." If the student needed verbal, model, or physical prompt to participate the step, it was marked with a "P." A step was considered prompted not only if the teacher reminded the student to perform the step, but also if a paraprofessional or another student did so. If the student did not participate in the step in any way, the step will be marked with an "N." If a student was not given the opportunity to perform the step, an "N/O" was marked. If the student performed the step correctly, a + was added to the assigned code. If the step was performed incorrectly, a - was added to the assigned code. Steps 2, 3, and 4 were only assigned a + (gave an answer) or N because the students were being asked to provide individual answers that were not judged as right or wrong. Reliability and validity of this measure were determined using the same approach used for the *Checklist for an Inquiry-based Science Lesson* (see Table 3 for the 12 steps being measured, operational definitions, and examples).

Total of new science terms used. The fourth research question examined the students' use

TABLE 3

Student Measurement and Examples of Student Steps

<i>Student Steps</i>	<i>Example Lesson Steps 1. Magnetism Lesson 2. Simple Machines (Inclined Plane Lesson)</i>	<i>Examples of Correct Student Responses</i>	<i>Incorrect Responses</i>
A. Engage			
1. Student touches or looks at the picture/ material being shown	1. Students were asked to look at and touch different objects on a table (including objects of different materials-wood, plastic, metal and magnets)	1. Look at and touch materials on the table	1. Does not touch or eyegaze to picture/material
	2. Students were asked to look at two pieces of plywood (i.e., piece of wood leaned up against the top of a shelving unit and a piece of wood lying flat on the floor)	2. Look at the pieces of wood	
2. Student tells what he/she thinks the picture/material is	1. Students were asked to tell the teacher what they thought each object was (verbally or by pointing to a picture choice)	1. Independently respond to the teacher's request to identify the materials	2. Does not respond
	2. Students were asked to tell the teacher what they thought the object was (verbally or by pointing to a picture choice)	2. Independently respond to the teacher's request to identify the object	
3. Student tells what he/she think the picture/material does (what they know about it)	1. Students were asked to tell the teacher what they knew about the objects (e.g., what they were made out of; some of the objects were called magnets; magnets stuck to other objects)	1. Independently respond to the teacher's request to tell what they knew about the objects	3. Does not respond
	2. Students were asked to tell the teacher what they knew about the wood (verbally or by pointing to a picture choices; e.g., it was leaning; it was on the floor)	2. Independently respond to the teacher's request to tell what they knew about the wood	
4. Student tells what he/she would like to find out about the picture/material	1. Students were asked what they would like to find out about the materials and were given verbal and picture choices to help make decisions (e.g., What do the magnets stick to?)	1. Independently respond to the teacher's request to tell what they would like to know about the objects	4. Does not respond
	2. Students were asked what they would like to find out about the wood and were given verbal and picture choices to help make decisions (e.g., What could we do with the wood?)	2. Independently respond to the teacher's request to tell what they would like to know about the pieces of wood	

of science terms. This dependent variable was measured using a count of the number of times students used science terms taught in

previous lessons correctly. The first author tallied the number of times terms were used during the science lessons they observed.

TABLE 3 (Continued)

<i>Student Steps</i>	<i>Example Lesson Steps 1. Magnetism Lesson 2. Simple Machines (Inclined Plane Lesson)</i>	<i>Examples of Correct Student Responses</i>	<i>Incorrect Responses</i>
B. Investigate & Describe Relationships			
5. Student tells how he/she will gather information about the subject (use of 5 senses)	1. Students were asked to tell the teacher how they would gather information to find out what they would like to know and were given verbal and picture choices to help them make decisions (e.g., ask the teacher, look in a book, experiment (try out) the materials)	1. Independently respond to the teacher's request to tell how they would gather information	5. Does not respond; responds with a sense that is incorrect-example-eating something that is not edible
6. Student tells what is the same (pattern)	2. Same as example 1 1. Students were given some of the materials and asked to respond to what was the same about some of the objects (given verbal and picture choices; e.g., students were shown objects that were the same color or size)	2. Same as example 1 1. Independently provide a correct response to the teacher's request to tell what was the same about the objects they were looking at	6. Does not respond; chooses dissimilar characteristics; chooses an incorrect pattern
7. Student tells what is different (pattern)	2. Students were asked to look at the two pieces of wood and respond to what was the same (given verbal and picture choices; e.g., they were both the same size, same color) 1. Students were given some of the materials (i.e., 1 object made of wood, 1 object made of plastic; one object made of metal) and asked to respond to what was different about the objects (give verbal and picture choices)	2. Independently provide a correct response to the teacher's request to tell what was the same about the two pieces of wood they were looking at 1. Independently provide a correct response to tell what was different about the objects they were looking at	7. Incorrect-Does not respond; chooses similar characteristics; chooses an incorrect pattern
	2. Students were asked to look at the two pieces of wood and respond to what was different (given verbal and picture choices; e.g., one is on the floor; one is leaning on the shelving)	2. Independently provide a correct response to the teacher's request to tell what was different about the two pieces of wood they were looking at	

Teachers were asked to tally the number of times the terms were used by the students during any lessons that were not observed by a data collectors and keep anecdotal records of

the use of the terms by the students outside of a science lesson. The teachers were asked to record which term was used and the context in which the term was used.

TABLE 3 (Continued)

<i>Example Lesson Steps 1. Magnetism</i>			
<i>Student Steps</i>	<i>Lesson 2. Simple Machines (Inclined Plane Lesson)</i>	<i>Examples of Correct Student Responses</i>	<i>Incorrect Responses</i>
C. Construct Explanation			
8. Student touches or looks at the information being shown	1. Students pointed to or read with the teacher as she read sentences about a science concept to the students (e.g., Magnets stick to most metals. This paper clip is metal. The magnet will stick to it.) 2. Students pointed to or read with the teacher as she read sentences about a science concept to the students (e.g., A ramp is a simple machine. Simple machines make work easier. It is easier to push an object up a ramp than to lift it up.)	1. Touches sentence or reads sentence with teacher as she reads it 2. Same as example 1.	8. Does not touch or eyegaze to picture/material
9. Student provides an explanation (prediction)	1. Using the same concept, students made a prediction about whether the magnet would stick to another material (e.g., This pencil is made of wood. The magnet will not stick to it.) 2. Using the same concept, students made a prediction about whether it is easier to lift something or push it up a ramp (e.g., I need to get this crate on top of the book shelf. It will be easier to use the ramp than to lift it up)	1. Independently make a prediction or answer a prediction question based on the science concept (e.g., This pencil is made out of wood. Will the magnet stick to it? Yes or no?) 2. Independently make a prediction or answer a prediction question based on the science concept (e.g., I need to get this crate on top of the book shelf. Will it be easier to use the ramp than to lift it up? Yes or no?)	9. Does not provide an explanation; chooses an explanation that is not relevant to the previously provided information
10. Student participates in testing explanation	1. Students participated by touching magnets to objects made of wood, plastic, and metal 2. Students participated attempting to lift the crate and push the crate up the ramp	1. Independently participate by physically manipulating the objects or directing partners to 2. Independently participate by physically manipulating the objects or directing partners to	10. Does not respond

Experimental Design and Analysis

A multiple probe across participants single subject research design was used to evaluate the effect of the multi-component training on

teacher's use of the steps of inquiry-based science instruction and the concurrent effects on student participation in an inquiry lesson. A multiple probe design is a variation of a multiple baseline design in which data are

TABLE 3 (Continued)

<i>Example Lesson Steps 1. Magnetism Lesson 2. Simple Machines (Inclined Plane Lesson)</i>		<i>Examples of Correct Student Responses</i>	<i>Incorrect Responses</i>
<i>Student Steps</i>			
D. Report 11. Student reports what he/she found	1. Students answered questions or reported information about what they discovered during the experiment (i.e., What the magnet stuck to?)	1. Independently provide a correct statement or answer to a question about what they discovered (e.g., The magnet stuck to the paper clip. No, the magnet did not stick to the book)	11. Does not respond; makes incorrect choices or provides incorrect information about what was found
	2. Students answered questions or reported information about what they discovered during the experiment (i.e., It was easier to push the crate up the ramp.	2. Independently provide a correct statement or answer to a question about what they discovered (e.g., The ramp made it easier to get the crate on the shelf. It was harder to pick up the crate than push it up the ramp)	
12. Student answers questions about the information	1. Students responded to questions about the science concept (i.e., Magnets stick to most metals)	1. Independently provide a correct statement or answer to a question about what they the science concept (i.e., Q: What kind of materials to magnets stick to? A: Most metals)	12. Does not answer literal questions; answers questions incorrectly
	1. Students responded to questions about the science concept (i.e., A ramp is a simple machine. It is easier to push an object up a ramp than to lift it up.)	2. Independently provide a correct statement or answer to a question about what they the science concept (i.e., Q: Did this simple machine make our work, moving the crate, easier or harder? A: Easier)	

collected intermittently in order to estimate trends and patterns in the data within and between tiers (Horner & Baer, 1978; Kennedy, 2005). Specifically, “probes” (observations of science lessons) were conducted for all teachers and students prior to each teacher and student pair entering intervention. Ongoing data were collected once the teacher entered intervention.

Procedure

Pre-baseline. Because teachers of students with moderate and severe intellectual disabili-

ties may receive little to no exposure to science instruction, all teachers received a one day workshop that included a general overview of science from the first author and science curriculum experts prior to the beginning of data collection. Each special education teacher was asked to invite a general education science teacher to the workshop with them. Specifically, the inservice consisted of information on five topics: (a) Science and Students with Significant Disabilities (the first author described why the re-

search was being done and what is known about teaching science to students with significant disabilities), (b) Middle School Science Content Overview (two school district science curriculum personnel gave an overview of middle school science content, including state science standards and core concepts that are addressed in grades 6–8), (c) How Do We Get There? Strategies for Accessing the General Curriculum (the first author provided strategies such as adaptations and modifications, systematic instructional procedures, the use of functional activities and the use of technology), (d) Extending State Standards (a doctoral student gave specific examples of how to design grade-level appropriate science activities based on state standards), and (e) Planning Lessons (the special education and general education teachers worked together to adapt lesson plans to meet the needs of students with severe disabilities). Providing this general information prior to baseline was important to determine whether the individual teacher training package was needed.

Baseline. During baseline, teachers were asked to teach a science lesson they had developed. No instruction was given to the teachers about the content, structure, or delivery of the lesson other than the general information they received in the pre-baseline workshop. Data on the four teachers and the eight students were collected using the task analysis for the teacher (*Checklist for an Inquiry-based Science Lesson*) and the student (*Checklist for Student Acquisition of Inquiry Skills*). As described, the first author and two observers collected all data through direct observation in the classrooms. No feedback was given to the teachers after the lessons. Baseline data were collected on each of the teacher and student pairs three times. The data were graphed and visually inspected.

Intervention. When the baseline was found to be stable for a teacher and student pair, that teacher received a 4-hour training session from the first author. The training took place in a one-on-one context between the teacher and the first author at the teacher's school in a private setting (e.g., tutoring room, empty office). The intervention was a multi-component training program that included: (a) a fidelity checklist that the researcher followed to ensure each teacher received all the same

training components, (b) a training manual, (c) verbal explanation of the contents of the training manual, (d) a videotaped model of an inquiry based science lesson in which a student with severe disabilities was being instructed, and (e) an opportunity to develop a science lesson for which the first author modeled the components and gave feedback.

During the individual teacher training session, the researcher first played the videotaped science lesson and gave the teacher a guided notes handout to help her identify the steps of the inquiry instruction. Next, the researcher did a verbal presentation of the training manual which the teacher followed in her own copy. The manual was based on the Professional Development Standards from the National Science Education Standards (NRC, 1996), research related to teaching inquiry (Germann, Aram, & Burke, 1996; Keys & Kennedy, 1999; Palincsar, Anderson, & David, 1993), and research related to staff training (Demchak, 1987). The manual was 30 pages and included: (a) an overview of inquiry-based science instruction, (b) a rationale for the use of inquiry based instruction for general education students and students with disabilities, (c) general education science lessons demonstrating plans for an inquiry based lesson, (d) steps included in the adapted inquiry process (task analysis), (e) examples for each step of the task analysis, (f) sample lessons applying the task analysis to specific science content for students with moderate and severe disabilities, (g) ideas for choosing a first lesson, (h) ideas for individualizing lessons for each student (e.g., assistive technology), and (i) a lesson planning form (the task analysis with space to fill in specific materials and activities for each step).

As part of training, teachers were instructed on how to use the system of least prompts procedure to promote student responding on each step of the task analysis. The system of least prompts was chosen based on evidence of its effectiveness with students with severe disabilities who are learning chained tasks (Demchak, 1990). Teachers were instructed to move through the following prompts if the student was not responding to a question or request: (a) verbal, (b) model, and (c) physical guidance. The first author also noted the importance of praising correct responses and

responding to errors by interrupting them and giving the next level of prompting.

After the manual and information on using the system of least prompts was reviewed, the teacher used the planning form to create a lesson and then role played it with the first author. The first author gave feedback on any steps omitted and on the use of prompting and feedback. Following the individual training, the first author or other observers would also give feedback on any steps omitted and the use of prompting and feedback during the classroom observations in intervention by meeting with the teacher briefly at the end of the lesson. During intervention, the observers also gave prompts during the lesson if the teacher overlooked a step or began to respond for the student (e.g., by saying “What does Monica know about the material?” or “I wonder who knows what’s the same?”).

Procedural Fidelity

In order to strengthen the ability to demonstrate a functional relationship between the independent and dependent variables and to provide reliable training across teachers, treatment integrity (Billingsley, White, & Munson, 1980) was measured using a checklist of each component (verbal explanation of inquiry instruction and rationale for use, videotape example, strategies for adapting inquiry-based instruction and science content for students with severe intellectual disabilities, planning, implementation, feedback). A second member of the research team attended two of the four individual teacher sessions and measured the treatment integrity for teacher training. Because the focus of this study was teacher behavior change, the *Checklist for an Inquiry-based Science Lesson* served as the treatment integrity checklist for the student’s intervention.

Social validity. A threat to validity in an educational intervention is that the outcomes may not be of practical significance to key stakeholders (Wolf, 1978). To address this threat, a survey was sent to the students’ parents to determine if they perceived science instruction to be important for their children. Also, surveys were conducted with the teachers in the study to determine if the variables being measured were socially important and if

it was feasible to instruct this student population using inquiry-based methods. A second survey was given to the teachers to determine they perceived the intervention itself to be socially valid.

Results

Lesson Implementation

Each teacher began implementing the science lessons within three days of the individualized intervention training. All lessons took place in the special education classrooms the students regularly attended. Lessons lasted approximately 20–30 minutes. Lessons were taught in small groups that ranged from 2–6 students. Each teacher taught 2–3 science lessons per week.

Fidelity for Researcher’s Training of the Teachers

Procedural fidelity for the researcher’s training of the teachers was monitored for pre-baseline training as well as the individual teacher training (intervention). Fidelity for the pre-baseline workshop was monitored by the two trained observers. Fidelity of the individual teacher trainings was monitored by one of the trained observers. Procedural fidelity for the pre-baseline workshop was 100%. Procedural fidelity for the individual teacher trainings had a mean of 93.43%.

Interobserver Agreement

Interobserver agreement on 6 of the 13 (46.2%) probes taken during the baseline period using the *Checklist for an Inquiry-based Science Lesson* (teacher data) ranged from 92%–100% with a mean of 96%. Interobserver agreement on 16 of 48 (33.33%) probes taken after intervention using the *Checklist for an Inquiry-based Science Lesson* (teacher data) ranged from 83%–100% with a mean of 97.43%.

Interobserver agreement on 6 of the 13 (46.2%) probes taken during the baseline period using the *Checklist for Student Acquisition of Inquiry Skills* (student data) ranged from 92%–100% with a mean of 96.67%. Interobserver agreement on 16 of 48 (33.33%) probes taken after intervention using the *Checklist for Student*

Acquisition of Inquiry Skills (student data) ranged from 83%–100% with a mean of 93.89%. When interobserver agreement fell below 85%, the data collectors were retrained on the data collection procedures and operational definitions by the first author.

Observers noted the concept of each lesson being taught by the teachers. Fifty-six lessons were coded by the first author (content area of 5 lessons was missing) and the science content expert. Of the 21 different concepts taught (concepts were taught multiple times by multiple teachers), the first author and science content expert agreed on the content area for 18 of the concepts (86%). The first author mistakenly identified three concepts (i.e., gravity as an Earth Science concept, simple machines and work as Physical Science concepts). The science content expert corrected the misconceptions (i.e., gravity is a Physical Science concept; simple machines and work are Science and Technology concepts).

Effect of Training Teachers in Inquiry-based Instruction on Science Lessons

Figure 1 presents the number of steps on the *Checklist for an Inquiry-based Science Lesson* each teacher performed correctly. For all four teachers, there was a change in level and trend after the training in inquiry-based science instruction. Maintenance probes were only taken with Teacher 2 because the school year came to an end before more probes could be taken.

Teacher 1. During baseline, Teacher 1's scores ranged from 2 to 3 lesson components correct. Her post-intervention scores ranged from 7 to 12 with a majority of the scores (75%) at 10 or higher (criteria for teacher performance was set at 10 or above). The last two data points show a decelerating trend that may have been related to her personal circumstances. Teacher 1 had to drop from the study because of a death in her immediate family.

Teacher 2. During baseline, Teacher 2's scores ranged from 3 to 4 steps of the lesson correct. Her post-intervention scores ranged from 10 to 12 with a majority of the scores (55%) at 12. Two maintenance probes were conducted. Teacher 2 scored 11 on both maintenance probes.

Teacher 3. During baseline, Teacher 3's scores ranged from 3 to 4 steps of the lesson correct. Her score during the baseline probes ranged from 4 to 5 steps correct. An additional probe was conducted because the teacher's performance showed some acceleration after the first teacher's intervention. Teacher 3 performed 3 steps correct during the additional probe. Her post-intervention scores ranged from 10 to 12 with a majority of the scores (88%) at 12.

Teacher 4. During baseline, Teacher 4's scores ranged from 1 to 3 steps of the lesson correct. Teacher 4's scores during baseline and the probe phases indicated a stable trend and level. Her post-intervention scores ranged from 7 to 12 with a majority of the scores (75%) at 10 or higher.

Effects of Training Teachers on Generalization across Content Area

All four teachers generalized the use of the inquiry-based task analysis across three or more areas. Lessons were taught that addressed concepts in Physical Science, Life Science, Earth and Space Science, and Science and Technology. No lessons were taught that addressed concepts in the areas of Science in Personal and Social Perspectives or History and Nature of Science. All four teachers taught lessons in Physical Science. Lessons taught that represented this content area included concepts such as magnetism, gravity, force, friction, motion, speed, and density. All four teachers also taught lessons in Life Science. Lessons taught that represented this content area included concepts such as plants and plant cells, parts of the human body, the respiratory system, cells, and heredity. Three of the four teachers taught lessons in Earth and Space Science. Lessons taught that represented this content area included concepts such as earth's crust, volcanoes, shadows/sunlight, day/night, and gravity. Teacher 2 taught two lessons in Science and Technology). The lesson concepts coded as Science and Technology included simple machines and work. No lessons were coded as content areas F (Science in Personal and Social Perspectives) or G (History and Nature of Science).

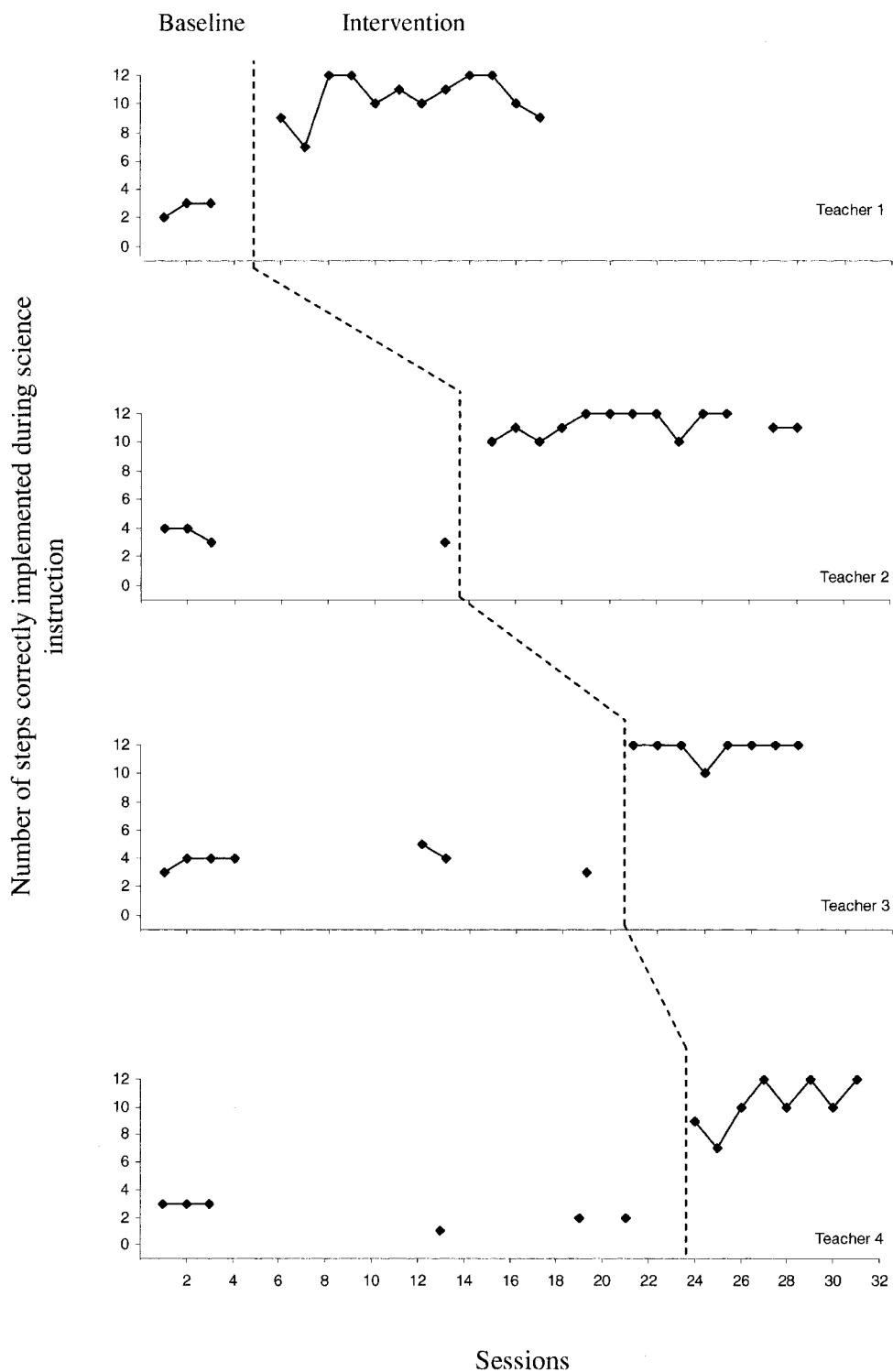


Figure 1. Teacher's number of steps of task analysis correctly implemented during science lesson.

Effects of Inquiry-based Science Instruction on Students' Acquisition of Inquiry Skills

Figures 2 and 3 summarize the number of inquiry responses made by the students. For clarity of presentation, one student from each teacher's classroom is presented in each graph (e.g., Monica and Kyle both received instruction from Teacher 1). There was a change in level and trend after the training in inquiry-based science instruction for all eight students. Baseline scores ranged from 1 to 3 lesson components correct. Post-intervention scores ranged from 3 to 12, with a majority of the scores in classes 2, 3 at 9 (75%) or higher. Both students in class 1 had to discontinue participation in the study when their teacher requested to be removed due to a death in the family. Two maintenance probes were conducted in class 2. Valerie scored 10 and 11 on the probes and Charlotte scored 9 and 10 on the probes indicating an ability to maintain the high skill acquisition over time (see Figures 2 and 3).

Students' Use of Science Terms

Only one teacher (Teacher 2) reported student's use of a new term ("skull") outside of a lesson. During observed lessons, students with Teacher 2 also initiated use of newly introduced terms (metal, magnet, dense, liquid, solid, and dissolved). There were no other observations of student initiation of science terms.

Social Validity Results

Following the intervention, a parent survey was sent to the parent/guardian of each student involved in the study that used a 5-point Likert scale (i.e., 5=strongly agree, 1=strongly disagree). Only three of the eight (38%) parents/guardians returned the survey and responses ranged from 4–5 (see Table 4). Although the return rate was low, the survey was not sent out again because the school year ended. Similarly, a validity survey was sent to the teachers involved in the study. The survey contained seven questions which could be answered using a 6-point Likert scale (i.e., 1=I disagree, 6=I agree). Three open ended questions were also included: (1) What was the

most helpful component of the training; (2) Least helpful; and (3) Suggestions for improving/changing training for future studies. All four of the teachers (100%) returned the survey. Scores for each of the seven questions ranged from 5–6. Examples of comments to the open ended questions included: *Learning the task analysis in order to teach all the components of an inquiry lesson was the most helpful; more sample lessons & more time for planning with regular educators.*

The teachers also were sent a feasibility survey. The survey contained seven questions which could be answered using a 5-point Likert scale (i.e., 5=strongly agree, 1=strongly disagree). All four of the teachers (100%) returned the survey and responses ranged from 3 to 5. Examples of additional comments included: *I appreciate being involved in this grant. It has made me more aware of how to teach science that would be most beneficial to my students. The more I conduct inquiry science lesson plans, the more comfortable I feel; Planning for inquiry lessons is time consuming.*

Discussion

The purpose of this investigation was to determine if teachers of students with moderate and severe intellectual disabilities could learn to teach the process of inquiry using a task analysis. A further objective of this study was to determine if training the teachers would increase students' participation in inquiry science lessons. The findings of this study demonstrated a functional relationship between the multi-component teacher training package (videotape, manual, application, role play, in vivo feedback) and teacher's ability to instruct students with moderate and severe intellectual disabilities in the steps of inquiry. The teachers generalized the task analytic instruction across science content areas. All students increased the number of responses to participate in an inquiry lesson and one student used a science term outside the lesson and in another instance students initiated use of the terms in the science lesson. Finally, social validity measures indicated a high degree of teacher satisfaction with the intervention and its intended outcomes. Parent response rate was low, but those who responded were satisfied with the intervention.

Number of Inquiry Skills Completed Independently by the Students during Inquiry Lesson

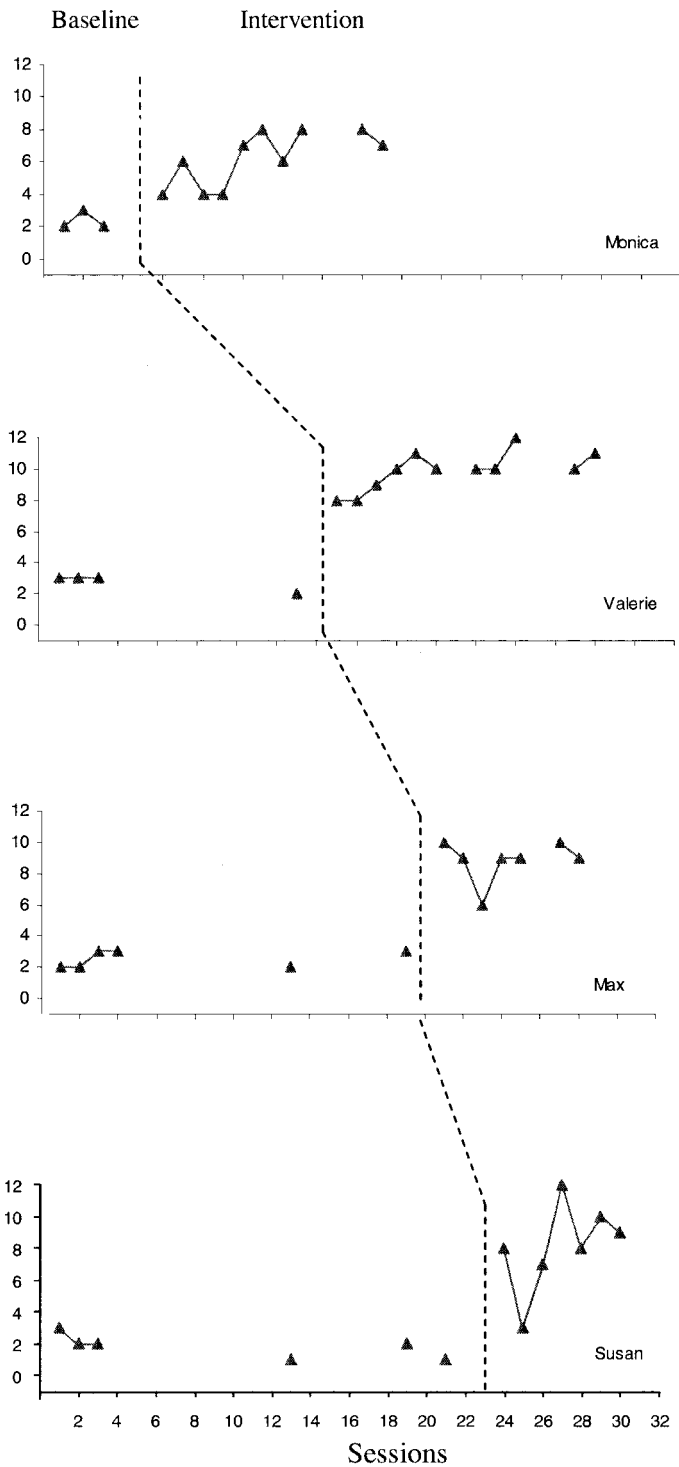


Figure 2. Number of inquiry skills completed independently by the students during inquiry lesson (Students 1, 3, 5, 7).

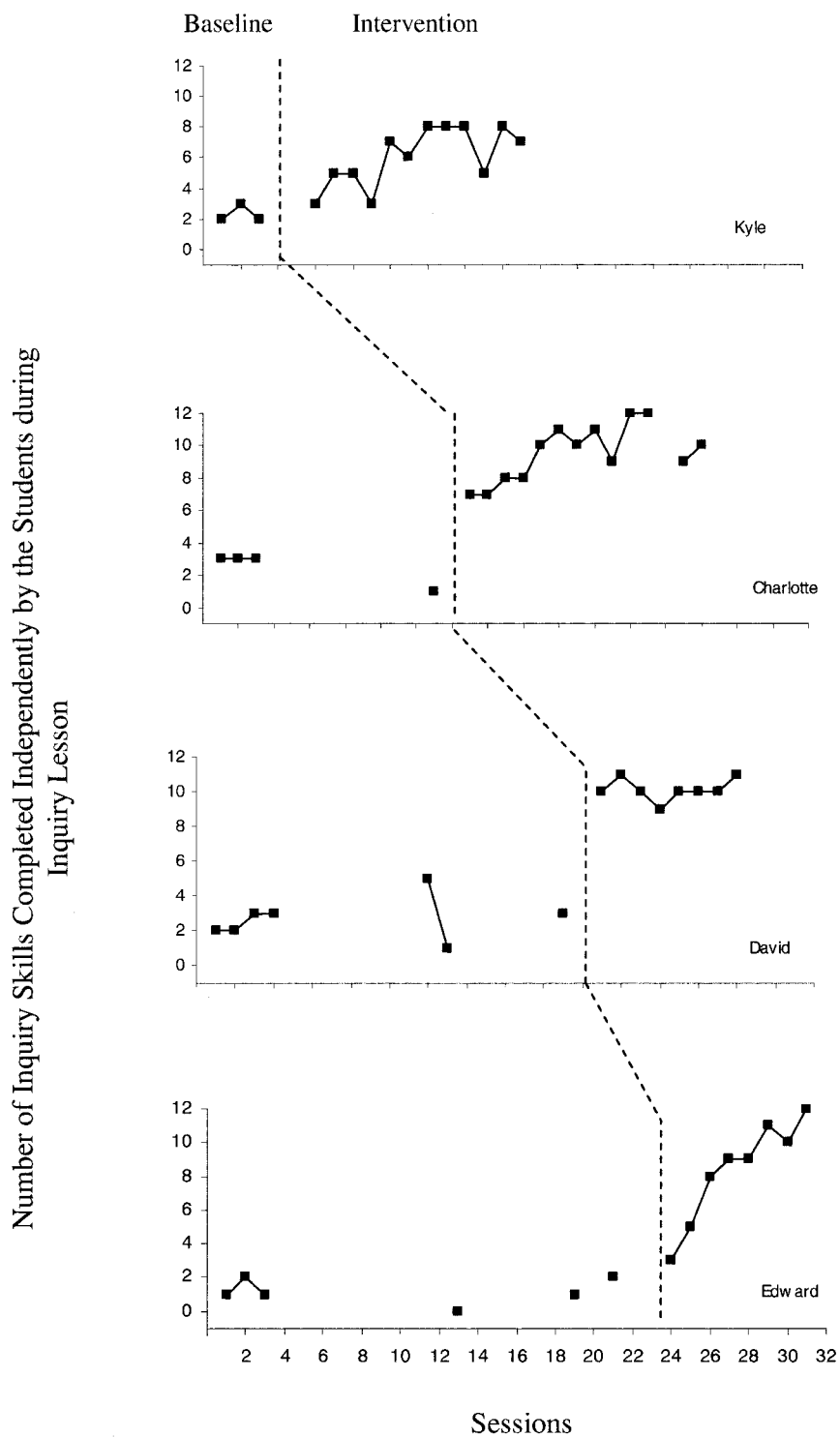


Figure 3. Number of inquiry skills completed independently by the students during inquiry lesson (Students 2, 4, 6, 8).

TABLE 4

Results of Parent Survey

<i>Item</i>	<i>Mean</i>	<i>Range</i>
1. I think it is important for my son/daughter to learn science skills.	4.33	4-5
2. My son/daughter should receive science instruction on a daily basis.	4.00	3-5
3. It is important to me that my son/daughter is instructed in science as recommended by the National Science Education Standards.	4.33	4-5
4. My son/daughter has expressed interest in the science skills he/she is learning.	4.33	4-5

Although an inquiry-based approach to instruction may be new for some teachers, especially those who were trained primarily to work with students with severe disabilities, professional development can be an effective way to build this capacity. In contrast, this professional development may need to be more intensive than the typical group workshop. In the current study, the general training in science and the process of inquiry did not result in teachers using steps of inquiry during baseline. Literature reviews of staff training conducted by Demchak (1987) and Jahr (1998) have found that multi-component training procedures that involve modeling, role play, and feedback are effective. A critical component of the training in the current study may have been the use of a videotape model in which the teachers could see a student with a severe intellectual disabilities using inquiry. It also was important for the teachers to have the opportunity to practice creating an inquiry lesson and role-play its use. The teachers also received in vivo feedback on their application of the inquiry-based task analysis. Other research on staff training has found benefits for giving teachers immediate feedback during classroom instruction (e.g., Demchak, Kontos, & Neisworth, 1992).

Another aspect of the training that may have made it effective for the teachers was that although an inquiry-based approach was new, the use of task analytic instruction was not. Task analytic instruction has been shown to be effective with a wide range of domestic and community living, safety, and academic skills for students with significant intellectual disabilities (e.g., fire safety (Bannerman, Sheldon, & Sherman, 1991), first aid (Spooner et al., 1989), and communicating being lost in the community (Taber, Alberto, Hughes, & Seltzer, 2002)). One of the advantages of training in this “generic” task analysis for inquiry is that teachers gained a template that could be used for a wide variety of science content. In this study, teachers planned and implemented the inquiry-based task analysis in four areas of science (Physical Science, Earth and Space Science, Life Science, and Science and Technology). Previous research focusing on teaching science to students with moderate and severe disabilities was mainly focused in one content standard (Science in Personal and Social Perspectives, Courtade et al., 2007; Spooner, DiBiase, & Courtade-Little, 2006). Giving teachers a generalizable method for instruction provides a tool for accessing the varied content of science. In this study, the students’ acquisition of the inquiry responses reflected generalized responding across different materials. That is, not only did the teachers generalize the inquiry instruction across materials, so did the students.

The limitation of this generic task analysis approach is that that students learned to engage with science materials, but it is unclear whether they learned science concepts per say. As described in the results, only a few of the students began to initiate use of the science terms. For example, McDonnell, Johnson, Polychronis, and Riesen (2002) embedded time delay instruction in the context of a general education setting to teach vocabulary including some science terms. Students might also need to practice generalizing the vocabulary in daily living activities. For example, the students might have noted that they can “conserve” water not letting the water run continuously as they wash their hands or how the rain caused “erosion” on the athletic field.

Because science instruction is a new direction in education for students with severe disabilities, ongoing discussion is needed about the outcomes proposed and achieved. One possible goal would be increased access to the educational opportunity of science content. Students in the current study did not have regularly scheduled science lessons prior to the implementation of this study, but had three lessons per week once intervention began. In the following school year, science instruction became a school system and state requirement for this population to prepare for upcoming NCLB-related assessments. This study provided an early model for how to structure this instruction to build on long standing principles of task analytic instruction. In contrast, one of the three parents who returned the social validation survey was “not sure” about the importance of his/her child receiving science instruction. The need exists to articulate clearer outcomes for science learning for this population beyond simple access.

One such outcome might be for students to acquire the skills involved in an inquiry process. Students in the current study were learning to focus their attention on novel materials, compare and contrast them (“What is the same/different?”), make predictions, and drawn conclusions. The generalization of these skills across a variety of materials was an important outcome. In contrast, what future research and practice should target is the generalization of these skills to non-instructional contexts. For example, could the student be taught to apply these skills in visiting a museum, going on a nature hike, setting up job parts, and so on?

For this to occur, teachers might need additional training in teaching this generalization. In this study, there were some “not sure” responses from the teachers about their confidence in using inquiry. Similarly general educators trained to use inquiry in their classrooms have sometimes expressed a lack of confidence (Keys & Kennedy, 1999; Roehrig & Luft, 2004). Two teachers indicated that the more they conducted the lesson, the more “comfortable/confident” they felt. Similarly, teachers may have needed training, practice,

and possibly a planning template to prepare for teaching students to generalize the inquiry skills across contexts.

Although this study focused primarily on the process of inquiry, the goal of students with moderate and severe intellectual disabilities mastering science concepts may be a topic for future research. One option might be to teach students to recognize science terms as sight vocabulary and then apply this vocabulary to perform an activity. For example, Browder and Minarovic (2000) taught supported employees to recognize job words and use them to follow a job schedule. Students might learn a term like “erosion” and then use a model to demonstrate how this occurs or find an example in a community setting.

Besides access to science curricula, learning inquiry, and mastering science concepts, a fourth goal of science education might be increased opportunity to learn *in* general education science classes. Some studies have shown that students with severe intellectual disabilities and their peers without disabilities can benefit from inclusion in general education settings (Cushing & Kennedy, 1997; Kennedy, Cushing, & Itkonen, 1997; Kennedy & Itkonen, 1994). Future researchers may want to try combining instruction in inquiry with the embedded trials demonstrated by McDonnell et al. (2002) to create an adaptation of the current intervention with utility within general education science classes.

Summary and Recommendations for Future Research

This study was the first to train teachers to use a form of inquiry with students with moderate and severe intellectual disabilities. The task analysis the teachers used was applicable across science content and promoted student responding. One limitation of the current study to address in future replications is that students’ performance was constrained by the teachers’ skill in following the task analysis. There were no baseline data showing how students may have responded to a teacher experienced in inquiry prior to receiving instruction. In contrast, student data showed gradual *vs.* immediate change once intervention began; indicating the change in student

data was not simply an artifact of the teachers offering opportunities. To prevent this limitation, future studies should include a baseline for students conducted by a teacher experienced in inquiry who creates the opportunity for all steps of the task analysis to be performed. Future research may also give more consideration to inquiry as an independent variable.

For example, if students master the steps of inquiry are they able to gain information on a new topic with minimal teacher guidance? Do they generalize communication skills gained during inquiry to other contexts? Future research may also want to consider how to promote student's acquisition of concepts within inquiry. For example, can students learn a concept like chemical reactions and apply it across materials and contexts?

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Description of Communication Breakdown Repair Strategies Produced By Nonverbal Students with Developmental Disabilities

Baris Dincer
Anadolu University

Dilek Erbas
Erciyes University

Abstract: This study describes the communication repair behaviors used by nonverbal students with developmental disabilities in the interactions they were involved in with their teachers during free play activities. All children were students at centers serving student with developmental disabilities at Anadolu University in Turkey. Data were collected by videotaping the students during free play sessions at the centers they attended. The tapes were observed by the researchers, and any communication repair behaviors displayed by the students and communication breakdowns used by their teachers was recorded. The results of this study revealed that repetition, no response, addition, and recast were most frequent communication breakdown strategies displayed by nonverbal students with developmental disabilities, respectively. In addition, results showed that there was a positive correlation between the way teachers expressed communication breakdowns and the communication strategies the students used, which may be interpreted as the more teachers made use of asking for clarification, the more students utilized recast, addition and repetition strategies.

Failing behind their peers in many skill areas, students with developmental disabilities are also poor communicators (Scudder & Tremain, 1992). Being an effective communicator requires a child to fulfill both listener and speaker roles. Students should have ability to respond to listeners' communication attempts. Also, they should be able to recognize that their message is not understood by listeners, and repair accordingly. However it is more difficult for individuals with developmental disabilities to recognize and repair communication breakdown than typically developing individuals (Halle, Brady, & Drasgow, 2004; Scudder & Tremain). Therefore, individuals with developmental disabilities face communication breakdowns more often than other people (Halle et al.; Keen, 2005)

Majority of the research concerning repair

strategies among student with disabilities have examined the frequency and type of strategies used by students with developmental disabilities who have verbal skills (Alexander, Wetherby, & Prizant, 1997; Brinton & Fujiki, 1991; Calculator & Delaney, 1986; Coggins & Soel-Gammon, 1982; Geller, 1998; Paul & Cohen, 1984; Scudder & Tremain, 1992). Analyzing the use of repair strategies by students with developmental disabilities is an important part of the assessment process for understanding their communication system. However, examining the repair strategies used by nonverbal students with disabilities is equally important for our understanding of their communication skills. But, currently little research is available focusing on the repair strategies used by students with disabilities who are nonverbal (Brady, McLean, & Johnston 1995; Keen, 2005; McLean, McLean, Brady, & Etter, 1991).

These studies used different assessment approaches while examining repair strategies; structured approach and naturalistic approach. In structured approach, researchers typically create situations to evoke communication opportunities (e.g., preferred toys within view, but out of reach). When the child

This study was completed by the first author as partial fulfillment of the requirements for a Master of Science degree in the Department of Speech and Language Pathology at Anadolu University. Correspondence concerning this article should be addressed to Dilek Erbas, College of Education, Department of Special Education, Erciyes University, Kayseri, Turkey. Email: dderbas@anadolu.edu.tr

reaches for the item, the researcher purposefully might ignore, ask a question (what do you want), or give an incorrect response (e.g., food instead of the toy requested by child) to create communication breakdown. In naturalistic approach, on the other hand, the researcher observes interactions of student with a social partner during natural routines (e.g., child and mother interaction during free play). Then, s/he evaluates how frequently breakdowns occur, how frequently student attempts to repair, and how often these repair attempts are understood by social partners.

Each approach has both advantages and disadvantages. An advantage of structured approach is that all of the participants receive equal number of opportunities to respond to a communication breakdown; therefore, it is feasible to compare repair strategies across students. Another advantage is that the approach is time efficient because it is possible to sample a great number of behaviors in a very short time. However, we cannot assess frequency of communication breakdowns using this approach. In such case, naturalistic approach would be more appropriate. Another advantage to naturalistic approach may be that student might be able to understand the communicative intent of social partners more easily (e.g. mother and teachers) than they do that of an unfamiliar partner. Similarly, it might be more difficult for social partners to interpret and respond to student's communication behaviors. Therefore, students are more likely to persist in their communication attempts with familiar partners (Halle et al., 2004).

To date, only one study included communication breakdown of students who are nonverbal in natural environment. Keen (2005) examined the communication repair strategies of six non verbal young students with autism. Results of this study showed that participants attempted to repair breakdowns in communication with their mothers using repetitions, augmentations and substitutions. However, authors analyzed the breakdown repair strategies displayed by only six students with autism who were nonverbal during mother child interaction. This study should be replicated and extended to larger number of student as well as other contexts. It is also critical to extend the study to another culture and to a language

other than English. The purpose of this study was to analyze communication repair strategies produced by twenty-six nonverbal students with developmental disabilities while interacting with their teachers during free play. The following questions were addressed:

1. How frequently did students initiate communication, what percentage of initiation resulted in communication breakdown, and what percentage of breakdowns was repaired by the students?
2. What types of repair strategies were produced by the students during interactions with their teachers?
3. Did repair strategies used by students vary according to the type of breakdowns produced by teachers?

Method

Participants

Teacher participants. All teacher participants were female. Four of the five teachers who participated in this study had Bachelor's degrees, and one had a master's degree in special education. Their teaching experiences ranged from two to 12 years. Participants were selected based on two criteria: (a) had non verbal students with disabilities in their classrooms, (b) willing to participate into this study.

Student participants. Participants of the study were twenty-six students with development disabilities. There were 19 boys and 7 girls with a mean age of 6.23 (ranging from 4 to 11). They were recruited in two different units serving students with developmental disabilities located in a university in Turkey (Institute of Research for the Handicapped; and Education, Training, and Research Center for Speech and Language Disorders). Table 1 illustrates student demographic information. As can be seen in Table 1, students' diagnoses included mental retardation, Down syndrome, and autism/mental retardation. In Turkey, because there are no reliable and valid standardized tools available to diagnose students with disabilities and evaluate their cognitive and language abilities, these students typically were evaluated based on informal evaluations by varying professionals (e.g.,

TABLE 1

Students' Description

<i>Subject</i>	<i>Age</i>	<i>Gender</i>	<i>Diagnosis</i>	<i>Primary Communication Form Used by Participant</i>
1	4	Male	Down Syndrome	Gestures (reaching, pulling someone's hand, etc) and vocalizations
2	6	Male	Down Syndrome	Gestures and word approximations.
3	5	Male	Down Syndrome	Gestures (pointing, reaching, giving/ offering, showing an object, etc) and vocalizations
4	8	Female	Down Syndrome	Gestures, two words (e.g. mummy, want) and word approximations.
5	9	Male	Down Syndrome	Gestures and word approximations.
6	4	Male	Down Syndrome	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
7	6	Male	Down Syndrome	Gestures and word approximations.
8	8	Male	Down Syndrome	Gestures, two words (e.g. mummy, go) and word approximations.
9	5	Male	Down Syndrome	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
10	4	Male	Down Syndrome	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
11	4	Male	Down Syndrome	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
12	9	Female	Down Syndrome	Gestures, three words (e.g. mummy, want, go) and word approximations.
13	4	Male	Down Syndrome	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
14	4	Female	Down Syndrome	Gestures and vocalizations
15	6	Female	Down Syndrome	Gestures, one word (e.g. mummy), and word approximations.
16	4	Male	Down Syndrome	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
17	6	Male	Autism	Gestures, one word (e.g. mummy) and word approximations.
18	6	Male	Autism	Gestures, one word (e.g. mummy) and word approximations.
19	4	Male	Autism	Gestures (pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
20	1	Female	Pervasive developmental disabilities	Gestures, two words (e.g. mummy, go) and word approximations.
21	7	Female	Pervasive developmental disabilities	Gestures, two words (e.g. mummy, want) and word approximations.
22	9	Male	Pervasive developmental disabilities	Gestures, three words (mummy, go, want) and word approximations.
23	8	Male	Pervasive developmental disabilities	Gestures, three words (e.g., mummy, dady, want) and word approximations.

TABLE 1 (Continued)

Subject	Age	Gender	Diagnosis	Primary communication form used by participant
24	4	Male	Pervasive developmental disabilities	Gestures pointing, vocalizing, reaching, giving/ offering, showing an object, etc.) and vocalizations
25	10	Female	Pervasive developmental disabilities	Gestures, four words (e.g. mommy, daddy, go, come) and word approximations.
26	7	Male	Pervasive developmental disabilities	Gestures, three (e.g., mummy, go, want) words and word approximations.

M = 6.23

special education teachers, speech and language pathologists). Therefore, the students' current diagnoses may not be accurate. For the same reason, we limited information regarding their cognitive and language abilities.

The students in this study were selected by interviewing speech and language pathologists and special education teachers. The following criteria were used in the selection process: (a) use of non-symbolic forms of communication (e.g., gestures, pointing, etc), and/or vocabulary limited with five words (e.g., mommy, want, go, etc.) and (b) a developmental disability (e.g., Down syndrome, Autism, etc.). In addition, none of the students demonstrated a history of hearing loss, neurological impairments, visual problems, or a physical disability.

All students were able to complete daily living skills such as toileting, dressing, or taking a shower with verbal or physical assistance. They were able to follow one or two steps instructions (e.g., "look", "write", "open your bag, and get your book"). When their names were called by others, they were able to recognize and acknowledge the communication partner. Finally, they were able to identify basic concepts such as primary colors, and shapes. They could turn their head toward the sound when their name was called.

Data Collection

Data were collected in participants' classrooms. Classrooms were similar in size (e.g., 5 to 8 students). The classrooms typically contained six tables and ten chairs, a variety of toys (e.g., balls, dolls, etc.) and educational materials (e.g., drawing books, pens, story

books). Number of student present during the free play varied and it ranged from one child to six students.

Each student was video-taped for a 60-minute-period during free play activities that were held in the classrooms. The first ten minutes of the observation were excluded from analysis to minimize the effect of observer and camera in the classroom. From remaining 50 minutes, 30-minute segments were randomly selected. The samples were obtained in the presence of background noise; so, the sample would be more typical of those occurring during everyday communication breakdowns and repair strategy use. Moreover, neither students nor teachers were informed about which recording would be analyzed; and since they were not informed, the video samples were as natural as they could be. The context of the interaction was determined by the teacher in a way that would lead to optimal communicative interaction among student.

Data Coding

Video tapes were analyzed, and interactions between students and teachers were coded for communication breakdowns used by their teachers and type of repair behaviors used by the students. The first and second author discussed potential categories and their definitions based on prior research.

Definition of initial communication behavior was adapted from Golinkoff (1986) and Keen (2005). An initial communication behavior is defined as the child's behavior that (a) was a gesture or vocalization; (b) was directed toward a teacher to interact; and (c)

served a communicative function. In this study, communication breakdowns were classified in the following ways. They were adapted from Brady & Halle (2002), and Halle et al., (2004).

Requesting clarification. Requesting clarification means that the teacher indicates that the message uttered by the student is not understandable and asks for clarification. For example, the student points the toy car, and the teacher says “What do you mean?”, “What do you want?”, or “I don’t understand”; or following the communicative behavior of the student, the teacher raises his/her eyebrows, narrows his/her eyes, and shakes his/her head once laterally, or projects his/her arms with his/her palms facing up and jerks his/her shoulders.

Non-acknowledgements. The teacher gives no verbal or nonverbal acknowledgement to the participant’s attempts to communicate. For instance, during an activity which focuses on animal sounds, one of the students’ points to the kitchen set nearby, but the teacher does not response and continues the activity as if the student did not do anything.

Topic shift. Following the communicative behaviors of the student, the teacher directs the student’s attention from what s/he is engaged to a different topic or thing. For example, while the teacher and the student are painting a picture, the student points to a toy, and the teacher says “Now, we are painting our picture, and we should paint these parts as well”. Another example is that; during a matching activity which requires finding identical pairs of some shapes, the student begins playing with one of the pieces as if it was a car, and the teacher says “Now, let’s collect the pairs that are the same”.

Coding definitions of repair categories were adapted from Brady and Halle (2002), Halle et al. (2004). Repair behaviors were classified in following four ways.

No response. No response is defined as discontinuance of communication initiated by the student. In other words, the student gives up his communication goal and or ignores the teacher’s communication signals. For example, the student points the ball, teacher does not response, and the student discontinues communication.

Repetition. When a student exactly repeats what s/he did or said in the previous communicative behaviors, repetition is recorded. For example, the student asks for the ball from the teacher by only pointing to it; then, s/he repeats the exact behavior without any additions or reductions.

Recast. Recast is changing the form of the previous communicative behaviors while keeping the content of the message exactly the same. For instance, the teacher asks “Where did daddy go?” by showing a picture to the student, and the student replies “/E:/” (trying to say “/EVE/”). But, the teacher repeats the same question, and the student, this time, only points to the ‘house’ figure in the picture that the teacher is holding, and says nothing.

Addition. Addition means that the student adds either vocal or gestural elements to his/her previous message, and in the meantime, also exactly repeats whatever s/he did or said in the preceding message. For instance, the student asks for the ball by only pointing to it (with his/her index finger); and after the response by the teacher, s/he both yells and points the ball.

Interobserver Reliability

Videotapes of seven students (25% of the students) were randomly selected to be coded by an independent observer to assess scoring reliability. Interobserver reliability was evaluated for each of the student’s communication repair behaviors (no response, repetition, recast, and addition or reduction), and teachers’ communication breakdowns (requesting clarification non-acknowledgements, topic shift). Interobserver reliability was calculated on a point by point basis by dividing number of agreements by the total number of agreements and disagreements, which was subsequently multiplied by 100. An agreement occurred when both observers assigned the same code to the repair strategy. A disagreement occurred when different codes were assigned by the two observers. In other words, if one observer recorded a repair strategy as occurring, and the other did not, a disagreement was scored. The percentages of interobserver reliability for *repetition, recast, addition, and no response, requesting clarification, non-acknowledge-*

TABLE 2

Student Data for Initiations, Communication Breakdowns Encountered, Repairs of Communication Breakdowns, and No Response (Discontinue Communication)

Subject	Number of Communication Initiations	Number and Percentage of Communication Breakdowns Encountered	Total Use of Repair Strategies	Percentage of Repaired Initiations	No Response (Discontinue Communication)
1	17	14 (82%)	7	50%	7
2	16	13 (81%)	7	54%	6
3	29	27 (93%)	22	81%	5
4	15	11 (73%)	6	54%	5
5	14	13 (93%)	9	69%	4
6	15	13 (87%)	5	38%	8
7	11	10 (91%)	9	90%	1
8	14	8 (57%)	6	46%	7
9	13	9 (69%)	4	44%	5
10	10	8 (80%)	5	55%	4
11	10	6 (60%)	7	70%	3
12	16	9 (56%)	3	33%	6
13	12	9 (72%)	6	66%	3
14	15	13 (87%)	8	100%	0
15	13	9 (69%)	10	100%	0
16	11	9 (69%)	5	63%	3
17	12	10 (83%)	3	75%	4
18	9	9 (100%)	6	86%	1
19	9	9 (100%)	1	20%	4
20	11	8 (73%)	7	88%	1
21	10	10 (100%)	5	63%	3
22	13	8 (62%)	7	78%	2
23	9	7 (78%)	7	88%	1
24	7	7 (100%)	3	50%	3
25	13	5 (38%)	7	78%	2
26	14	8 (57%)	6	67%	3
M =	13	10.07	3.5	65.57%	6.57
SD =	4.14		3.75		

ments, topic shift were 93%, 95.50%, 92%, 90.50%, 91.25%, 93.75%, and 92% respectively.

Data Analysis

Data obtained from interactions between teacher and student participants were loaded into a data file for analysis using SPSS-Windows, ver. 13.0 by the second author, a graduate student in Speech and Language Pathology. Data analyses were conducted by using both descriptive and inferential statistics. To describe teacher participants' communication breakdowns and student participants' repair

behaviors, percentage, frequency distribution, and measures of central tendency were calculated. In addition, inferential statistical analyses and one-way analysis of variance (ANOVA) were computed based on research questions of interests.

Results

This study describes the repair strategies used by non-verbal students with developmental disabilities for the communication breakdowns occurring in the interaction with their teachers during free play activities.

Descriptive Analysis

The first research question focused on determining how frequently students initiated communication, what percentage of initiation resulted in communication breakdowns and what percentage of breakdowns were repaired by the student participants.

Table 2 displays individual student participant's data for frequency of communication initiations, frequency and percentage of communication breakdowns encountered by teacher participants, total use of repair strategies, percentage of initiations repaired by using one of the strategies described earlier, and no response by students. A total of 338 communication behaviors were initiated by the students during free play with their teachers. All students initiated at least seven communication behaviors. Mean of communication breakdowns encountered by all students was 10.07 (range 5–27). All students utilized at least one communication repair strategy in response to the communication breakdowns displayed by their teachers.

Table 3 displays the percentages and frequencies of no response, repetition, recast and addition; which are types of repair strategies utilized by the students for the communication breakdowns during free play activities.

As Table 3 clearly depicts, non-verbal students with developmental disabilities used repetition the most (60.23%) and recast the least (8.71%) for communication breakdowns occurring during their interaction with their teachers in the classroom.

Inferential Statistical Analyses

Correlation was used to find out if there was a relation between the repair strategies applied by the students and the behaviors displayed by teachers to indicate communication breakdown.

Table 4 shows that there are moderate positive relations between requesting clarification by teachers and recasting by students ($r = .629, p < .01$), between again requesting clarification by teachers and addition by students ($r = .645, p < .01$), and finally once again requesting clarification by teachers and repetition by students ($r = .620, p < .01$). The results also demonstrate that there

TABLE 3
Students Data for the Frequency and Percentage of Repair Behavior

Subject	Communication Breakdown Repair Behaviors			Total Use of Repair Behaviors
	Repetition	Recast	Addition	
1	5	0	2	7
2	5	0	2	7
3	8	6	8	22
4	4	0	2	6
5	4	0	5	9
6	3	1	1	5
7	5	1	3	9
8	4	0	2	6
9	3	1	0	4
10	3	0	2	5
11	5	1	1	7
12	2	0	1	3
13	4	1	1	6
14	5	0	3	8
15	5	1	4	10
16	3	0	2	5
17	2	0	1	3
18	4	0	2	6
19	0	0	1	1
20	4	0	3	7
21	4	1	0	5
22	5	0	2	7
23	6	0	1	7
24	2	1	0	3
25	4	1	2	7
26	4	0	2	6
M =	3.96	0.57	2.03	6.57
SD =	1.53	1.20	1.68	3.75
Frequency	103	15	53	171
Percentage	60.23%	8.71%	30.79%	100%

is one more moderate positive relation between no indication of communication breakdown by teachers and no response ($r = .576, p < .01$) and repetition ($r = .420, p < .05$) by students. Another result of the analysis points again a moderate positive relation between topic shift by teachers and both recast ($r = .538, p < .01$) and addition ($r = .636, p < .01$) by students. No relation was established between the ignoring behavior of teachers and any of the repair strategies.

TABLE 4

Correlation Between Behaviors of Teachers and Students

<i>Teacher Behaviors</i>	<i>Student Behaviors</i>			
	<i>No Response</i>	<i>Repetition</i>	<i>Recast</i>	<i>Addition</i>
Requesting Clarification		.620**	.629**	.645**
No indication of Communication Breakdown	.576**	.420*		
Topic Shift			.538**	.636**
Ignoring				

* $p < .05$, ** $p < .01$

Discussion

This study describes the repair behaviors used by nonverbal students with developmental disabilities for the communication breakdowns occurring in their interaction with their teachers during free play activities.

The percentage of repaired initiations ranged from 20% to 100% with a mean of 65.57%. This is consistent with earlier research demonstrating that students with developmental disabilities have the ability to repair communication in response to their teachers' communication breakdowns (Brady et al., 1995; Keen, 2005).

Another finding consistent with earlier studies is that nonverbal students with developmental disabilities use repetition the most and recast the least as communication breakdown strategies (Alexander et al., 1997; Calculator & Delaney, 1986; Golinkoff, 1986). However, Brady et al. (1995) reported more recasts than repetitions in their sample of nonverbal students with developmental disabilities; which indicates a difference between their findings and those of this study. That the students do not have a variety of communication behaviors in their inventories may be a reason for repetition to be the mostly-utilized strategy instead of recast.

The students cannot judge if their message is understood by their teachers or not, and this may account for the higher frequency of repetition and no response over other strategies. It is widely known that individuals with developmental delays suffer from inadequacies of speech and language skills (Scudder & Tremain, 1992). Constrained by speech and language problems, these individuals face dif-

ficulties in conveying, assessing, and repairing their messages (Scudder & Tremain).

In terms of the relationships between communication repair strategies used by the students and the behaviors displayed by their teachers to indicate communication breakdowns, several moderate positive relations were observed. For example, moderate positive relations between requesting clarification by teachers and recasting by the students and between again requesting clarification by the teachers and addition by students, and finally once again between requesting clarification by the teachers and repetition by the students were found. From this, it is possible to conclude that the use of recast, addition, and repetition increases as the teachers require clarification from their students.

Moderate positive relation between no indication of communication breakdown by the teachers and no response and repetition by the students were also observed. So, it will not be naive to state that no indication of communication breakdown increases the use of both no response and repetition.

As the teachers displayed topic shift, the students used both recast and addition. This leads to the interpretation that topic shift by the teachers may cause frequent use of recast and addition strategies by the students. Furthermore, no relation was established between the ignoring behavior of teachers and any of the repair strategies. The overall interpretation of the correlation analysis might set forth that the teachers working with nonverbal students who are developmentally disabled should always indicate that the message is not understood and there is a communication

breakdown whenever it is the case. Hence, the students may use one of the repair strategies in his/her inventory to make his/her message clearer.

Although findings of the study are very encouraging, still there exist some limitations. The limitation of the study is that all the data were collected during free play; teachers employed a wide range of free play activities. For example, in one activity, a student just draws something at a desk, and another student looks at the pictures in a book with his/her teacher. Considering the density of interaction between the student and the teacher, we can say that there was little communicative interaction during the drawing activity. On the contrary, the student looking at a book with his/her teacher was given many more opportunities to communicate.

Another limitation was the lack of student descriptions. In other words, individuals who are nonverbal may differ markedly one from another; so, it is critical to account for this variability. Therefore, the students with disabilities were described in as much in detail as possible to make it clear to readers that the students were chosen based on their teachers' and speech and language pathologists' observations. However, we did not provide results of standardized language and cognitive tests; because, there are no standardized language and cognitive tests in Turkey.

In summary, the present results contributed to the literature in two ways. First, communication breakdowns and repairs were measured during real communication exchanged at school. Previous research focused on student responses to scripted communication breakdowns. Secondly, the study extends research to nonverbal students with developmental disabilities living in a different culture and learning a language other than English. Also, there are two implications, which should be helpful to teachers and parents. First, results provide information about effectiveness of different listener feedbacks or breakdowns to evoke participant's repair behaviors. If people in the students' environment are aware of them and use them, they will not fail to display repair behaviors. Therefore, they would successfully engage in communicative interactions. Second, parents and teachers should also remember that students with disabilities might not

possess the skills to respond appropriately to the listener feedback in a communication situation, which is not motivating for the student. In planning intervention programs for communication problems, the teacher should prepare various motivating situations to evoke and encourage students' communication and repair behaviors.

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Enabling a Prelinguistic Communicator with Autism to Use Picture Card as a Strategy for Repairing Listener Misunderstandings: A Case Study

Yoshihisa Ohtake
University of Okayama

Michael Wehmeyer
University of Kansas

Naomi Uchida
The Special School Affiliated with the Faculty of Education
Akitaka Nakaya and Masafumi Yanagihara
University of Okayama

Abstract: The purpose of this case study was to examine the effects of a time-delay prompting procedure on the acquisition of skills for repairing multiple listener misunderstandings. A prelinguistic student with autism was taught to use picture cards as a strategy to repair listener misunderstandings in a setting where the student had to ask the listener to pick up a pen to paint a TV logo that was one of his preoccupations. The listener intentionally provided the student a pen with non-preferred attributions (brand, color, or size) to provide the student opportunities to repair the communication breakdown. The type and number of attributions misunderstood by the listener in a communication episode changed as the student met the predetermined criterion. Results of a changing-criterion design demonstrated that the intervention was effective in enabling the student to use picture cards in a way that took into consideration which attributions the listener misunderstood.

Individuals with autism who exclusively rely on prelinguistic communication modes (i.e., vocalization and gesture) face frequent communication breakdowns due to the ambiguity in nature in sending a message (Brady & Halle, 2002; Halle, Brady, & Drasgow, 2004; Keen, 2005). When prelinguistic communicators with autism face communication breakdowns, the occasion calls for repair (Wetherby, Alexander, & Prizant, 1998). Communication repair is referred to as a perseverative communication act that is emitted when the communication initiation is not followed by the desired outcome within a reasonable amount of time (Halle et al.). If they repair communication breakdown by repeating the original communication forms or modifying them in ways that promote listener's under-

standings in socially acceptable manner, the probability of obtaining the desired outcome increases, which in turn may contribute to enhancing their self-determination (Brown, Gothelf, Guess, & Lehr, 1998; Wehmeyer, Aggan, & Hughes, 1998).

Recent studies (Keen, 2005; Meadan, Halle, Watkins, & Chadsey, 2006; Ohtake et al., 2005) have revealed that prelinguistic communicators with autism can repair a variety of communication breakdowns when (a) the requesting behaviors were not attended to, (b) the respondent asked for clarification vocally or gesturally, or (c) the communication breakdown was followed by a wrong response by the listener. In addition, it was found that prelinguistic communicators with autism used various types of repair strategies, including repeating the first communication forms, adding new forms, recasting the original forms and using new forms instead, and reducing the part of the original forms.

Furthermore, when they modified their communication forms in response to a com-

Correspondence concerning this article should be addressed to Yoshihisa Ohtake, University of Okayama University, 3-1-1 Tushima-naka, Okayama-Shi, Okayama 700-8530, JAPAN. Email: ohtake@cc.okayama-u.ac.jp

munication breakdown, prelinguistic communicators with autism were able to do so in a way that added information that was not part of the original communication initiation (Ohtake et al., 2005). To illustrate, suppose that an individual with autism exhibited an open-palm gesture that led to a communication initiation. Faced with the communication breakdown, as communication repair, she then grabbed the listener's hand and led the listener to the item she wanted. The first communication form sends a message that the individual wants something but does not send a message about what she wants. In contrast, the second communication form (i.e., communication repair) sends a specific message about what the individual wants.

Research has also revealed that prelinguistic communicators with autism are likely to choose more rudimental communication forms (e.g., direct touch to the listener) or increase the intensity of the original communication forms (e.g., banging objects or screaming) when they attempt to repair communication breakdowns (Keen, 2005; Meadan et al., 2006; Ohtake et al., 2005; Sigafoos, Drasgow et al., 2004). Without being taught alternative communication forms, these communicators could continue to resort to more rudimental and intensified forms, which occasionally would lead to challenging behaviors (Keen, 2003). On the other hand, if we systematically teach them in ways that replace the rudimental and intensified forms of communication repair with functionally equivalent but more symbolic forms (e.g., manual sign, picture cards, voice output communication system: hereafter referred to as VOCA), it is possible for them to use the alternative forms as a repair strategy (Halle et al., 2004).

Numerous studies have investigated the effectiveness of teaching picture cards, VOCA, or sign language as an initiation strategy for prelinguistic communicators with autism (Brady, 2000; Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002; Frea, Arnold, & Vitimberga, 2001; Ganz & Simpson, 2004; Richman, Wacker, & Winborn, 2001; Sigafoos, O'Reilly, Seely-York, & Edrisinha, 2004; Son, Sigafoos, O'Reilly, & Lancioni, 2006; Tincani, 2004). However, few studies have explored effective strategies for teaching communication repair to prelinguistic communicators

with autism. The exception is Sigafoos, Drasgow et al. (2004) that attempted to teach VOCA use as a repair strategy for two prelinguistic students with autism. They taught the repair skills in a setting where highly preferred food was shown outside the student's reach. Using a time-delay procedure, the researchers attempted to enable the students to use VOCA within 10 s when the listener did not attend to the communication initiation (e.g., pointing, reaching, touching bowl). Both students acquired the use of VOCA as a repair strategy in a condition where they wanted their preferred food.

Thus, Sigafoos, Drasgow et al. (2004) demonstrated that it is possible to teach students with autism to use VOCA when they meet a communication breakdown in which their first prelinguistic forms of request were not attended to by the listener. However, it is unknown if a systematic prompting procedure in highly motivating request contexts enables prelinguistic communicators with autism to repair other types of communication breakdowns (e.g., misunderstanding, spoken or gestural request for clarification). Additionally, it is unclear if the same intervention strategy enables prelinguistic communicators with autism to repair multiple breakdowns (e.g., two or more consecutive breakdowns).

Communication breakdowns in instances where the listener misunderstands what the individual wants and, therefore, provides a wrong item are likely to encourage prelinguistic communicators with autism to use communication repairs that specify what exactly they want. Such situations can be excellent teachable moments at which prelinguistic communicators with autism could efficiently acquire alternative forms (e.g., picture cards) as a repair strategy that are functionally equivalent to but more effective at specifying what they want than the rudiment forms they typically use (Horner & Day, 1991; Keen, Sigafoos, & Woodyatt, 2001).

The purpose of this study was to extend Sigafoos, Drasgow et al.'s research (2004) by investigating the effects of using a systematic prompting procedure in a highly motivating request context on enabling a prelinguistic communicator with autism to touch the picture card that corresponds to a misunder-

stood attribution when two consecutive misunderstandings occur.

Method

Participant

The study participant was Takao, a 12-year-old boy who was diagnosed with autism by a neuropsychiatrist according to the DSM-IV (APA, 1994). The child's hearing, vision, and motor development were within the normal range. According to the Kyoto Scale of Psychological Development (Ikusawa, Matsushita, & Nakase, 2002), his overall development was equivalent to 2:3. He could follow one-step spoken directions used in the routine. When he wanted something, he exclusively relied on prelinguistic communication modes, including vocalization, open palms, reaching, or pointing. When a written word was shown to him, he did not emit the correct corresponding sounds. However, the vocalization synchronized with pointing to each syllable. Further, he was able to write a few words, but did not use letters in functional ways.

At the beginning of the study, Takao had never been taught to use picture cards as a mode of requesting behavior. According to the repair assessment, which followed procedures proposed by Ohtake et al. (2005), in free-play situations, Takao exhibited persistent requests when he faced with any types of communication breakdowns (i.e., asking for clarification vocally or gesturally, not attending and not responding, misunderstandings) in all breakdown opportunities across play activities (e.g., trampoline, swing, bike riding). In addition, he frequently used communication forms that specified what he wanted (e.g., pointing to, reaching for, or leading listener's hand toward the object) in response to the listener's misunderstandings. For example, in situation where his teacher presented a shovel and said "You want to play shovel?" in response to his open palm used for requesting "pushing swing," Takao threw the shovel and led his teacher's hand toward the chain of the swing.

Settings and Materials

Takao attended a special school affiliated with a university, where he was educated with two

other students with autism in a self-contained classroom led by two teachers. All sessions were conducted at a table using a one-to-one format during a highly structured teaching period when communication skills were targeted. The room was divided into three spaces by partitions and lockers. Each of the spaces (2×3 m) was assigned to a different activity to help Takao predict what activity he was assigned to do. During the sessions, only Takao and his teacher were in the room.

At each session, Takao and the teacher sat at a desk. A few plates of pens were placed horizontally on a table in view of the student, but out of reach (i.e., approximately 2 m in front of him). The distance between each plate was approximately 30 cm. Picture cards (6×7 cm) were placed within easy reach (20–30 cm), at a distance of approximately 1 cm between each. The pens used in this study consisted of five brands (TOMBO™, MITSUBISHI™, UNI™, ZEBRA™, SAKURA™), four colors (red, black, blue, green), and two sizes (thick and thin).

Before starting the session, the teacher provided Takao an opportunity to access the table where the pens were placed to let him know what pens were available. Then the teacher invited him to sit at a desk where an A6 size of paper (10×15 cm) and picture cards were placed and waited for his communication initiation.

Assessment for Preoccupied Attributions

In a one-hour interview with his special education teacher, Takao demonstrated a strong interest in painting the logo of a specific TV program ("Comedy Focus"). When he painted the logo, he persistently pointed to or reached for a pen of a specific brand (TOMBO or MITSUBISHI), a specific size (thin), and a specific combination of color (red and black). During all trials conducted in the study, we double-checked to see if he (a) accepted when a pen with these preferred attributions was provided and (b) rejected when a pen without these preferred attributions was provided. All of Takao's accepting and rejecting behaviors were consistent with the information on preoccupied attributions collected from the interview.

During the first baseline condition, Takao

demonstrated a specific pattern in coloring. For example, if red and black pens were available among several colors, he first asked his teacher to pick up a black pen to draw the outline of the logo. He then picked up a red pen to paint the inside of the outline for a while. He repeated the pattern of alternating the use of black and red pens whenever he drew the logo. This pattern informed the teacher which color Takao wanted in a given turn.

Session Schedule and Data Collection

Data were collected during approximately 15-minute sessions twice a week during the regular class periods. Within each session, Takao requested his preferred pens in terms of brand name, color, and size, 8 to 10 times, to paint the logo in his favorite ways. Two types of opportunities, Standard Opportunities and Repair Probes (Sigafoos et al., 2004; described in detail below), occurred within the request opportunities. All sessions were videotaped and the videotaped communication behaviors were later analyzed to record the presence or absence of the target behaviors on an episode-by-episode basis. The video camera was inconspicuously placed on a tripod approximately 2 m from the table where the student and teacher were seated. The student never noticed the camera.

Response Definitions

Three topographies were recorded; that is, Behavior Indication, Picture Use, and Combined Use. Behavior Indication was recorded if Takao attempted to obtain a pen by reaching for or pointing to the pen, moving toward the pen, or pushing out a non-preferred pen. Picture Use was recorded if Takao touched the picture card that corresponded to his preferred attribution. Finally, Combined Use was recorded if Takao simultaneously used both Behavior Indication and Picture Use in response to a communication breakdown.

These responses were further classified depending on whether each occurred as the Initiation, as the First Repair, or as the Second Repair. An Initiation was defined as the first communication behavior used to initiate a request when he needed a pen to draw his fa-

vorite TV logo. A First Repair was the communication behavior used to request his preferred pen when the first misunderstanding occurred (i.e., a non-preferred pen was presented). A Second Repair represented the communication behavior used to request his preferred pen when the second misunderstanding occurred.

On Standard Opportunities, all initiations were immediately reinforced by providing a preferred pen. On Repair Probes, all initiations were immediately followed by presenting a non-preferred pen to provide one or two opportunities to use a picture card as a repair strategy (see *Conditions*). A Correct Repair was recorded only when Picture Use or Combined Use occurred in all repair turns during a Repair Probe. Takao were allowed 5 s to make a correct repair (i.e., touching the picture card that corresponded to a misunderstood attribute). If he touched any card depicting non-preferred attributions even once, the response was classified as incorrect.

Conditions

Two conditions (One Attribute Repair and Two Attribute Repair) were set up, each consisting of three phases, to enable Takao to repair multiple misunderstandings. Followings are detailed descriptions of each phase.

One Attribute Repair

In the first condition, Takao was required to repair one communication breakdown in which one attribution of a pen was misunderstood by the listener. This condition consisted of three phases, Brand, Color, and Size.

Brand. In this phase, the attribution misunderstood by the listener was brand name. Three plates of pens were placed horizontally on the table behind the teacher. The three plates consisted of one preferred brand (i.e., TOMBO) and two non-preferred brands (i.e., SAKURA and ZEBRA). Each plate included four different colors of pens, two of which were preferred colors (i.e., black and red) and the remaining two non-preferred colors (i.e., blue and green). The size of the pens was the preferred attribution (i.e., thin). Three picture cards, each of which depicted TOMBO, SAKURA, or ZEBRA, were placed

within easy reach. The instructional goal in the Brand phase was defined as follows:

When the communication initiation is misinterpreted and a plate of pens of a non-preferred brand (i.e., SAKURA or ZEBRA) is presented, Takao will touch the picture card symbolizing the preferred brand (i.e., TOMBO) within 5 s with 80% accuracy for three consecutive blocks.

In this study one block consisted of 5 Repair Probes.

Color. In this phase, the attribution misunderstood by the listener was color. Four TOMBO pens (preferred brand) were placed horizontally on the table behind the teacher. The colors were two preferred (i.e., red and black) and two non-preferred (i.e., blue and green). The size of the all pens was the preferred attribution (i.e., thin). Four picture cards, each of which depicted one of the colors of the pens, were placed within easy reach. The instructional goal in the Color phase was defined as follows:

When the communication initiation is misinterpreted by the listener and a pen of a non-preferred color (i.e., blue or green) is presented, Takao will touch the picture card depicting a preferred color (i.e., black or red) within 5 s with 80% accuracy for three consecutive blocks.

Size. In this phase, the attribution misunderstood by the listener was size. Two plates of TOMBO pens were placed horizontally on the table behind the teacher. One of the plates included thin pens and the other thick pens. Each case included four pens, two preferred (i.e., red and black) and two non-preferred (i.e., blue and green) colors. Two picture cards, depicting a symbol of thin or a symbol of thick, were placed within easy reach. The instructional goal in the Size phase was defined as follows:

When the communication initiation is misinterpreted and thick pens are presented, Takao will touch the picture card depicting a symbol of thin within 5 s with 80% accuracy for three consecutive blocks.

The order of the phases was determined by the teacher based on her intuition of the

Takao's degree of preoccupation with the attribution. The teacher perceived that brand name was the attribution that preoccupied Takao the most, followed by color and size in order. Therefore, these three phases were taught sequentially, starting with Brand, followed by Color and then Size. We included one or two non-preferred attribution cards as distractors from the first phase within the same attribution because Takao's ability to discriminate different shapes, colors, and logos was considered excellent by his special education teacher. In the Size phase, only one non-preferred attribution (thick) card was used as a distractor because no brand of pens included more than two dimensions of size (i.e., thin or thick).

Two Attribute Repair

The second condition required Takao to repair two consecutive communication breakdowns in which two attributions of a pen were misunderstood by the listener. This condition also consisted of three phases (i.e., Brand-Color, Color-Size, and Size-Brand), as described below.

Brand-Color. In this phase, attributions misunderstood by the listener were brand and color. Four plates of pens were placed on the table behind the teacher. The four plates consisted of two black pens (preferred color), two red pens (preferred color), two blue pens (non-preferred color), and two green pens (non-preferred color), respectively. Two pens on each plate consisted of a preferred brand (MITSUBISHI) and a non-preferred brand (UNI or ZEBRA). All pens on the four plates were the preferred size (i.e., thin). Three picture cards, each depicting MITSUBISHI, UNI, or ZEBRA, and four picture cards, each depicting red, black, blue, or green, were placed within easy reach. The instructional goal in the Brand-Color phase was defined as follows:

When the communication initiation is misinterpreted and a thin pen of a non-preferred brand (e.g., UNI) and a non-preferred color (e.g., blue) is presented, Takao will touch the picture card depicting the preferred brand (i.e., MITSUBISHI) or preferred color (i.e., red or black) within 5 s. In addition, when the first communication re-

pair is misinterpreted and a thin pen of a non-preferred brand (e.g., UNI) or non-preferred color (e.g., blue) is presented, Takao will touch the picture card depicting the preferred color or preferred brand, depending on the attribution that the listener misunderstood in the second breakdown, within 5 s with 80% accuracy for two consecutive blocks.

Color-Size. In this phase, the attributions misunderstood by the listener were color and size. Four plates of pens were placed on the table behind the teacher. The four plates contained two black pens, two red pens, two blue pens, and two green pens, respectively. The two pens on each plate were of a preferred size (i.e., thin) and a non-preferred size (thick). All pens on the four plates were a preferred brand (i.e., MITSUBISHI). Two picture cards, each symbolizing thin or thick, and four picture cards, each colored red, black, blue, or green, were placed within easy reach. The instructional objective in the Color-Size phase was defined as follows:

When the communication initiation is misinterpreted and a pen of a preferred brand (e.g., MITSUBISHI), non-preferred color (e.g., blue), and non-preferred size (e.g., thick) is presented, Takao will touch a picture card depicting the preferred color (i.e., black or red) or preferred size (i.e., thin) within 5 s. In addition, when the first communication repair is misinterpreted and a pen of a non-preferred color (e.g., green) or non-preferred size (e.g., thick) is presented, Takao will touch a picture card depicting the preferred color or preferred size, depending on the attribution that the communication partner misunderstood in the second breakdown, within 5 s with 80% accuracy for two consecutive blocks.

Size-Brand. In this phase, the attributions misunderstood by the listener were brand and size. Four plates of pens were placed on the table behind the teacher. Each plate included four pens of two preferred colors (i.e., red and black) and two non-preferred colors (i.e., blue and green). Two of the four plates consisted of pens of a preferred brand (i.e., MITSUBISHI). Of these two plates, one consisted of four thick pens and the other of four thin

pens. The remaining two plates consisted of pens with a non-preferred brand (i.e., UNI or ZEBRA). Of the latter two plates, one consisted of four thick pens and the other of four thin pens. Two picture cards, each symbolizing thin or thick, and three picture cards, each symbolizing MITSUBISHI, ZEBRA, or UNI, were placed within easy reach. The instructional objective in the Size-Brand phase was defined as follows:

When the communication initiation is misinterpreted and a plate of pens of a non-preferred brand (e.g., UNI) and non-preferred size (e.g., thick) is presented, Takao will touch a picture card depicting the preferred brand (i.e., MITSUBISHI) or preferred size (i.e., thin) within 5 s. In addition, when the first communication repair is misinterpreted and a plate of pens of a non-preferred brand (e.g., UNI) or non-preferred size (e.g., thick) is presented, Takao will touch a picture card depicting preferred brand or preferred size, depending on the attribution that the listener misunderstood in the second breakdown, within 5 s with 80% accuracy for two consecutive blocks.

Following the first repair responses made by Takao, the teacher provided the second type of misunderstanding in which a pen with one non-preferred attribution and two preferred attributions was presented (e.g., a pen of a non-preferred size, a preferred brand, and a preferred color). Which non-preferred attribution was presented depended on Takao's first repair response. For example, if he touched a picture card depicting black (non-preferred color) within 5 s after a green (non-preferred color), thick (non-preferred size), and MITSUBISHI pen (preferred brand) was presented in the first breakdown, the teacher presented a MITSUBISHI (preferred size), black (preferred color), and thick (non-preferred size) pen in the second breakdown. If Takao touched a picture card depicting black (preferred color) and then a picture depicting thin (preferred size) within 5 s after a MITSUBISHI (preferred brand), thick (non-preferred size), and green (non-preferred color) pen was presented, the teacher honored the one he touched longer (e.g., thin)

and provided Takao a pen with thin (the honored attribution), MITSUBISHI (preferred brand), and green (non-preferred color). Reducing the number of wrong attributions one by one as Takao exhibited a repair attempt in Two Attribute Repair was viewed as analogous to a gradual understanding by the listener on the basis of a piece of information provided by Takao, which typically occur in their daily interactions.

Procedure

Baseline. During baseline, Standard Opportunities and Repair Probes were presented with a 1-to-1 ratio. On Standard Opportunities, when a communication initiation occurred, the teacher immediately exhibited acknowledgment (e.g., nodding or saying OK), moved to the table to pick up a pen or a plate of pens, and provided a pen or a plate of pens that Takao requested. On Repair Probes, when a communication initiation occurred, the teacher immediately nodded or said “OK” to show her acknowledgment, moved to the table to pick up a pen or a plate of pens, and provided a pen or a plate of pens with one non-preferred attribution (One Attribute Repair), or two non-preferred attributions (Two Attribute Repair). When Takao exhibited a correct response within 5 s after the first breakdown, the teacher immediately provided the requested pen (One Attribute Repair) or a pen with one non-preferred attribution (Two Attribute Repair). When the target behavior did not occur within 5 s, the teacher provided the pen requested by Takao (One Attribute Repair) or a pen with one non-preferred attribution (Two Attribute Repair).

With regard to Two Attribute Repair, when the student exhibited a correct response within 5 s after the second breakdown occurred, the teacher immediately nodded or said “OK” to show her acknowledgment, moved to the table to pick up a pen, and provided the requested pen. When the target behavior did not occur within 5 s, the teacher provided the pen requested by Takao. The order of picture cards was changed every session.

Interventions. During intervention, Standard Opportunities and Repair Probes were presented with a 1-to-3 or 1-to-4 ratio. The

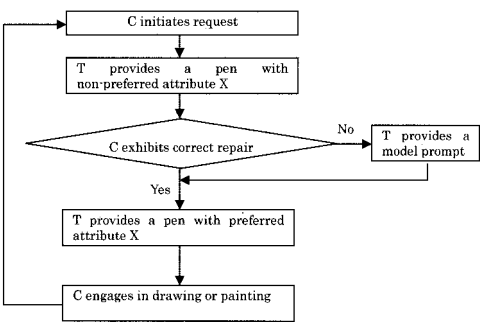


Figure 1. One Attribute Repair intervention flow-chart. C = Takao, T = Special education teacher.

procedures for Standard Opportunities were the same as those in the baseline sessions. On Repair Probes, a constant time-delay procedure was employed to enable Takao to use a picture card that corresponded to the misunderstood attribution any time a misunderstanding occurred. Specifically, when he did not touch a card that corresponded to the misunderstood attribution within 5 s after a communication breakdown occurred, the teacher provided a model prompt as a controlling prompt across all phases. Takao failed to exhibit the target behavior after the controlling prompt was provided once across all phases. To deal with the unexpected response, a physical prompt was provided. As in baseline, the order of picture cards was changed every session.

The intervention procedures in One Attribute Repair and Two Attribute Repair were presented in Figure 1 and 2, respectively.

Research Design

One Attribute Repair required Takao to repair a misunderstanding with a wrong attribution. Two Attribute Repair required him to repair two misunderstandings with two wrong attributions. Therefore, a changing-criteria design across two conditions was used to demonstrate two occurrences of behavior change immediately after the constant time-delay procedure was introduced. In addition, baseline and intervention were inserted in each of the phases.

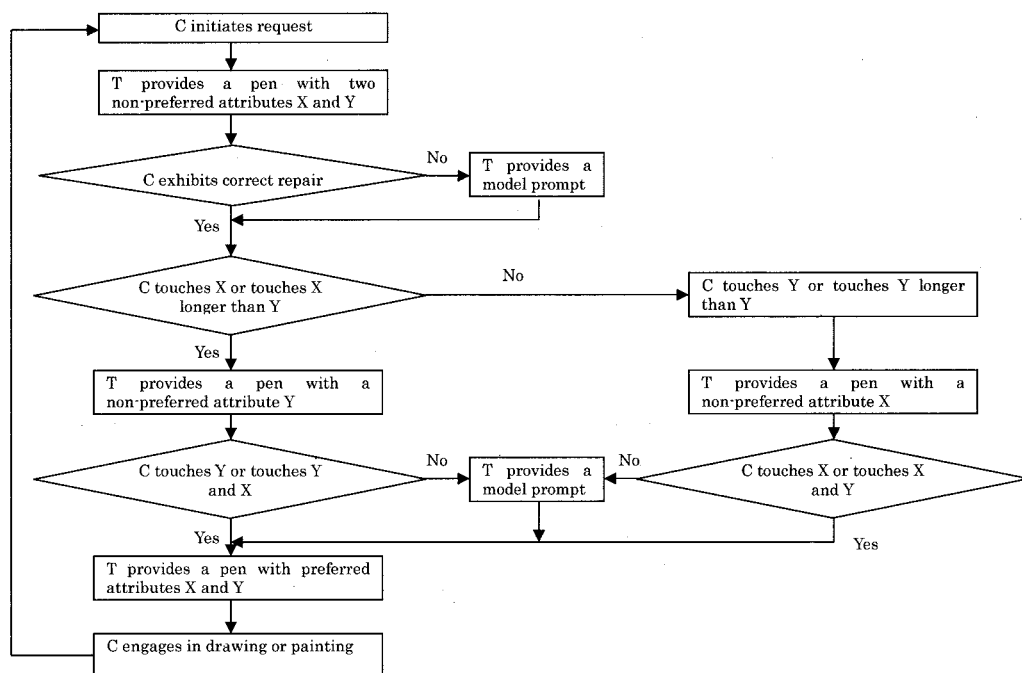


Figure 2. Two Attribute Repair intervention flowchart. C = Takao, T = Special education teacher.

Inter-Observer Agreement and Treatment Fidelity

The first author recorded topography of behavior and correct repair. A trained graduate student independently recorded an average of 35.9% of all trials across all conditions. If the two raters recorded the same category, an agreement was scored. If not, a disagreement was scored. Mean point-by-point agreement for topography of behavior (Behavior Indication, Picture Use, Combined Use) and target behaviors (correct or incorrect repair) was 93.8% and 95.7%, respectively.

The first author scored treatment fidelity by checking if the special education teacher correctly implemented the procedures in the Standard Opportunities and Repair Probes. If all procedures were implemented correctly, the trial was scored as a correct treatment procedure. The first author recorded approximately 50% of all of the trials across sub-phases. The percentage of correct procedures was 92.7%.

Results

Figure 3 shows the percentage of correct re-

pairs across all phases. Data are plotted in blocks. One block consists of 5 Repair Probes.

One Attribute Repair

As illustrated, during baseline in the Brand phase, Takao never exhibited correct repairs. Instead, he exclusively relied on reaching for or pointing to the preferred brand of pens. However, once the intervention was introduced, the percentage of correct repairs increased and stabilized at 80 to 100%. In the Color phase, Takao exhibited 100% accuracy of repair responses for three consecutive blocks. During baseline in the Size phase, Takao never used the picture card in repair turns to request the pen of a preferred size. Instead, as seen in the Brand phase, he exclusively relied on reaching for or pointing to the preferred size of pens. Immediately after introducing the intervention, however, the percentage of correct repairs dramatically increased and maintained at 80% or higher for three consecutive blocks.

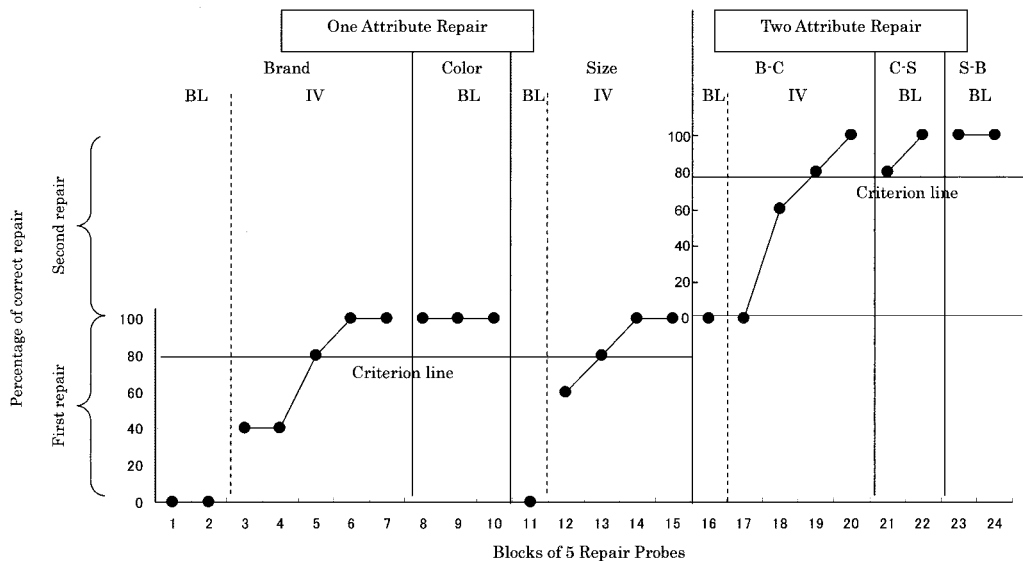


Figure 3. Percentages of correct repair in One Attribute Repair and Two Attribute Repair. One block consisted of five repair probes for baseline and intervention. B-C = Brand-Color, C-S = Color-Size, S-B = Size-Color, BL = Baseline, IV = Intervention.

Two Attribute Repair

During baseline in the Brand-Color phase, no correct repair occurred. Takao exclusively used the picture of his favorite color (i.e., black or red) to repair the first wrong response (i.e., wrong color and brand). In this sense, he exhibited correct responses with 100% accuracy in the first repair. Therefore, in Figure 3, the data point of the baseline is plotted on the level of 100% in One Attribute Repair. When the partner presented a pen of a preferred color and non-preferred brand in response to the first repair response, Takao did not use brand as a repair strategy. Instead, he exclusively pointed to the picture of his preferred color. Introducing interventions did not produce any correct repair in the first block. As in the baseline condition, he exclusively touched the picture of his preferred color in the first repair response. However, from the second intervention block, his performance improved dramatically and met the acquisition criteria in the fourth intervention block.

During baselines in the Color-Size and Size-Brand phases, the percentages of correct repair reached the criterion line or above from the very first sessions. That is, Takao pointed

to the picture that corresponded to a misunderstood attribute. Therefore, no interventions were needed to reach the pre-set criterion with two consecutive blocks in both phases.

Discussion

The purpose of this study was to extend the work of Sigafos, Drasgow et al. (2004) by teaching a prelinguistic communicator with autism to use picture cards as a repair strategy when he encounters single and multiple incorrect responses. Takao's repair skills improved only when a constant time-delay procedure was implemented in One Attribute Repair and in Two Attribute Repair. In addition, within One Attribute Repair, two occasions (i.e., in the Brand and Size phases) were observed in which behavior change occurred immediately after a constant time-delay procedure was initiated. We acknowledge that our design was a pseudo-changing criterion design because the number of criterion changed was only one. In this regard, this study should be called a case study. However, given that behavior change occurred more than one time upon introducing repair training, it can be

stated that the training program may have contributed to enabling the student to use a picture card as a repair strategy any time a misunderstanding occurred.

The study provided a maximum of two breakdown opportunities per episode. Nevertheless, Takao never terminated his attempt to repair the communication breakdowns. One of the reasons for his perseverance may be the nature of the activity selected for teaching repair skills. Coloring the logo of a favorite TV program was one of Takao's most preferred activities. In addition, the wrong response made by the teacher consisted of a wrong brand, color, and size—attribution with which Takao was highly preoccupied. Utilizing his perseverative interests (Frost & Bondy, 2002) may have helped develop a teaching context where Takao had a high level of motivation to repair multiple misunderstanding opportunities presented by the teacher. As Halle et al. (2004) argued, the level of motivation to communicate is one of the critical factors determining whether or not the individual repairs communication breakdowns. Utilizing highly preferred activities and preoccupied attributions may influence the effectiveness of our instructions.

We did not use a multiple-probe design in which baseline data of all the six phases were taken at the beginning of the study and at the time when a target behavior receiving the treatment was improved. Therefore, caution must be used in concluding that Takao's repair skills acquired in the Brand phase generalized to the Color phase, or that his repair skills acquired in the Brand-Color phase generalized to the Color-Size and Size-Brand phases. However, it is safe to conclude that Takao's repair skills acquired in the Brand and Color phases did not generalize to the Size phase and that his repair skills acquired in One Attribute Repair did not generalize to the Brand-Color phase in Two Attribute Repair.

In the typical correct repair in Two Attribute Repair, Takao touched the card corresponding to one of the two misunderstood attributions in the first breakdown and touched the card corresponding to the misunderstood attribution in the second breakdown. The target behaviors acquired by Takao maybe called a self-determined behavior em-

ploying the framework developed by Wehmeyer and Mithaug (2003). These authors defined self-determined behavior as persistent behaviors that are directed by the individual to fill a gap between where he wants to be and where he is. Specifically, the self-determined person (a) realizes a gap between where he wants to be and where he is, (b) develops a strategy to fill the gap and implement the strategy, (c) evaluates if the gap disappeared, (d) determines what should be changed when the gap did not disappear, and (e) continues the process until the gap disappeared. In an episode in Two Attribute Repair, Takao touched a card depicting red when a piece of paper was given but his preferred pen was out of reach. It can be described that he realized a gap between where he wants (i.e., obtaining his preferred pen) and where he is (i.e., his preferred pen is not available), developed a plan to fill the gap (i.e., touching a red card), and implement the plan. Next, Takao touched a red card again when the teacher presented a pen with wrong color and brand. In this process, he realized that the gap remains large, decided a strategy to fill the gap, and implemented the strategy. Third, Takao touched a brand card when the teacher presented a pen with correct color but wrong brand. In this process he realized that the gap decreased but still existed, decided a strategy to fill the gap, and implemented the strategy. Finally, Takao showed a satisfied face and received a pen to paint when the teacher presented a pen with correct color and brand. In this process he realized that the gap disappeared and the problem was solved. This is exactly what Wehmeyer et al. described as being self-determined. In this sense, enabling prelinguistic communicators with autism to use AAC to repair multiple breakdowns may contribute to nurturing a self-determined person in a micro-unit of daily life.

He occasionally pointed to two correct cards (e.g., preferred color and brand) when a pen with two wrong attributions (e.g., non-preferred color and brand) was presented. However, this study did not honor the beyond-expected response. Instead, our procedure was to honor only the attribution that he pointed to longer by providing him another opportunity to repair. Before implementing this procedure, we discussed with Takao's

teacher whether we should fully honor “pointing to two correct cards” (i.e., provide a pen with two preferred attributions) in the first repair turn or whether we should only partly honor the same response (i.e., provide a pen with one of the two preferred attributions) in the turn and provide one more opportunity to repair. We agreed with the teacher that this study should emphasize skills of using picture cards in response to two consecutive wrong responses. Takao’s mother and teacher recognized that he frequently faced multiple misunderstandings. Enabling him to touch the card in ways that take into consideration what the listener misunderstands in more than a single opportunity was considered a priority, given his daily experiences where he frequently faced gradual understanding by the listener (e.g., “Oh, you want this. No, you want that. No, you want this . . .”).

This was the first study to teach a student with nonverbal autism to repair when the student’s request was misunderstood by the listener. In addition, this was the first study to demonstrate the possibility that we can teach students with autism to repair multiple breakdowns in ways that take into consideration which information the listener misunderstood. However, this study should be called preliminary due to the following limitations. First, this study changed the criterion one time, which is not considered rigorous in experimental control. At the beginning of the study, we planned one more criterion change in which Takao was required to repair three consecutive misunderstanding. However, we did not conduct any interventions in the condition due to the end of the school year. A multiple-baseline or probe design across different wrong responses would have been more appropriate for enhancing internal validity. However, we decided not to use a multiple-baseline or probe design because Takao would be confused if he received different baselines simultaneously. Second, the study demonstrated the effectiveness of the program with only one participant and one object (i.e., pen) with three specific attributions (i.e., color, brand, and size). As mentioned earlier, this student had been able to use prelinguistic communication forms as a repair strategy for an incorrect listener response in ways that specified what he wanted. Therefore, the

same level of effectiveness of the training cannot automatically be expected in a student with a more severe level of autism. Finally, the study failed to investigate if Takao’s repair strategy used for listener misunderstandings in daily activities changed as a result of the systematic instruction implemented.

The present study demonstrated the potential of using systematic prompting procedures in a highly motivating context (e.g., requesting preoccupied activities and attributions) to teach more conventional forms as a strategy for repairing multiple listener misunderstandings. The most intriguing finding was that the instruction enabled a student with autism to repair communication breakdowns by taking into consideration which attributions were missing. Future research needs to utilize a more rigorous design (e.g., a multiple-probe design), a variety of developmental levels of participants, and various settings outside of structured classrooms (e.g., playground, cafeteria, communities) to enhance the internal and external validity of using perseverative interests and a systematic prompt procedure to teach responses to multiple listener misunderstandings.

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Evaluation of a Personal Digital Assistant as a Self-Prompting Device for Increasing Multi-Step Task Completion by Students with Moderate Intellectual Disabilities

Linda C. Mechling
University of North Carolina Wilmington

David L. Gast
University of Georgia

Nicole H. Seid
University of North Carolina Wilmington

Abstract: The purpose of this study was to evaluate whether the use of a personal digital assistant (PDA), with picture, auditory, and video prompts, would serve as a portable self-prompting device to facilitate independent task performance by high school age students with moderate intellectual disabilities. A multiple probe design was used across three cooking recipes and replicated across three students to evaluate the effectiveness of the self-prompting program. Results indicate that students were able to independently use a PDA to self-prompt completion of the three cooking recipes without the need for external adult prompting, to maintain use of the device over time, and to self-adjust the levels of prompts used within and across recipes.

Researchers continue to investigate use of self-operated prompting systems, operated by persons with intellectual disabilities, as tools for increasing independence and decreasing reliance on external prompts delivered by adults or peers. Self-operated prompting systems may be used to prompt: completion of tasks with multiple steps (i.e., washing dishes); a sequence of tasks such as following a daily schedule; or transitioning independently between activities (MacDuff, Krantz, & McClanahan, 1993). Traditionally self-prompting systems for completion of multi-step tasks have been in the form of picture-based materials (Lancioni, O'Reilly, & Oliva, 2001; Mechling, 2007) whereby students look at a static picture depicting a step of a task analysis, complete the step, return to the system, mark off the picture corresponding to the completed step or turn a page in a book, proceed to the next picture and so forth. Static picture prompting has been used to prompt: food

preparation (Singh, Oswald, Ellis, & Singh, 1995); assembly tasks (Martin, Mithang, & Frazier, 1992); dusting, setting tables, and vacuuming (Steed & Lutzker, 1997); packaging (Johnson & Miltenberger, 1996); taking customer orders and preparing sack lunches (Agran, Fodor-Davis, Moore, & Martella 1992), and daily living skills (i.e., setting a table, making a bed) (Pierce & Schriebhan, 1994). Auditory-based systems have also been used as self-prompting devices whereby students operate a portable cassette player (Davis, Brady, Williams, & Burta, 1992; Grossi, 1998; Taber, Seltzer, Heflin, & Alberto, 1999; Hughes, Alberto, & Fredrick, 2006) or MP3 player (Taber-Doughty, 2005) by listening to a description of how to complete a step, or cluster of steps, of a task analysis, complete the step, and advance the system to the next step.

Researchers have further evaluated use of video based prompting systems to support independent task completion by persons with intellectual disabilities. Similar to picture or auditory based systems, students watch a video segment of a step of the task being completed, pause the video tape, complete the step, and return to the prompting device to watch the next step. Video prompting has been used effectively to teach a range of multi-step tasks

Correspondence concerning this article should be addressed to Linda Mechling, University of North Carolina Wilmington, Department of Early Childhood and Special Education, 601 S. College Road, Wilmington, NC 28403-5940.

(Mechling, 2005) including: self-help skills (Norman, Collins, & Schuster, 2001); cooking (Graves, Collins, Schuster, & Kleinert, 2005; Mechling, Gast, & Fields, 2008); microwave oven use (Sigafoos et al., 2005); putting away groceries (Cannella-Malone et al., 2006); and setting a table (Cannella-Malone et al.; Goodson, Sigafoos, O'Reilly, Cannella, & Lancioni, 2007). Unlike picture or auditory based systems, video prompting devices hold the advantage of offering the student both visual and auditory cuing. In addition, video can provide animated, real-life simulations of the task (Mechling). Although Cihak, Alberto, Taber-Doughty, and Gama (2006) found no significant differences between static picture prompting and video prompting when teaching use of an ATM and debit card machine to six students with moderate intellectual disabilities, Mechling and Gustafson (2009) found that six young adults with moderate intellectual disabilities independently completed a greater number of tasks when using video prompting compared to static pictures. Mechling and Gustafson (2008) report similar findings in favor of video prompting in their study with six young men with a diagnosis of autism. Tasks evaluated in each study were component steps of recipes (i.e., opening crescent rolls), whereby Mechling and Stephens (2009) included multiple step cooking recipes in their study. Results of the study support video prompting over static picture prompting for increasing independent performance of tasks for four students with moderate intellectual disabilities.

In addition to investigating differences in skill acquisition using different self-prompting devices (picture, audio, video), an area of interest concerning self-prompting systems is portability. Although a paper-based picture system can be portable (i.e., small notebooks or flip cards) some researchers have found that students lose their place with such systems (Lancioni, O'Reilly, Seedhouse, Furniss, & Cunha, 2000; Mechling & Stephens, 2009) and they do not provide auditory feedback. To address these concerns and keeping abreast with developing technologies, research is being conducted on the use of personal digital assistants (PDAs) by persons with disabilities. These hand held systems, referred to by Tomasino, Doubek, and Ormiston (2007) as mo-

bile technologies, have incorporated text (Ferguson, Smith-Myles, & Hagiwara, 2005) and text and auditory prompts (Davies, Stock, & Wehmeyer, 2002a) to teach time management and task completion. Pictures and auditory prompts, presented on a small hand held digital display, have also been used to teach completion of vocational and independent living tasks (Cihak, Kessler, & Alberto, 2007; Riffel et al., 2005); transitioning between vocational tasks (Cihak, Kessler, & Alberto, 2008); and packaging and assembly tasks (Davies, Stock, & Wehmeyer, 2002b; 2003; Furniss et al., 1999).

Presentation of video-based instruction within the realm of portable systems is also beginning to receive research attention. Mechling et al. (2008) used a portable DVD player to deliver video prompts to three young adults with moderate intellectual disabilities when the system was placed on a kitchen counter. Video displayed on portable PDA systems was also explored in two recent studies (Taber-Doughty, Patton, & Brennan, 2008; Van Laarhoven, Van Laarhoven-Myers, & Zurita, 2007). Both Taber et al. and Van Laarhoven et al. used video modeling procedures to present information to students on hand held systems. Video modeling differs from video prompting by requiring the individual to watch an entire video recording followed by immediate performance of the entire task or performance of the skill at a later time. Limited research exists comparing the two procedures, however Cannella-Malone et al. (2006) found video prompting more effective than video modeling in promoting acquisition of table setting skills and putting away groceries by six adults with developmental disabilities. Although video prompting has been shown to be an effective tool for presenting information and instruction to students with moderate intellectual disabilities (Cannella-Malone et al.; Graves et al., 2005; Mechling et al.; Mechling & Stephens, 2009; Norman et al., 2001; Sigafoos et al., 2005), to date no research has been reported in the literature evaluating the effects of video prompting on a PDA system.

The purpose of the current study was to evaluate the effectiveness of a PDA self-prompting system which combined the use of video, picture, and auditory prompts. While previous research has shown these individual

components to be effective prompting systems, no study has evaluated a system using a combination of these three components nor has research addressed presentation of a combination system on a portable hand-held device. Advantages for combining the systems have been noted by researchers. Van Laarhoven and Van Laarhoven-Myers (2006) found that combination systems (video modeling paired with photographs and video modeling paired with video prompting) resulted in more independent correct responses and were more efficient in terms of sessions to criterion than video modeling alone when teaching community daily living skills to young adults with developmental disabilities. Mechling and Stephens (2009) report that some students may be able to perform some steps of a task using pictures while needing video descriptions for more difficult steps. Van Laarhoven and Van Laarhoven-Myers found that students, although not permitted to do so in the study, tried to self-fade and rely on picture prompts rather than use of video prompts as they learned tasks. Similarly, Taber-Doughty et al. (2008) found that students began to rely only on auditory prompts and self-faded looking at video models on a PDA system that provided both video models and auditory cues. Based on their findings, Van Laarhoven and Van Laarhoven-Myers suggest a “scaffolding approach” whereby students use more intrusive prompts of a system during initial trials and progress to a less intrusive level of prompting as they become familiar with a task.

In the current study students could: look at a still photograph on a hand held device, touch the photograph and hear an auditory prompt, or watch a video segment with auditory prompting, depending on how much information was needed. In addition, as they learned steps of the task analysis, and did not need additional information, students could progress the system to the next photograph without receiving further prompts. The intention of the combination prompting system in this study was to allow for adaptations as students’ needs for prompts changed (Van Laarhoven & Van Laarhoven-Myers, 2006), to provide different prompt levels depending on the complexity of the step (Mechling & Stephens, 2009), and to provide a system that could be

adaptable to varying abilities across students (Mechling et al., 2008). The current study sought to answer the following research questions: a) Would a hand-held self-prompting system, using video, picture, and auditory prompt levels, increase the percentage of cooking steps completed independently by students with moderate intellectual disabilities?; and b) Would students with moderate intellectual disabilities self-adjust their use of prompt levels when using the PDA?

Method

Participants

Three young adults (2 females and 1 male) with moderate intellectual disabilities participated in the study. Each had experience in food preparation, computer-based instruction, and use of picture-based prompting although none had used video based prompting or a handheld system. Students were screened for the following prerequisite skills prior to the start of the study: (a) visual ability to see video and pictures on a small 2 inch × 3 inch digital display; (b) ability to hear auditory prompts delivered by the system; (c) fine motor ability to touch the PDA screen or use a small 1/8 inch diameter stylus; (d) cognitive ability to recognize pictures and icons; (e) ability to attend to video stimuli; and (f) imitation skills. Because the purpose of the study was to evaluate the PDA system as a self-prompting tool, students were also evaluated on their ability to perform individual components of each task analysis. These included: (a) operation of a digital kitchen timer; (b) operation of dials on an electric stove and toaster oven; (c) use of a microwave oven; (d) ability to lift off plastic lids; (e) ability to twist lids on and off of jars; (f) use of a bread clip; (g) cutting with scissors; (h) ability to open cheese slices; (i) removing and putting on a cooking spray lid; and (j) operating cooking spray. In addition, the following skills were adapted to ensure students’ abilities to complete the component steps of the task analysis: (a) using a bread clip rather than a twist tie; (b) placing food items into plastic storage containers rather than zip lock bags in which they were purchased; (c) cutting open bags with scissors rather than tearing or pulling

them open; (d) using oven mitts rather than pot holders; and (e) using color coded measuring cups.

Andy was a 15 year, 11 month old male diagnosed with Williams syndrome, mild autism traits, and a moderate intellectual disability (IQ 55, *Kaufman Assessment Battery for Children*: Kaufman & Kaufman, 1983; Adaptive Behavior Composite Score 48, *Vineland Adaptive Behavior Scales*: Sparrow, Balla, & Cicchetti, 1984). He read simple sight words and some letter sounds and was working on identifying main ideas and themes in stories as well as increasing his ability to read and match words to pictures. He was able to write his name, address, phone number and emergency contact information. He could also write the days of the week and the months of the year. He was working on completing forms, writing sentences with assistance and writing a grammatically correct simple sentence. He could count objects, rote count to 100 by 1s, 5s, 10s and complete simple addition problems using tally marks. He was also able to count sets of nickels and dimes, but not in combination. His short term objectives included use of a calculator and telling time on the hour and half hour. He used appropriate language to ask for help and to interact with others with clear articulation and a strength in pragmatic language. His needs included increasing his vocabulary, use of descriptive words in sentences, and answering simple who, what when, and where questions. He had difficulty processing auditory information and performed tasks better with visual cues. Andy's needs further included demonstration of effective listening skills in class when directions were being given. He was able to care for all of his self-care needs and perform simple home living tasks such as making a bed and washing dishes. He was able to operate a microwave oven with visual cues and a toaster oven, but required supervision for all cooking related tasks. He was described as being very social, polite, courteous and enjoyed adult attention. He greeted people appropriately and had a good memory for people's names and facts about them. He continued to have difficulty with peer relationships, impulse control, and concentration and was easily frustrated. He frequently left his chair and stared out the window and asked for drinks of water or to use the restroom. He

worked well in a quiet and structured environment with frequent praise and reinforcement. Andy enjoyed choir, community outings, and working on the computer.

Monica was a 17 year, 3 month old female diagnosed with Down syndrome and a moderate intellectual disability [IQ 51, *Wechsler Intelligence Scale for Children—Third Edition* (WISC-III): Wechsler, 1997; Adaptive Behavior Composite Score 70, *Vineland Adaptive Behavior Scales*: Sparrow et al., 1984]. She had a mild hearing loss and wore eye glasses. She read on a late kindergarten/early first grade level and recognized simple sight words. She knew the sounds for all letters and was working on sounding out and blending sounds to read words. She had difficulty with comprehension and often answered, "I don't know" to questions about what she had read. She was able to write simple sentences in a journal and copied sentences dictated to her teacher. She used modified spelling and often omitted articles when writing sentences. Her needs included increasing her ability to write simple sentences using periods and to write personal information and prepare a written grocery list. Monica used a calculator to solve computation problems with addition and subtraction and was able to tell time to the hour and half hour. She used a digital clock and watch for all other times. One of her short term objectives was to understand which hour is next and what time of day events happened. She was unable to recognize coins or state their value and had difficulty counting by fives and tens. She was able to take care of her personal needs, was working on folding clothes with a model, and was able to hang shirts and pants with some prompts for positioning on the hanger. She needed assistance making a bed and cooked with supervision and assistance. Her needs included working on planning meals making a grocery list, shopping for items, and preparing meals. She could operate a microwave and oven and needed assistance with a stove top. She was described as being very outgoing and well liked by her classmates and teachers. Monica enjoyed free time, working puzzles, coloring, and computer games. She liked Hanna Montana and enjoyed searching websites pertaining to the topic.

Wanda was a 17 year, 9 month old female diagnosed with a moderate intellectual dis-

ability (IQ 44, *Stanford-Binet Intelligence Scales—Fourth Edition*: Thorndike, Hagan, & Sattler, 1986; Adaptive Behavior Composite Score 58, *Vineland Adaptive Behavior Scales*: Sparrow et al., 1984]. She was able to read 25 sight words on a primer level and knew the sounds for all letters. She was working on blending sounds to read words. Her comprehension skills were stronger when read to than when she read a passage. She copies sentences and was working on writing simple three word sentences. She used a calculator to complete simple addition and subtraction problems with reminders for entering decimal points. She could tell time on the hour and half hour and need to tell time on five minute intervals. She could count by fives and tens, recognized all coins and their values and was working on counting coin and dollar combinations to \$5. She was able to care for all of her self-care needs except for difficult fasteners. Wanda could make her bed, wash dishes, take out the trash, and follow simple recipes with pictures using a microwave, stove, and oven with close supervision. Her needs included planning and cooking healthy meals, writing a grocery list, and locating items in the grocery store. She liked to socialize in the hallways of the high school and had many friends from her community. She was working on appropriate verbal behavior and body language in the hallways. In addition to socializing with friends, she enjoyed making puzzles, working on the computer, physical education class, and playing basketball.

Settings and Arrangements

Probe, intervention, and history training sessions, took place in the home living room at the students' high school. The kitchen area of the home living room was arranged with all of the appliances (refrigerator, stove, dishwasher, and sink) positioned in a single row along the wall with counter space separating each appliance. The microwave was positioned on a countertop next to the refrigerator and the toaster oven was positioned on a counter top next to the electric stove. All silverware, utensils, skillets etc. were kept in the cabinets above and below the counters along the wall. The PDA was placed flat on the counter between the sink and the stove. The

instructor stood to the right of the student and when present, the reliability data collector stood behind and to the left of the student.

Materials and Equipment

A Cannon ZR 830 digital video camcorder was used to make all video recordings and still photographs. The camera record button was stopped between recordings of each video prompting segment (step of the task analysis) for each recipe. Video recordings were made using an adult model unfamiliar to the students. During recording of each step a voice over procedure was used to record directions (verbal prompts) provided by the person operating the camera. Video recordings were downloaded through the fire wire port of the camera to a Dell Latitude X 300 laptop. Video captions were edited using Windows Movie Maker, and saved on the hard drive of the laptop for later importing onto the PDA. Likewise, photographs were downloaded to the laptop computer through the USB port, converted to a JPEG files, saved into picture files, and later imported onto the PDA. The Personal Digital Assistant (PDA) used in the study was the Cyrano Communicator TM (Hewlett Packard iPAQ Pocket PC with pre-installed software by One Write Company). The software pre-installed onto the PDA allowed for importing of pictures and video links directly onto available templates, linking of presentation slides, and recording of auditory prompts. The program also allowed use of larger photographs on the displays which could be more readily seen and touched with a finger rather than a stylus. The template selected for the current study contained three blocks (Figure 1). A presentation slide, using the template, was created for each step of a task analysis. The top or largest block contained a photograph corresponding to the step of the task analysis. Photographs were downloaded from the laptop, stored on the PDA, and attached to each presentation slide. An auditory prompt was recorded directly onto the PDA and played when the picture block was touched by the student (using a finger or the stylus). The bottom left block contained the label "movie" and linked to the video prompt when touched. Movie files were downloaded from the laptop, and stored di-



Figure 1. Illustration of one page on the Cyrano Communicator TM PDA.

rectly on the PDA. The video caption played immediately, using Windows Media Player, (available on the PDA) which was automatically opened when the block was touched. After the video caption was complete, the movie stopped, the student closed Windows Media Player using the stylus, and the program then returned to the presentation slide. The block in the bottom right corner contained a picture of an arrow pointing to the right and an auditory prompt which said, "Next". This block was linked to the subsequent presentation slide corresponding to the next step of the task analysis. When the arrow block was touched by the student (using a finger or a stylus) the program automatically advanced to the next slide. A student could repeatedly touch a picture on a page and hear the auditory prompt or touch the video block and replay the video recording as often as needed until the step was completed, however, the program only advanced forward and students could not go back or "rewind" to a step. The last presentation slide for each cooking recipe contained a photograph of the finished food item, an auditory prompt "finished", and a video recording of the finished food item on a plate with the voice over, "Finished, you may eat the ____."

Three cooking recipes were selected which sampled three modes of food preparation: stove top (grilled ham and cheese sandwich), microwave (Hamburger Helper Microwave Singles), and toaster oven (individual serving size pizza). Recipes ranged from 19 to 25 steps and required use of a range of stimuli (i.e.,

boxes, bags, jars, measuring cups, spatula, digital timer) and responses (i.e., stirring, turning, pouring, holding) (Table 1).

Experimental Design and General Procedures

A multiple probe design across three cooking recipes and replicated with three students was used to determine the effectiveness of a handheld self-prompting system, using video, picture, and auditory prompt levels, to teach food preparation (Gast, 2009). The PDA was operated individually by each student and used to deliver all prompts for task completion. One cooking task was performed during each session and only one session was conducted per day, 3–4 days per week. Experimental conditions occurred in the following sequence: history training for PDA operation, cooking task probe without the PDA (three recipes), PDA prompting (first recipe), cooking task probe without the PDA (three recipes), PDA prompting (second recipe), PDA prompting probe (mastered recipe), cooking task probe without the PDA (two recipes) and so on. Subsequent probe sessions with the PDA following mastery of a recipe were conducted to evaluate use of the device over time (maintenance).

Dependent Measure and Data Collection

During each condition, data were recorded for each step of the recipe task analyses shown in Table 1. Data were calculated and reported for the percentage of steps completed independently using the PDA regardless of the prompt level used on the PDA. Although the primary dependent variable was the percentage of steps completed independently correct for each recipe, the type of prompt level the student used on the PDA in order to complete the step (independent, picture only, picture + auditory, or video) was also recorded.

History Training

Prior to the first probe session, students participated in instructional sessions to teach operation of the PDA. A washer and dryer were present in the home living area and a self-prompting program with five presentation slides was developed for operation of the

TABLE 1**Task Analysis for Cooking Recipes**Hamburger Helper Microwave Singles (19 steps)

Get box of Hamburger Helper from cabinet and put on counter
Get 1 cup measuring cup from drawer and put on counter
Get small spoon from drawer and put on counter
Get 2 oven mitts from on top of the microwave and put on counter
Get white mixing bowl from cabinet and put on counter
Open box and take out one packet
Get scissors from drawer, cut open packet and pour contents into bowl
Fill measuring cup with water from sink and pour water into bowl
Stir mixture 8 times, put spoon on counter
Put bowl in microwave, close door, Press “5” “0” “0” “Start:
Wait 5 min for microwave to “ding”
Take bowl out of microwave using oven mitts, put on counter, close microwave door and stir mixture 8 times
Close box and put in cabinet
Put oven mitts on top of microwave
Put measuring cup in sink
Put spoon in sink
Throw empty packet in trash can
Put scissors in drawer
Stop

Grilled Ham and Cheese Sandwich (24 steps)

Get skillet from cabinet and put on front right stove burner
Get plate from cabinet and put on counter
Get spatula from drawer and put on counter
Get cooking spray from cabinet and put on counter
Get bread from refrigerator and put on counter
Get 2 slices of cheese from refrigerator shelf and put on counter
Get package of ham from refrigerator shelf and put on counter
Take off lid of cooking spray and spray bottom of skillet 6 times
Open bread and place 2 slices of bread in skillet
Unwrap 2 slices of cheese and place one slice on each slice of bread
Open package of ham and place one slice of ham on top of one cheese slice
Turn stove dial to “medium”
Get kitchen timer from kitchen drawer
Press minute button two times and press “start”
Wait 2 minutes for timer to beep
Turn stove dial to “off”
Get spatula and place one slice of bread/cheese/ham on top of other, lift sandwich from skillet with spatula and place on plate
Close bread with bread clip and put in refrigerator
Put ham in refrigerator
Place lid on cooking spray and put in cabinet
Put cheese wrappers in trash can
Put spatula in sink
Put timer in drawer
Stop

Individual Serving Size Pizza (25 steps)

Get plate from cabinet and put on counter
Get knife from drawer and put on counter
Get pizza dough packet from refrigerator and put on counter
Get pizza sauce bottle from refrigerator and put on counter
Get cheese package from refrigerator and put on counter

Continued

TABLE 1 (Continued)

Get pepperoni package from refrigerator and put on counter
Get mushroom container from refrigerator and put on counter
Get oven mitts from on top of microwave and put on counter
Open pizza dough packet and put one piece on plate
Open pizza sauce and squirt 3 rotations on dough
Hold knife and spread sauce around on dough
Open cheese package and sprinkle one handful of cheese on dough/sauce
Open pepperoni package and place 5 slices on top of dough/sauce/cheese
Open mushroom container and place 5 pieces of mushrooms on top of dough/sauce/cheese/pepperoni
Open toaster oven door, place pizza on cooking sheet inside oven
Close toaster oven door, turn top dial to "bake" and bottom dial to "5 minutes"
Wait for timer to ding, put on oven mitts, open door, pull out cooking sheet and place on top of stove, close toaster oven door
Get spatula from drawer and use to place pizza on plate
Put oven mitts on top of microwave
Put spatula in sink
Put knife in sink
Close mushrooms and put back in refrigerator
Close sauce and put back in refrigerator
Put pepperoni, cheese, and dough back in refrigerator
Stop

dryer. The self-prompting program followed the same format as those used for the three cooking tasks. Students were taught individually how to operate the different functions of the PDA using a stylus and their fingers. These functions included: (a) looking at the picture prompt; (b) touching the photograph to hear an auditory prompt; (c) touching the "movie" block to watch the video prompt; (d) closing the movie by touching a small box in the upper right corner of the digital display using the stylus; and (e) touching the arrow block to advance to the next presentation slide. Students were also taught to touch the screen if it went blank during the activity. The PDA was programmed to shut down after a period of approximately 25 seconds of non-use in order to conserve the battery. In addition to operation of the device, students were taught to complete a step and return to the PDA before advancing the program to the next slide. History training, using a system of least prompts procedure, continued until a student was able to independently operate all functions of the device to complete the clothes drying task.

Probe Procedures: Cooking without the PDA

The first probe condition served to evaluate each student's ability to complete the three

cooking recipes prior to instruction and without use of the self-prompting system. Initial probe sessions were conducted individually for a minimum of three sessions per recipe or until data stabilized. Subsequent probe conditions without the PDA system were conducted for one session per recipe immediately following mastery of a cooking task (Probe 2–4). Each session consisted of one trial for one of the recipes. Trials began with the instructor showing the student a photograph of the item to be prepared and delivering the task direction, "It's time to cook _____," or "Cook the ____." The instructor then waited 3 seconds for the student to respond by initiating the first step for preparing the recipe. Students could perform each step of the task analysis correctly, incorrectly, or not respond. Steps for each task analysis were performed by an adult without disabilities prior to the study to determine criterion levels for duration. A correct response was recorded if the student initiated a step within 3 seconds of the previous step and completed the step within 30 seconds following initiation of the step. Incorrect response was defined as: (a) initiation within 3 seconds, but failure to complete a step within 30 seconds of the previous step (duration); (b) initiation within 3 seconds of the last step, but failure to complete the step correctly (to-

pographic); and (c) no response, characterized by failure to initiate a step within 3 seconds of the end of the previous step. Failure to complete a step or initiate a step was also recorded if a student verbally expressed that he/she did not know how to complete a step. If a student performed a critical step incorrectly or did not respond, the instructor blocked the student's view and performed the critical step. A step was considered critical if subsequent steps could not be completed without the step's completion (e.g. putting the dough on the plate so that the sauce, mushrooms etc. could be placed on the dough). Students received verbal praise for attempting steps and for attending to the materials on an average of every third step (VR-3). Students could also eat the food at the end of the session, offer it to another classmate or staff member, or save it for later consumption if they so desired.

Self-Prompting PDA Procedure

During each cooking session, using the self-prompting system, the PDA was placed on the kitchen counter and was used by the student to navigate through each step of the task analysis. Each session began with the instructor turning on the PDA and locating the correct recipe. The first presentation slide contained a photograph of the recipe to be prepared and an arrow block at the bottom right side of the page. The student was given the task direction, "Touch the arrow and start cooking the _____ using the iPAQ," (the PDA was referred to as an iPAQ rather than a Cyrano Communicator because this was the label found on the outside of the PDA). The student then touched the arrow block which linked to the next presentation slide containing prompts for the first step of the task analysis. Following the model of the system of least prompts (SLP) the student could look at the photograph on the slide and complete the step (picture only), touch the photograph and hear an auditory prompt (i.e., "put the dough on the plate") (picture + auditory), and/or touch the video block and watch a video caption of the step being modeled along with a verbal description of the step (video). The student could also complete steps of the task analysis without advancing the system to the

corresponding presentation slide (independent).

For each step of the recipe a student could perform a step correctly or incorrectly, or not respond. An unprompted correct response was defined as initiating a step within 3s and completing a step within 30s following the PDA prompt. Students could also navigate their way through the prompt levels. For example, a student could look at the photograph (picture only) and decide that he/she needed a more intrusive prompt. He/she then touched the photograph and listened to the verbal prompt (picture + auditory). He/she could attempt to complete the step or progress to a more intrusive prompt level – video prompt. In order to be considered an unprompted correct response, the student was required to initiate the next prompt level within 3s of hearing and/or seeing the less intrusive prompt. A student could also return to the system for further prompting on the same level or to receive prompting on a more intrusive level after a step was initiated. In this case, an unprompted correct response was recorded if the student did so within 30s of initiating the step.

An incorrect response was defined as (a) initiation of a step within 3s following the prompts, but incorrect performance of the step (topographic); (b) initiation within 3s but failure to complete the step within 30s of the prompt (duration); or (c) no response, whereby the student failed to initiate a response within 3s of the PDA prompt. If an incorrect response occurred, the instructor prompted the student (i.e., said, "Touch the _____" while pointing to the block) to use the PDA to perform the step correctly (prompted correct). When the instructor prompted the student back to the PDA, she pointed to the next intrusive prompt level. For example, if the student touched the photograph, listened to the verbal prompt (picture + auditory) and responded incorrectly, the instructor prompted the student to touch the video block.

If a student failed to perform a step correctly after being directed through all of the prompt levels on the PDA (incorrect prompted response), the instructor performed any critical steps (while blocking the students view) followed by directing the stu-

dent to touch the arrow block to advance to the next presentation slide. If the step was not defined as critical (subsequent steps did not rely on its completion) the student was immediately prompted to touch the arrow block. No other prompts were provided for task completion by the instructor. Students received descriptive verbal praise on a VR-3 schedule of reinforcement for unprompted and prompted correct responses. At the end of the session the student could also eat the prepared food item, package it to be eaten at a later time, or offer it to another student or staff member. After criteria was reached for one recipe (100% unprompted correct for one session), one probe session was conducted to evaluate the student's completion of the currently mastered recipe and any remaining recipes without use of the PDA. In addition, mastered recipes were probed using the PDA during subsequent training conditions to measure maintenance.

Social Validity

On the day that each student finished the last probe session, each was shown the PDA, a portable DVD player, and a picture-based cookbook. The instructor showed each student a portion of a recipe and operation of the portable DVD player (video and voice over prompts). The instructor also explained one recipe and how to look at and cross off pictures in the cookbook. The instructor then showed the student a box of pudding and asked, "If you were going to make the pudding, which of these would you like to use?"

Reliability

Interobserver agreement and procedural reliability data were recorded simultaneously on 33.3% of all sessions across probe and self-prompting PDA conditions. Interobserver agreement was calculated using the point-by-point method in which the number of instructor and observer agreements was divided by the number of agreements plus disagreements and multiplied by 100. Mean interobserver agreement for student independent correct responses was 98.8% across all students and conditions (range = 94.7%–100%) and 98.1% across all students during the self-prompting

condition for level of prompt used by the student (range = 94.7%–100%)

Procedural reliability data were recorded for the following instructor behaviors when implementing the study: (a) prompting use of the PDA; (b) delivery of reinforcement; (c) blocking student's view when completing critical steps; (d) assuring that materials and equipment were in proper locations and working order; and (e) turning on the PDA and delivering task directions. Agreement was calculated by dividing the number of each observed instructor behavior by the number of opportunities, multiplied by 100 (Billingsley, White, & Munson, 1980). Mean procedural accuracy was 97.9% (range = 90.9%–100%). Errors occurred, for example, when a high school staff member removed the bowl from the cabinet, the safety cap was not removed in advance from a new bottle of pizza sauce, Wanda left to go to the bathroom and the skillet was removed from the stove to prevent burning, student held finger on "next" icon too long and the program jumped ahead of the target slide, bread clip was not placed on a new loaf of bread, and the handle broke on the measuring cup.

Results

Figures 2, 3, and 4 show the percentage of steps performed independently correct by each student across the three cooking recipes during probe sessions without the self-prompting device and during PDA self-prompting sessions. Visual inspection of the figures reveals an immediate and abrupt increase in steps completed independently after introduction of the PDA system and that performance was maintained over time. Although students could perform some steps prior to use of the PDA, performance remained low during probe sessions with the exception of Wanda for making individual serving size pizza. It is possible that her level of performance increased prior to use of the PDA because she saw the final product (pepperoni, cheese etc. on the pizza) when her classmates brought the pizza into the classroom to share with classmates. In addition, some steps were repeated across recipes and Monica, for example, began to obtain potholders independently before using the PDA on her last recipe.

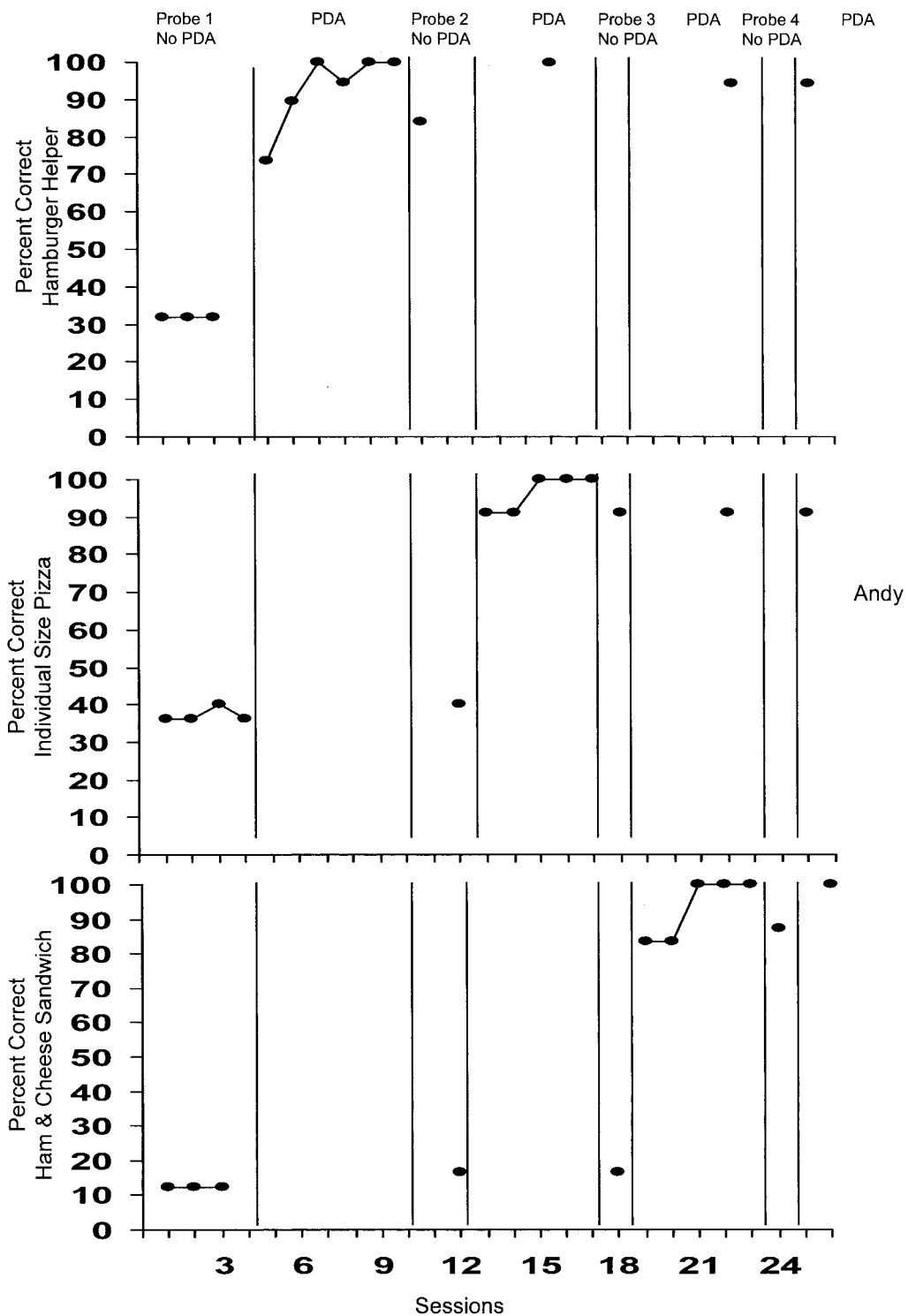


Figure 2. Percentage of steps performed correctly by Andy across the three cooking recipes.

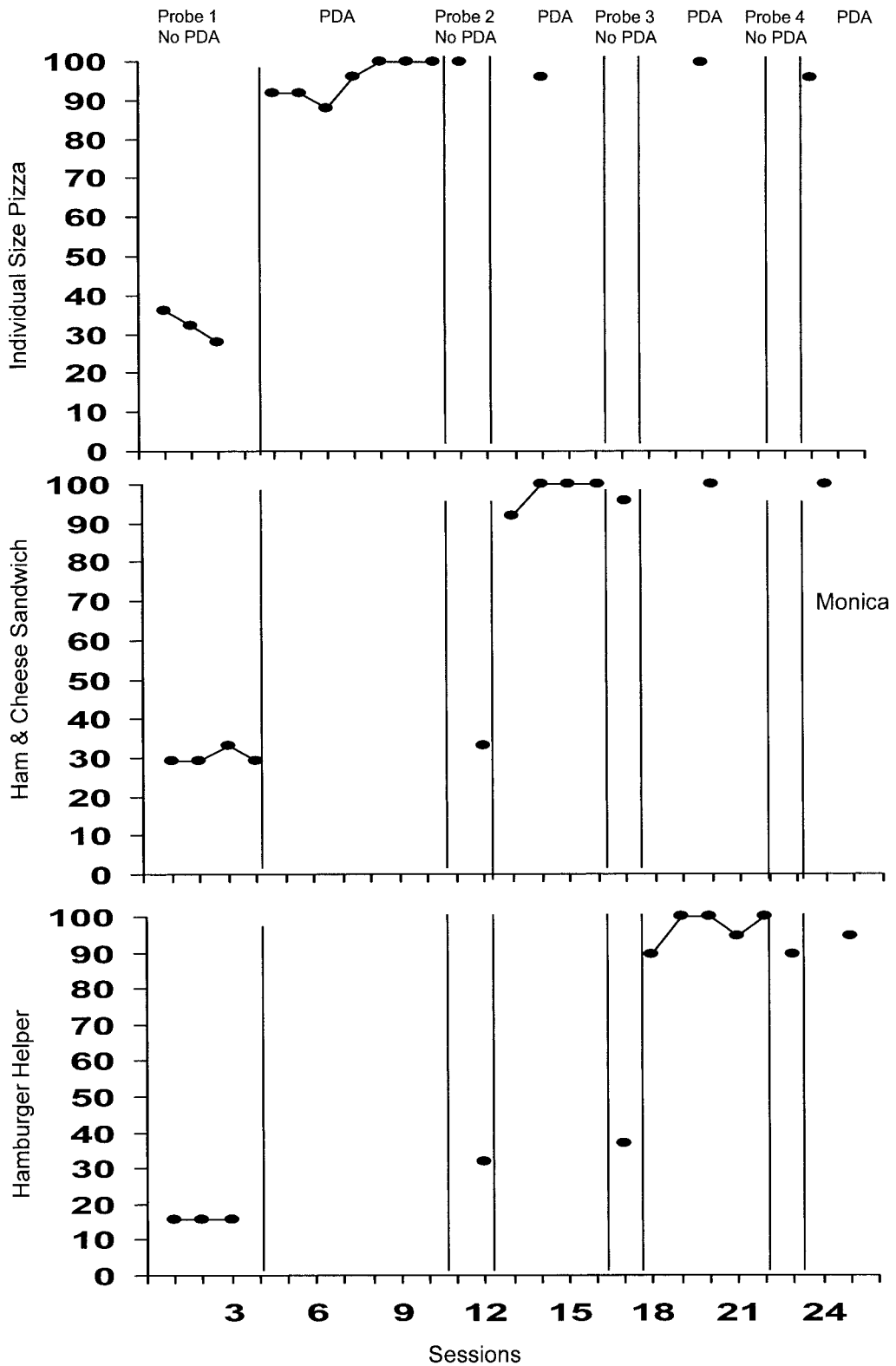


Figure 3. Percentage of steps performed correctly by Monica across the three cooking recipes.

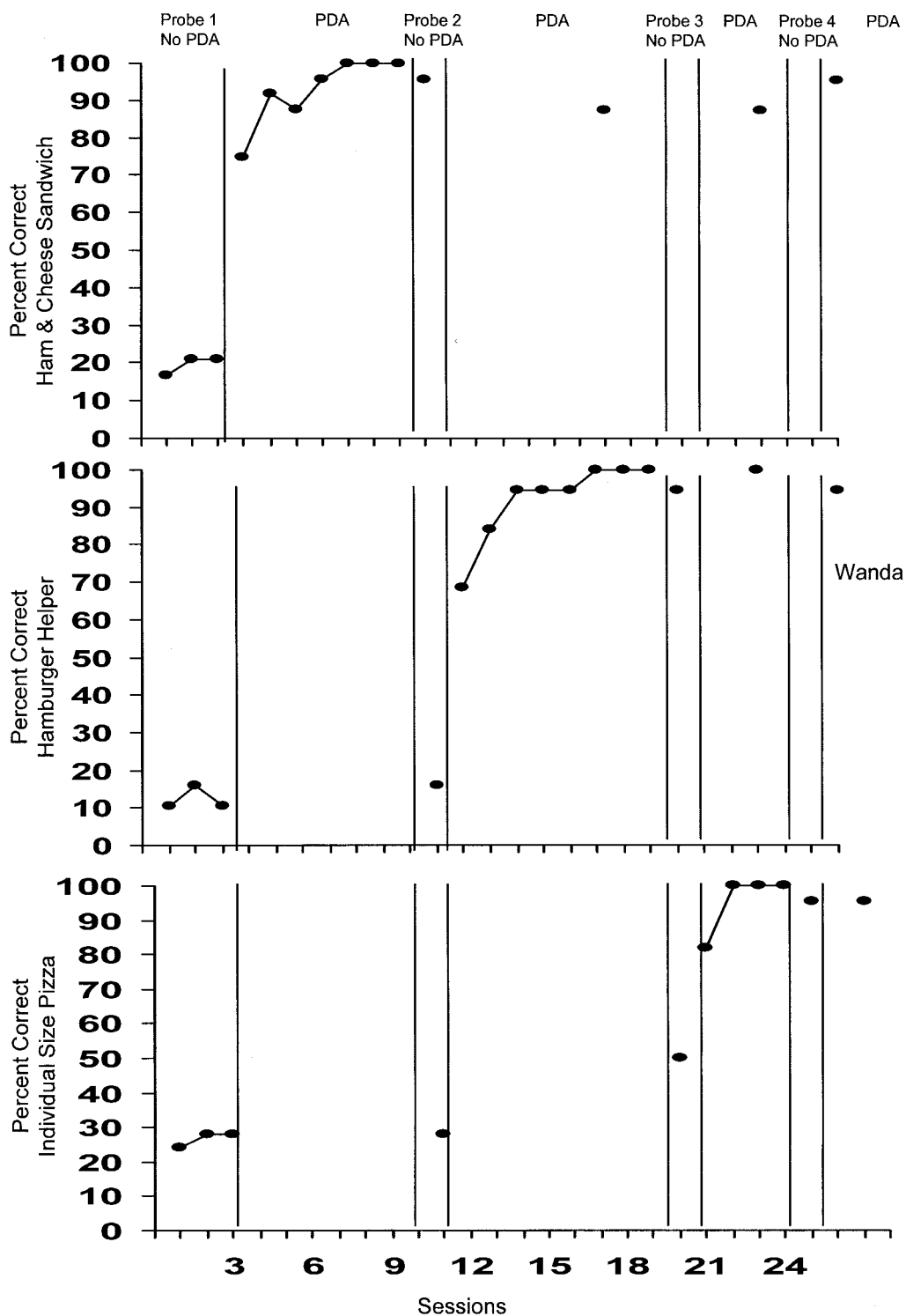


Figure 4. Percentage of steps performed correctly by Wanda across the three cooking recipes.

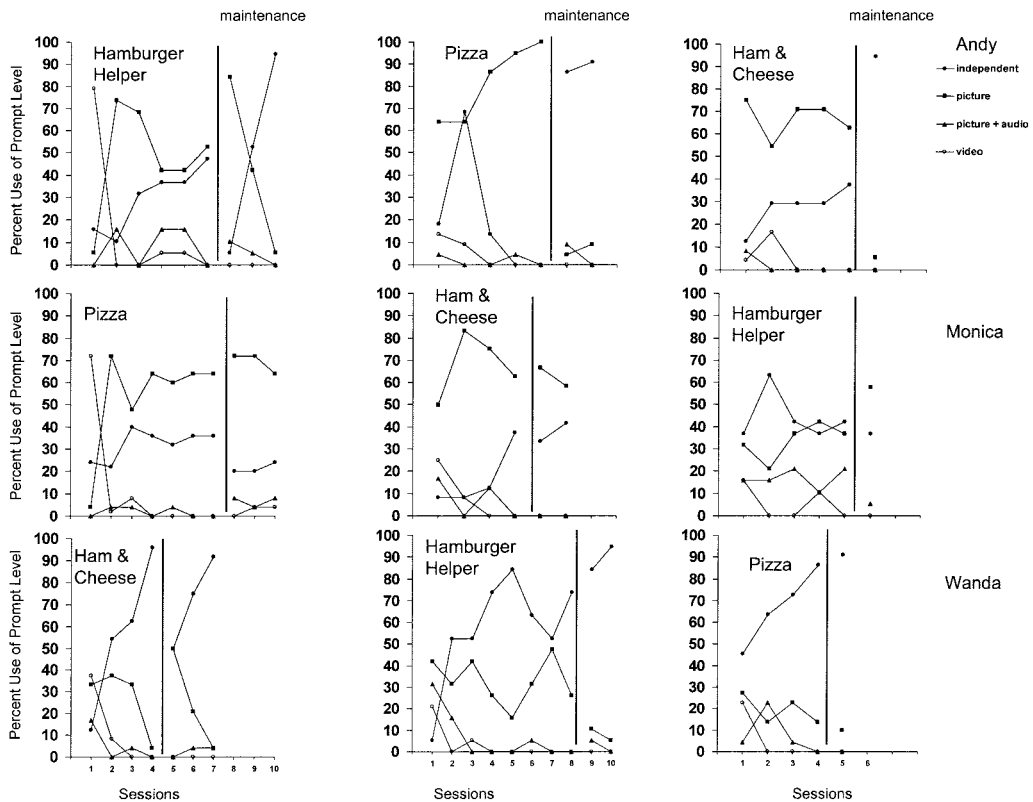


Figure 5. Percentage of steps performed using each PDA prompt level across three cooking recipes and three students.

As reflected in Figures 2–4 students were able to learn to independently use the PDA self-prompting system to complete recipes without instructor prompts. Andy and Monica required the greatest number of sessions to criteria on their first recipe, however, Wanda increased her number of sessions to criteria on the second recipe. Although the ham and cheese recipe (Wanda’s first recipe) required 24 steps (compared to 19 steps for microwave hamburger helper), it appears that students found this recipe less difficult to perform when using the PDA. Errors across all recipes were most frequently committed when students initiated completion of a step without using the PDA and performed the step incorrectly, thus requiring the instructor to prompt them to use the device. This behavior occurred with Wanda when completing her second recipe. She proceeded to perform a step

incorrectly and was prompted by the instructor to look at the picture (next prompt level).

Figure 5 presents the percentages for each prompt level used by each student across the three cooking recipes during self-prompting and probe sessions with the PDA. Students showed trends toward requiring less intrusive prompt levels (video and picture + audio) within and across tasks. All three students used video for the greatest amount of time during the first session of the their first recipe (Andy 78.9%, Monica 72%, and Wanda 37.5%), but quickly faded it’s use within the second session (Andy 0%, Monica 2%, and Wanda 8.3%) and subsequently relied less on video across the first session of the remaining recipes (i.e., use of video on first session of second recipe: Andy 13.6%, Monica 25%, and Wanda 21.1%). With the exception of Monica on her last recipe, students infrequently used the pic-

ture + audio feature of the PDA, but instead they frequently accessed the picture prompt if they were unable to perform a step independently. This behavior continued for each student into maintenance sessions when students were presented with the PDA for use with previously mastered recipes.

Social Validity

When presented with a choice of the PDA, portable DVD player, or picture cookbook to hypothetically cook pudding, all three students responded that they would like to use the portable DVD player because it had movies. Imitating a cable television cooking program, Monica further said that she wanted to, "Watch the movies and be an iron chef."

Discussion

As the technology of PDA systems progresses and prices lower (Swan, Swan, Van Hover, & Bell, 2002), handheld computers may be a low-cost, effective means for students to have access to information anywhere at anytime (van 't Hooft & Vahey, 2007). The current study supports previous research reporting that students with intellectual disabilities can learn to use an electronic, portable, handheld prompting system to independently complete tasks (Cihak et al., 2008; Davies et al., 2002b, 2003; Riffel et al., 2005; Taber-Doughty et al., 2008; Van Laarhoven et al., 2007). The study extends the research literature evaluating handheld self-prompting systems by using a system that provided picture, auditory, and video prompting within one program.

Students demonstrated the ability to independently use a PDA to self-prompt completion of the three cooking recipes without the need for external adult prompting. An important contribution of the current study was demonstrating the ability of students to determine what level of prompting they needed or preferred. Students initially used more intrusive levels of prompts if needed and self-faded these levels of prompts (i.e., video to photos), later re-instituted use of more intrusive prompt levels when needed (i.e., during maintenance sessions), or used no prompts at all. These results show that students may initially need video prompts rather than photographs

for more difficult steps (Mechling & Stephens, 2009) or may need to refer back to more intrusive prompt levels when a task is not continuously performed

The small number of students participating in the study calls for future research to replicate the findings. Furthermore, additional studies are needed to investigate use of self-prompting systems with multiple prompt levels across other disabilities and tasks. Of interest, for example, would be how students with autism use the system and on which prompt levels they would rely (visual, auditory, video). Further evaluation of different tasks may provide information concerning whether some activities or steps are better suited for video modeling or prompting or whether pictures or auditory prompts will suffice. Furniss et al. (1999) stated that the nature of the task rather than students' abilities likely influenced successful use of a PDA in their study.

A limitation of the current study was that there was no further clustering of task steps as they were learned or a change in the photographs or video segments used. As tasks are learned it may be beneficial to cluster steps into fewer pictures or combine multiple video segments into fewer segments (Furniss et al., 1999). Students may initially require video prompting and then move to lengthier video segments that resemble video modeling (Cannella-Malone et al., 2006). It is important to select methods of instruction that match the needs of the individual students (Simpson, 2005). One critical advantage of a PDA is the ability to individualize the system to meet the needs of each student (Furniss et al., 1999). Future studies may wish to investigate the adaptability of prompts as a student's performance progresses, presentation of cues at the student's own individual pace (Davies et al., 2003), and other customization features that can be adapted to the individual. For example, realistic photographs and video segments from the student's actual environment may assist with acquisition of skills compared to generic stimuli on commercial programs. The current study used custom-made photographs and video recordings that exemplified each student's cooking environment. Future research may need to compare the benefits of customized verses commercially available software programs for prompting tasks. Although

easier to obtain, commercially available products may be more costly. The question remains, are commercial products as effective as those made specifically for each student? In addition, auditory recordings pertinent to the student such as key words or a student's name may be used to gain attention before presenting a step.

Researchers have also identified the importance of allowing students to select their own preferred method of prompting (Taber-Doughty, 2005; Taber-Doughty et al., 2008). Taber-Doughty found that students increased their skill acquisition and decreased their time to complete tasks when provided a choice between prompting systems (adult, pictures, auditory). In the current study students could choose within the system what to use (i.e., picture, video), but were limited to using the hand-held system. Further, although students were asked at the completion of the study which system they preferred, students need to have opportunities to use all of the systems before they determine their preferred system (Taber-Doughty et al.).

Another factor to consider when interpreting results and determining what role a PDA can play in supporting programming for persons with disabilities is that the current study used the device to prompt completion of multi-step tasks, for which students could already perform the component steps, rather than instruction or acquisition of a new task. The instructor also turned on the PDA and found the target recipe. Further independence could be increased by setting up a home page with photographs of the recipes or tasks to be completed and to evaluate students' abilities to navigate through a range of available task analyses. Additional studies are needed to evaluate use of the extensive features available through these developing technologies. Future studies may also address features for prompting and using lists of tasks and daily schedules for organizational skills, self prompting across a range of complex tasks, and students abilities to enter and use information on the systems through text, auditory and video recordings and taking their own photographs. Portable digital assistants and other hand-held electronic devices appear to hold promising potential for persons with disabilities due to their non-stigmatizing

use by the general public (Davies et al., 2002b) and their non-obtrusive format that does not make students stand out among peers in school (Myles, Ferguson, & Hagiwara, 2007).

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Effects of Most to Least Prompting on Teaching Simple Progression Swimming Skill for Children with Autism

İlker Yılmaz
Anadolu University

Ferman Konukman
The College at Brockport, SUNY

Binyamin Birkan
Tohum Autism Foundation, İstanbul

Mehmet Yanardağ
Anadolu University

Abstract: Effects of most to least prompting on teaching simple progression swimming skill for children with autism were investigated. A single subject multiple baseline model across subjects with probe conditions was used. Participants were three boys, 9 years old. Data were collected over a 10-week with session three times a week period using the single opportunity method as an intervention. Results indicated that all the boys increased their simple progression swimming skill significantly during intervention phase. In addition, participants maintained their successful skills during first, second and fourth week of generalization phases. Results showed that most to least prompting was an effective way of increasing and maintaining simple progression swimming skill of children with autism.

Autism is a lifelong developmental disability that causes delays in verbal and nonverbal communication and social interaction as well as exhibition of ritualistic and compulsive behaviors (Loovis & Ersing, 1979). Autism is a brain disorder that impairs a person's ability to communicate, form relationships, socially interact, and respond appropriately within a given environment.

Children with autism have severe communication, language, and social interaction problems compared to their nondisabled peers. Children with autism have several difficulties in four general areas: Speech, language and communication; relating people, objects, events; responses to sensory stimuli; developmental discrepancies (Houston-Wilson & Lieberman, 2003). Therefore, teaching games and physical activity is an important necessity to improve vital social skills of children with autism (Leaf & McEaching, 1999; Maurice, Green, & Fox, 2001).

Autism is the fastest growing developmental disability in the nation and school districts are

having a hard time finding trained teachers to accommodate the needs of students with the disorder (Block, Block, & Halliday, 2006). There are 1.5 million Americans who have autism and 15 million more Americans, such as family, teachers and health care workers who are indirectly affected (Crollick, Mancil, & Stopka, 2006).

Children with autism have several stereotypical motor behaviors (e.g., swinging their bodies backward and forward, playing with their fingers, moving their head in a circular motion and jumping). These behaviors cause communication and learning problems for children with autism. However, it is possible to decrease these behaviors via teaching physical activity and games (Leaf & McEaching, 1999; Smith, 2001). Several studies found that physical activity interventions such as jogging, ball throwing, swimming, and vigorous physical activity reduced stereotypical motor behaviors (Levinson & Reid, 1993; Richmond, 2000; Yılmaz, Birkan, Konukman, & Erkan, 2005a). In addition, Sherrill (2006) indicated that some of these stereotypical behaviors can be used to teach skills similar in behavior such as swimming (e.g., swinging their bodies backward and forward, moving arms up and down).

Correspondence concerning this article should be addressed to İlker Yılmaz, Anadolu University, School of Physical Education & Sports, Eskisehir, 26470, TURKEY. E-mail: ilkery@anadolu.edu.tr

The therapeutic use of aquatic activities or swimming can promote language, self concept and improve adaptive behaviors for children with disabilities. In addition, these activities provide an appropriate educational setting for many early interventions (Prupas, Harvey, & Benjamin, 2006; Killian, Joyce-Petrovic, Menna, & Arena, 1984; Yilmaz et al., 2005a).

Researchers have shown that children with autism have success in aquatic activities and these activities reported as enjoyable and helpful to improve motor skills. Moreover, these studies indicated aquatic and swimming activities as popular activities among the children with autism (Campion, 1985; Dewey 1973; Dulcy, 1992; Huetting & Darden-Melton, 2004; Killian et al., 1984; Mosher, 1975; Oppenheim, 1977; Wing, 1976; Yilmaz, Birkan, Yanardağ, & Konukman, 2005b)

Although in the past researchers have shown that children with autism have normal motor development patterns, a recent study found that autistic children have very low performance in motor skills. Therefore, it is recommended that autistic children be encouraged to participate in games and other physical activities for motor skill development (Smith, 2001).

Several studies have been published where successful of teaching of individuals with autism or moderate to severe intellectual disabilities play skills such as bowling has been demonstrated (Zhang, Bridget, Shihui, & John, 2004), playing darts (Schleien, Kiernan, & Wehman, 1981), pinball (Hill, Wehman, & Horst, 1982), frisbee (Horst, Wehman, Hill, & Bailey, 1981). Also, Cameron and Capello (1993) taught specific sport skills to individuals with autism or severe intellectual disabilities. Moreover, a recent study revealed that most to least prompting was an effective method in teaching leisure skills to an adult with autism (Vuran, 2008).

Most to least prompting is an errorless teaching technique that requires giving the strongest prompt for the student to respond correctly. When the student starts to perform skills independently from the provider, the strength of the prompt is decreased. Thus, the student becomes independent from the cues (Tekin & Kircaali-Iftar, 2001). There are several studies indicated that most to least prompting was an effective teaching method

for individuals with mental retardation and autism. For example, researchers have taught leisure skills (Vuran, 2008), learning pedestrian skills (Batu, Ergenekon, Erbas, & Akmanoglu, 2004), food preparation skills (Kaysen, Billingsley, & Neel, 1986), banking skills (Donnell & Ferguson, 1988), and verbal labeling (Richmond & Lewallen, 1983). Consequently, all of these studies showed that most to least prompting method was an effective intervention in teaching for individual with disabilities.

Although there have been studies about the effects of most to least prompting procedure on different disabilities in the literature, there is no research on the effects of most to least prompting procedure on the simple progression of swimming skill for children with autism. Therefore, the aim of the current investigation was to examine the effectiveness of most to least prompting procedure on the simple progression swimming skill of children with autism who acquired mental adjustment to the water. Also, maintenance and generalization effects of the procedure were assessed.

Simple progression swimming skill was gathered from the Halliwick's method of teaching swimming skills. This method was designed by James McMillan who taught at Halliwick School for Girls in Southgate, London. The Halliwick's method is based on scientific principles of hydrodynamics and body mechanics. It has been found to be very safe for people of all ages, and individual with disabilities as well as for the able bodied (Martin, 1981). Swimmers trained on a one-to-one ratio of instructor until complete independence achieved. The swimmer-instructor pair becomes a unit within a group activity so that the swimmer gains the advantages of social interaction with his peers while at the same time enjoying the unobtrusive but constant attention of an individual instructor. Groups became aware of properties and behavior of water and how to control their own specific balance problems. Swimmers disengaged from instructor when they learned initial mental adjustment to the water and balance control principles learned. This method provides a sport, recreation and exercise as wells as an opportunity for friendship, equality, and competition. The Halliwick's method has ten stages and divided into

TABLE 1

Stages of The Halliwick's Swimming Method

<i>Phases</i>	<i>Skills</i>	<i>Purpose</i>
Phase 1	Mental adjustment Disengagement	Adjustment to the water
Phase 2	Vertical rotation Lateral rotation Combined rotation	Rotations in the water
Phase 3	Up thrust Balance Turbulent gliding	Control of movement in the water
Phase 4	Simple progression Basic progression	Movement in the water

four phases. Table 1 shows phases of the Halliwick's method of teaching swimming skills.

Method

Participants

Three boys with autism, ages 9 years, participated. Three prerequisite conditions were established for participants applying three phases of the Halliwick's method before the study: 1) Adjustment to water skills, 2) Ability to use rotations skills in the water, 3) Control of movement in water skills. All participants met these criteria. The names of participants were given pseudonymously in the study.

Ömer was a 9 year old boy with autism. He participated in an early special education program when he was 3–5 years old. In addition, he had an individual special education service twice a week when he was 6 years old. At the time of the study he was being mainstreamed student at a public school for the past three years. Ömer had reading, writing, and simple mathematical skills. However, he had difficulty in social interaction, communication and use of appropriate language skills.

Yener was a 9 year old boy with autism. He also participated in an early special education program when he was 4–5 years old. Yener also is mainstream student at a public school for two years, and he had reading, writing, and simple mathematical skills. He also had problems in communication and language skills.

Soner was a 9 year old boy with autism and he is the twin brother of Yener. He partici-

pated in an early special education program when he was 4–5 years old. In addition, he had an individual special education service four times a week when he was 6 year old. At the time of the study, Soner had been a mainstream student at a public school for a year. He had reading, writing, and all simple mathematical skills. Similar to other participants Soner had problems in social interaction, communication, and language skills. None of the participants had any systematic intervention in most to least prompting method prior to the study.

Trainers

The intervention phase was applied by three researchers. Researchers had degrees in special education and physical therapy with prior research experience in special education.

Settings

All instructional, probe, maintenance and generalization sessions occurred at the Anadolu University indoor swimming pool. The swimming pool was divided into two parts with a rope. At the beginning, all students participated in fun water activities (e.g. jumping, splashing water, and walking hand by hand) with instructors on the right side of the pool. Each student then was transferred individually to the left side of the pool for instruction and intervention. In addition, all sessions occurred in a one-to-one format for 10 weeks, three times a week, between 7:30 AM and 8:30 AM. There was also a writing board at the swimming pool.

Materials

No special equipment was used during the study. However, a video recorder, video tapes, data collection forms, a writing board and pencil were employed to collect data. Social reinforcers were used for motivational purposes (e.g., free time game activities, jumping in the water up ward).

Screening Procedure for Target Behaviors

The main purpose of this study was to teach simple progression swimming skill for chil-

dren with autism. Therefore, this skill was selected as a main task from the Halliwick's method of teaching swimming (Martin, 1981). Each child trained on water adjustment skills before the implication of study.

Experimental Design and Procedure

A multiple baseline design across subjects was used to determine the effectiveness of the most to least prompting (Alberto & Troutman, 1995; Tawney & Gast, 1984).

A 1 to 1 instructional format was used during all experimental sessions. There were probe, probe, maintenance, and generalization sessions in the study. Trainer and participants were face to face in all sessions, and all participants were ready in the pool before the start of the study.

Baseline (A) Conditions

A probe condition was implemented before the training of the target behavior, and after the criterion was reached in training of that target behavior for a minimum of three probe sessions. Probe sessions occurred prior to training target behavior and after the criterion was met for that target behavior. Each probe condition had a minimum of three consistent probe sessions.

A single opportunity procedure was used during all probe sessions. The trainer presented the task direction and recorded the participants response to steps of the task analysis. When the subject initiated an incorrect response, performed an incorrect response or no response, he was interrupted by the teacher and the subject's response was recorded as a minus (−) and the rest of the steps in the task analysis were recorded as incorrect. When a participant performed a correct step he got a plus (+) (Brown & Snell, 2000). For example, the trainer took his place in the pool and said, "Soner, are you ready to perform simple progression movement in the water?" to get his attention. Once an affirmative verbal or physical response was received, the trainer delivered the task direction, "Do the simple progression movement in the water." Then the trainer waited 5-s for the participant to initiate a response. The child was reinforced with a descriptive verbal phrase

when he initiated the correct steps in 5-s and kept it 15-s. Incorrect responses were defined as not initiating a step in 5 s, initiating but not completing in 15-s, and initiating an incorrect step of the task analysis is not considered. In addition, if the first response was incorrect then the rest of steps in the task analysis were recorded as incorrect (Wolery, Ault, & Doyle, 1992).

Most to Least Prompting Instructional (B) Conditions

There are three stages in application of most to least prompting. In the first stage, physical cues and verbal direct prompts were provided. Trainer says how to do this stage to subject as well as a physical cue such as "Lay back now" and trainer provides support with his hands from student's back. In addition, trainer gives verbal reinforcement like "Good Job" and as soon as task is over another step starts. Trainer says "Okay, let's go on. Now, stick your fingers together and place your arms to your side" with a physical assistance to subject. Verbal reinforcement provided when subject completed his task correctly in 100%. In second stage, verbal directed prompt and gesture-mimic prompt provided. Trainer provides verbal cues and reinforces every step in 5 s. The third stage started when the participant could complete his task at 100% correct. In the final stage, only verbal cues were provided and participant asked to swim such as "Ömer let's swim" to get attention of subjects during teaching sessions. Training session was ended when subject completed all steps successfully at the end of the final stage.

There were five types of subject responses during instructional sessions: correct response before cueing; correct response after cueing, wrong response before cueing, wrong response after cueing, and no response. Correct response before cueing was defined as completing a step of the task correctly within 5-s after the prompt. Correct response after cueing was defined as attempt to completing a step of task correctly within 5-s after the prompt and completing it within 5-s. During teaching sessions correct responses recorded as a plus (+) and other responses were recorded as a minus (−). All correct responses were before after cueing reinforced to com-

plete other steps (Tekin & Kırcaali-İftar, 2001).

Reliability

Reliability data were collected during at least 35% of all the experimental sessions. Inter-observer reliability was calculated by using point by point method with a formula of the number of agreements divided by the number of agreements plus disagreements multiplied by 100 (Tawney & Gast, 1984).

The mean percent of the inter-observer agreement for the simple progression skill during baseline was 98% (90% to 100%); during instruction was 93% (80% to 100%); during maintenance was 100% and during generalization was 96% (90% to 100%). Independent variable reliability (procedural reliability) was calculated by dividing the number of teacher behaviors observed by the number of teacher behaviors planned and multiplied by 100 (Billingsley, White, & Munson, 1980). The following teacher behaviors were observed for procedural reliability during training session: (a) having the materials ready, (b) securing the participants attention, (c) delivering the task direction, (d) delivering the controlling prompt in time (if appropriate), (e) waiting for the response interval, (f) delivering the correct behavioral consequences, (g) waiting for the inter-trial interval. The same steps were observed during probe, maintenance, and generalization sessions except for delivery of control prompts.

Procedural reliability measures resulted in an overall percentage of 100% during baseline for Ömer. Procedural reliability measures resulted in an overall percentage of 96% (87% to 100%) during instruction for Ömer. This teacher implemented maintenance and generalization sessions with 100% accuracy for Ömer. Procedural reliability measures resulted in an overall percentage of 100% during baseline for Yener. Procedural reliability measures resulted in an overall percentage of 98% (86% to 100%) during instruction for Yener. This teacher implemented maintenance and generalization sessions with 100% accuracy for the lateral rotation skill. Finally, procedural reliability measures resulted in an overall percentage of 100% during baseline for Soner. Procedural reliability measures re-

sulted in an overall percentage of 95% (80% to 100%) during instruction for Soner. Also, this teacher implemented maintenance and generalization sessions with 100% accuracy.

Maintenance and Generalization Sessions

Maintenance sessions were collected two, and four weeks after the instruction had stopped. Maintenance data showed that the participants maintained the rotation skills taught to them at criterion level one, two, and four weeks after the instruction. Generalization across persons was examined by a pre-post test design. These sessions occurred before training and at the end of teaching the simple swimming skills. Generalization sessions were identical baseline but in another settings. One to one teaching arrangement and single opportunity methods were used during both maintenance and generalization. Generalization data showed that all participants retained the simple swimming skills taught to them across people 100%.

Results

Most to Least Prompting Instructional Data

Table 2 shows instructional data for each student through the criterion. Ömer, Yener, and Soner needed 9 training sessions to reach criterion on simple progression swimming skill. Baseline and training data for Ömer, Yener and Soner shown in Figure 1 respectively.

The open circles represent the percentage of correct responding during full baseline and instructional sessions, maintenance and generalization session. As seen in Figure 1, all subjects meet criteria after the introduction of most to least prompting. This data showed that most-to-least prompting was effective on teaching simple progression swimming skill for children with autism.

Ömer, Yener, Soner performed no correct responses during the baseline sessions. When instruction of the simple progression using “physical prompt and verbal prompt” started, they performed with 100% accuracy in the first three session, and continued the performance (100 %) while using “verbal and gesture/prompt” in sessions 4, 5, 6. All subjects’ performance continued 100% in sessions 7, 8,

TABLE 2

Instructional Data for Each Student through Criterion

<i>Students</i>	<i>Behaviors</i>	<i>Thru Criterion</i>	<i>Number of Sessions</i>
Ömer	Simple progression	Physical + Verbal Prompt	3
		Verbal + Gesture/Mimic Prompt	3
		Verbal Prompt	3
		Total	9
Yener	Simple progression	Physical + Verbal Prompt	3
		Verbal + Gesture/Mimic Prompt	3
		Verbal Prompt	3
		Total	9
Soner	Simple progression	Physical + Verbal Prompt	3
		Verbal + Gesture/Mimic Prompt	3
		Verbal Prompt	3
		Total	9

9 while using only “verbal prompt.” During the maintenance and generalization sessions he continued to perform the skill with 100% accuracy.

Discussion

The main purpose of this study was to determine the effects of most to least prompting on the simple progression swimming skills for children with autism. In addition, generalization and follow up data was collected. Results of the study were analyzed using graphic illustrations. Results indicated that all subjects increased their correct target skills in simple progression swimming skills with a significant amount during the intervention phase. Moreover, subjects maintained their successful simple progression skills during the first, second, and fourth weeks of generalization phases.

Literature review proved that most to least prompting method is an effective intervention to teach leisure skills to an adult with autism (Vuran, 2008), learning pedestrian skills (Batu et al., 2004), food preparation skills (Kayser et al., 1986), banking skills (Donnell & Ferguson, 1988), teaching verbal labels (Richmond & Lewallen, 1983). Consequently, similar to these findings, this study demonstrated that most to least prompting was an effective method to teach and maintain a simple progression swimming skill to children with autism.

Based on the graphic illustration of data, it

can be concluded that all participants received the same amount of sessions and all subjects did not have any error in their performance during the intervention. Considering the difficulties subjects such as attention and communication skills, this study proved that most to least prompt was an effective procedure to teach the simple progression swimming skill. Moreover, procedural reliability measures showed that all teachers applied most to least prompting procedure consistently between 87%–100%. In the literature it is recommended that procedural reliability which is minimally 80% and above 90% is highly regarded (Wolery, Bailey, & Sugai, 1988). This study also showed that procedural reliability was high for teachers during the sessions. As a result, it can be concluded that all teachers effectively applied the procedures of most to least prompting to teach the simple progression swimming skill for children with autism. Also all participants performed this skill very well in early sessions with this intervention in a limited time. Therefore, this procedure is highly recommended for further research attempts.

The present study has two important contributions to literature: 1) support of the literature that most to least prompting was an effective method to teach certain tasks to individuals with disabilities: 2) first research attempt to determine the effects of most to least procedure on simple progression swimming skill for children with autism.

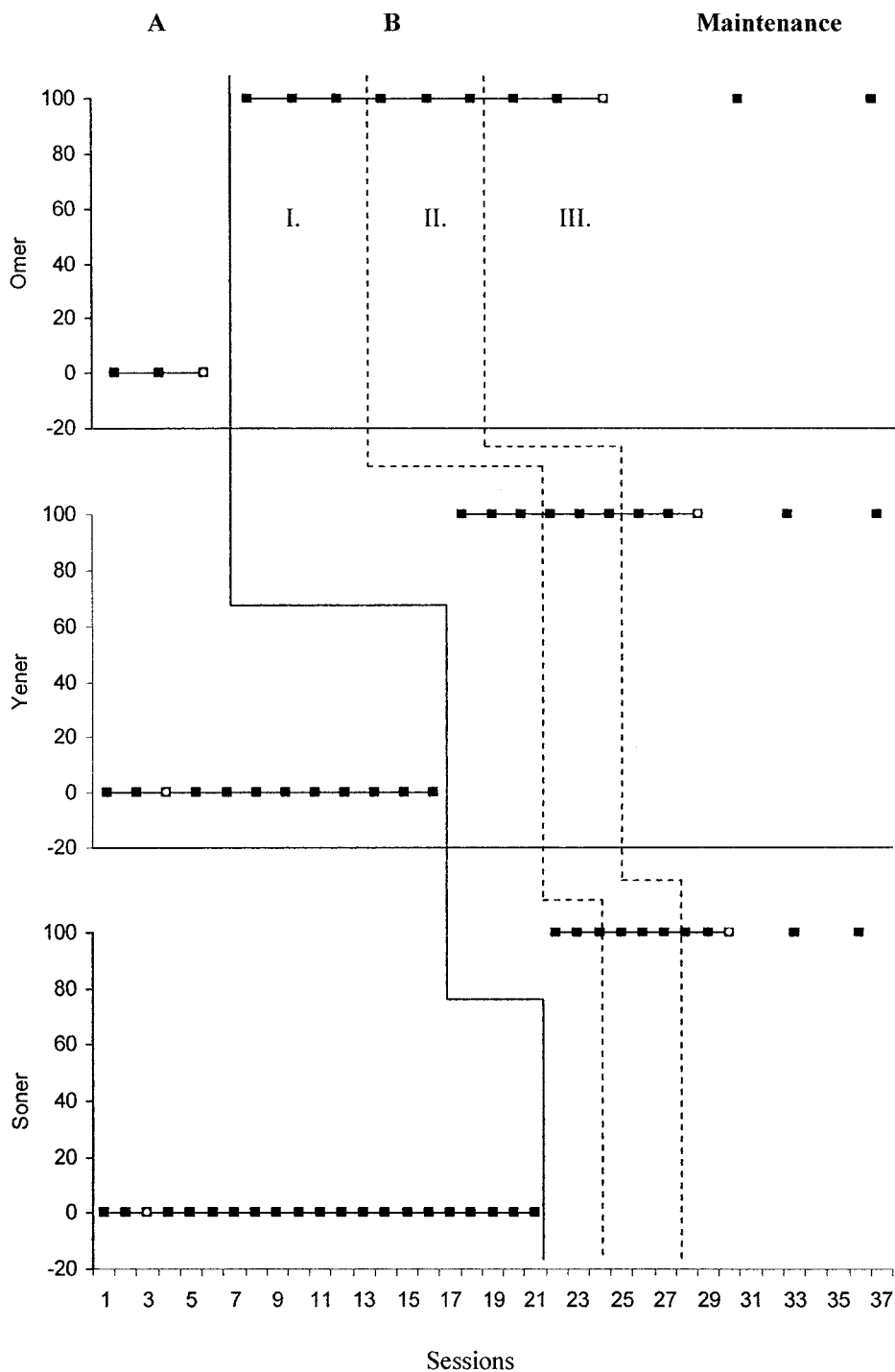


Figure 1. Percentage of correct responses after the prompt for simple progression swimming skill during full probe, instructional, maintenance, and generalization probe sessions. Closed circles represent correct responses during full probe, instructional, and maintenance sessions. Open circles represent correct responses during generalization sessions.

Data from this study resulted in several recommendations for future research. First, 1 to 1 teaching arrangement and single opportunity method to teach simple progression swimming skill was used. The findings from this study can be replicated using instructional group arrangements and other instructional methods such as cooperative learning, direct instruction, peer tutoring, class wide peer tutoring. Second, simple progression swimming skill was selected from the Halliwick's swimming education program (Martin, 1981). Thus, all children became ready to participate and learn actual swimming skill patterns. Therefore, it is recommended to teach different swimming skills, and educational games to children with autism for future experimental research. Third, trainers reported that all children enjoyed this aquatic drill during all sessions, and improved their social and communication skills with peers in comparison to their out of pool behaviors. Fourth, most important, trainers witnessed that autistic children had less stereotypical autistic motor behaviors (e.g., swinging their bodies backward and forward, playing fingers, moving head in a circular motion and, jumping) in the water during training.

As a result, findings of this research revealed that most to least prompting is an effective and applicable method of increasing and maintaining a simple swimming skill for children with autism. Also, it is reasonable that teachers can teach many different activities using this simple progression swimming skill.

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Effects of the *TOUCHMATH* Program Compared to a Number Line Strategy to Teach Addition Facts to Middle School Students with Moderate Intellectual Disabilities

Dale Fletcher and Richard T. Boon
The University of Georgia

David F. Cihak
The University of Tennessee

Abstract: The purpose of this study was to systematically replicate and extend previous studies of the TOUCHMATH program, a multi-sensory mathematics program (Bullock, Pierce, & McClellan, 1989). Three middle school students with moderate and multiple disabilities (e.g., autism and moderate intellectual disabilities) participated. Students were taught how to solve single-digit mathematics problems using TOUCHMATH and a number line. An alternating-treatments design across participants (Barlow & Hersen, 1984) was utilized to evaluate and compare the effects of both strategies. Results indicated that the TOUCHMATH strategy was more effective and efficient in teaching students' single-digit addition problems compared to the use of the number line. Limitations of the study, implications for practice for classroom teachers, and suggestions for future research are discussed.

Many students with disabilities at the middle school level, particularly those with moderate intellectual disabilities have difficulty meeting the curriculum demands in content-area classrooms such as mathematics instruction (see Browder & Grasso, 1999; Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, 2008; Butler, Miller, Kit-hung, & Pierce, 2001; Jitendra & Xin, 1997; Kroesbergen & Van Luit, 2003; Mastropieri, Bakken, & Scruggs, 1991; Miller, Butler, & Lee, 1998; Swanson & Jerman, 2006; Xin & Jitendra, 1999; for reviews). Specifically, students with moderate intellectual disabilities frequently have difficulties with mathematics, including *basic skills* (Nesbitt-Vacc & Cannon, 1991; Podell, Tournaki-Rein, & Lin, 1992; Luit & Naglieri, 1999; Young, Baker, & Martin, 1990), *money applications* (Test, Howell, Burkhart, & Beroth, 1993; Fredrick-Dugan, Test, & Varn, 1991; Sandknop, Schuster, Wolery, & Cross, 1992), and

problem-solving activities (Mastropieri, Scruggs, & Shiah, 1997; Morin & Miller, 1998). For example, students with moderate intellectual disabilities are less proficient and use less effective strategy instruction in completing and solving mathematics problems than their “typically” functioning peers (Goldman, Pellegrino, & Mertz, 1988). However, performing basic computational mathematics is essential for student success and to foster independent living skills. Acquiring these computational skills for many students with moderate intellectual disabilities may require the use of manipulatives.

Using manipulative materials has been used to assist in teaching basic computational mathematics skills for students with moderate intellectual disabilities. For instance, Burns (1996) indicated that manipulative materials were used at all levels and that teachers could not teach without them. There are various manipulatives that are used in teaching basic computational mathematics skills. For example, one widely used mathematics strategy to teach mathematics is the number line (Ernest, 1985). Copeland, Hughes, Agran, Wehmeyer, and Fowler (2002) used a number line and

Correspondence concerning this article should be addressed to Richard T. Boon, The University of Georgia, Department of Communication Sciences & Special Education, 537 Aderhold Hall, Athens, GA 30602-7153. Email: rboon@uga.edu

systematic instruction to teach four students with moderate intellectual disabilities to match numbers at the secondary level. The use of a number line is one multi-sensory approach to teach addition utilizing a count-all to count-on approach (Secada, Fuson, & Hall, 1983). In counting-all, entities must be present for each addend, and students count all the entities. For instance, students begin counting “one” and count to “ $m + n$.” Where as counting-on, the student begins with “ m ” and continues counting on “ $m + n$ ” (Secada et al., 1983). For example, if a student was given the following problem $4 + 5$, the student would start counting-on from four and say, “five, six, seven, eight, and nine.”

Another type of manipulative strategy for teaching computational mathematics skills is the use of a “dot-notation” as a representative approach. Kramer and Krug (1973) introduced the dot-notation approach for teaching mathematics skills to students with disabilities, which students begin learning to count-all, and progress to using the counting-on approach. Kokaska (1975) examined the effectiveness of the dot notation system with four students with mild disabilities. These students were pre-tested in their addition and subtraction skills. Two of the students were unable to independently complete any problems, while the other two students were only able to complete a partial number of the problems. Then, these students were taught the dot-notation system for solving addition and subtraction problems. Results showed that two of the four students were able to solve addition problems ranging from single-digits to a combination of two or more digits. Moreover, students solved problems accurately if the problems were presented either horizontally or vertically. These results support the use of multi-sensory manipulative programs such as the *TOUCHMATH* program.

The *TOUCHMATH Program* (Bullock et al., 1989) which is similar to that of the dot-notation introduced by Kramer and Krug (1973) was used with large numbers of students in the general education classroom. Scott (1993) examined the use of the *TOUCHMATH* program with elementary students with mild disabilities in the fourth grade. Three students with mild disabilities

were taught the touch-points strategy for addition and subtraction problems within a multiple-probe design across mathematics skills. The target skills were adding two-digit numbers with regrouping, adding columns of two-digit numbers with regrouping, and subtracting single-digits up to 18, subtracting two-digit numbers with regrouping, and subtracting three digit numbers with regrouping. Results indicated that all three participants were successful in using the *TOUCHMATH* program. In another study, Simon and Hanrahan (2004) utilized the *TOUCHMATH* program to evaluate the learning of addition computational skills with students with learning disabilities. Three students with learning disabilities in mathematics instruction were examined to see if they could be taught three-row, double-digit addition problems using the dot-notation method. Results revealed that the students were able to learn and apply the dot-notation method and were able to retain the method from 6 weeks and 18 weeks after completing instruction.

With different manipulative materials available, the suitability of a particular manipulative is a concern, especially if a student is dependent upon a manipulative system to complete computational problems later in life (Kramer et al., 1973). To date, there are a limited number of studies involving students with moderate and multiple disabilities using a dot-notation method. Moreover, previous studies have only included elementary-aged students and no studies using the dot-notation strategy in the middle school grades were found.

Therefore, the purpose of this study was to *replicate and extend* on the use of the “touch point” strategy to teach addition problem-solving skills to students with moderate intellectual disabilities at the middle school level. In addition, a secondary purpose of this study was to compare the effectiveness and efficiency of touch points and number lines for teaching single-digit addition problems to determine if there are functional differences between the two strategies for students with moderate intellectual disabilities (e.g., autism and moderate intellectual disabilities).

Method

Participants and Setting

The sample consisted of three middle school students with moderate intellectual disabilities. Two of the students were diagnosed with autism in addition to having a moderate intellectual disability. Formal educational assessments were conducted on these two students, particularly with autism, as well as the local educational agency's school psychologist within four years preceding the study. The teacher participating in the study had three years of teaching experience in a self-contained special education classroom working with students with mild to moderate intellectual disabilities, while the paraprofessional had four years experience in an early education classroom setting and one year in a self-contained special education classroom environment. The study was conducted within a self-contained classroom, which instruction commonly occurred for these students. All the students demonstrated the prerequisite skills of counting and writing to 20.

Ashley. Ashley was a 13-year-old female in the sixth grade that on the *Wechsler Intelligence Scale for Children – WISC IV* (Wechsler, 1991) had a Full Scale IQ score of 40 and was diagnosed with a moderate intellectual disability. Ashley's *Verbal Comprehension* and *Perceptual Reasoning* were also below average, as her standard scores were 53 and 47, respectively. Also, her *Working Memory* and *Processing Speed* were likewise far below average with a standard score of 50. According to her *Peabody Picture Vocabulary Test-4* scores, her receptive language skills were also very low with a standard score of 50; similarly Ashley's expressive language skills on the *Expressive One-Word Picture Vocabulary Test* were below average with a standard score of 48. In addition, Ashley's basic academic skills were also well below average, specifically her phonemic decoding skills were below average on the *WJ-III Word Attack* subtest with a standard score of 31, word identification skills on the *WJ-III Letter-Word Identification Test* with a standard score of 37, and finally on the *WJ-III Spelling* and *Calculation* subtests, with standards scores of 36 and 7, respectively, which were both well below average. Furthermore, her scores from the *Vineland Adaptive*

Behavior Scale were also in the low range as her standard scores of adaptive skills were as follows: *Communication*, 54; *Daily Living Skills*, 52; *Socialization*, 89; *Motor Skills*, 49; and *Composite*, 56. Ashley was not currently taking any medications; however, based on her last IEP, she was functioning approximately in the lower first grade level in mathematics. Moreover, Ashley had a mild articulation disorder and received speech and language services and also displayed deficits in writing (i.e., poor graph-motor control) and had problems with her short-term attention abilities.

Robert. Robert was a 13-year-old male in the seventh grade and according to the *Stanford-Binet Intelligence Scale-Fourth Edition* (Thorndike, Hagan, & Sattler, 1986) his scores showed the following: *Verbal Reasoning*, 70; *Visual Reasoning*, 63; *Quantitative Reasoning*, 66; *Short-Term Memory*, 49; and *Test Composite*, 54. As indicated by his *Peabody Picture Vocabulary Test-R* scores, Robert was within the moderate intellectual disability range. Robert was also administered the *Gilliam Autism Rating Scale* (Gilliam, 1995) and was diagnosed with autism. The scores from the *Gilliam Autism Rating Scale* (GARS) are as follows: *Stereotyped Behaviors*, 8; *Communication*, 9; *Social Interaction*, 8; *Developmental*, 9; and *Autism Quotient*, 85. Additionally, his scores from the *Vineland Adaptive Behavior Scale* were in the low range, as average scores range from 85–115 and his standard scores of adaptive skills were as follows: *Communication*, 53; *Daily Living Skills*, 44; *Socialization*, 64; and *Composite*, 50. Prior to beginning the study, Robert could only add single-digit addition problems that involved one as one of the numbers. Robert was also Hearing Impaired and used two hearing aides and was not currently taking any medications.

Ken. Ken was a 14-year-old male in the eighth grade and had a Full Scale IQ score of 45 on the *Wechsler Intelligence Scale for Children – WISC III* (Wechsler, 1991), which suggested he had a moderate intellectual disability. Ken's *Verbal Comprehension* and *Perceptual Reasoning* were also below average, as his standard scores were 55 and 53, respectively. Also, his *Working Memory* and *Processing Speed* were likewise far below average with standard scores of 56 and 53, respectively. Similar to Ashley, according to Ken's *Peabody Picture Vocabulary Test-4* scores, his receptive language skills were

also extremely low with a standard score of 60. Ken was also administered the *Childhood Autism Rating Scale* (Schopler, Reichler, & Renner, 1988) and was diagnosed with moderate autism, with a standard score on the (CARS) of 31. In addition, his scores from the *Vineland Adaptive Behavior Scale* were in the low range, as his standard scores of adaptive skills were as follows: *Communication*, 72; *Daily Living Skills*, 65; *Socialization*, 66; and *Composite*, 66. Prior to the study, Ken was unable to add single-digit addition problems independently during mathematics instruction. Lastly, Ken was taking Stratera 40mg once a day for his attention deficit disorder (ADD).

Materials

The materials used in this study consisted of two forms, Form A and Form B, of which each form contained 10 single-digit addition mathematics problems. Form A consisted of the *TOUCHMATH* (Bullock et al., 1989) single-digit addition problems worksheets with the “touch points” presented on the numbers, while Form B contained the opposite problems and in a different order on the page for use with the number line strategy. For instance; if Form A had the problem $5 + 8$, then Form B presented the problem as $8 + 5$ located in a different order of the worksheet. A number line with numbers from 0 to 20 also was used.

Dependent and Independent Variables

The dependent variable was the percentage of single-digit mathematics problems performed correctly by the three students, while the independent variables were the use of the *TOUCHMATH* program using “touch points” and the number line strategy. There were two mathematics worksheets with different single-digit mathematics problems of similar difficulty. Also, the worksheets (both Form A and B) presented single-digit addition problems presented vertically with comparable problems for the students to solve. For example, if worksheet Form A had $3 + 5$ then worksheet, Form B had $5 + 3$ except in a different order on the page that was semi-randomly assigned. Every effort was made to ensure that the problems were not situated in the same order or

placement on the sheets. While similar problems were presented on both Forms A and B, the same worksheet was never presented to the students twice during the intervention phases.

Data Collection and Experimental Research Design

The data collection procedures for each session consisted of the permanent product recording from each of the three students. In order to calculate the student’s percentage of correct mathematics problems, each of the sessions were calculated by taking the number of correct mathematics problems completed independently and dividing by the total number of problems presented to calculate the total number of problems completed correctly for each of the sessions. The criterion for acquisition of the student’s performance of the mathematics problem-solving was 100% correct for three consecutive sessions. The strategy to first achieve criterion was then replicated using the content from the strategy that did not meet criterion. An alternating-treatments design (Barlow & Hersen, 1984) was used to examine and compare the differential effects of the *TOUCHMATH* program using “touch points” and the number line strategy on the acquisition of mathematics performance for each of the three students.

Procedure

Baseline. In the baseline phase, the students were provided a worksheet with 10 single-digit addition mathematics problems to complete. During this phase, the probe was completed when the students answered all 10 of the mathematics problems or if there were no written response on the worksheet after a period of 15 minutes from the student. In this phase, the students also did not receive any additional teacher assistance, as they completed the worksheet. In addition, before proceeding to the intervention phases, a minimum of three consecutive sessions of stable data collection were required for all three students.

Intervention procedures. During both interventions, the *TOUCHMATH* program using “touch points” and the use of the number line

strategy, the students were seated at their desks with the instructor in their classroom. An adapted model-lead-test procedure (Adams & Engelmann, 1996) was utilized to teach the students how to use the “touch points” and number line strategy. In this procedure, the teacher modeled the correct responses, lead the students by having them state the correct responses with the teacher, and then tested them by having the student independently state the correct responses. In the first three sessions following the baseline phase, the teacher provided model training sessions. During the “touch point” instruction, the students were explicitly and directly instructed on the dot-notation positions of the numbers 1 through 9, using the *TOUCHMATH* program. Then, the teacher provided the students with one worksheet per session of 10 single-digit addition problems with illustrated “touch points”, which consisted of numbers with single or double black dots on the worksheets. The students were instructed to count aloud the number of dots, while touching each dot, of both numbers (count-all) and then write the last number they had stated.

During the number line strategy instruction condition, the teacher provided the students with a number line from 0 to 20. Students were asked to place their fingers on the number line at the number that matches the first number in the problem; then locate the other number and move that many spaces counting aloud (count-on); and then write the number. In this condition, the teacher praised the student orally for the correct response followed by an immediate imitation (lead) of the model, which was identical to the “touch points” phase. Finally, the remaining sessions for both the “touch points” and number line strategy were considered test sessions to be recorded by the researcher.

The test sessions for both of the strategies “touch points” and the number line intervention were presented once a day in the morning of the school day, with at least a 30 minute but not more than one hour break between each testing session. During the break sessions, the students were instructed to work on other academic content-areas and homework assignments. The presentations of both interventions were administered semi-randomly to counterbalance which strategy was imple-

mented first or second during the testing sessions. Students completed one mathematics worksheet with the 10 single-digit addition mathematics problem per session using either the “touch points” or number line strategy. Sessions ranged from 5 to 15 minutes. In addition, students received verbal praise for correct responses. However, if a student required assistance, a least-to-most prompt hierarchy was used until the students provided a response without assistance using a 10-second interval between each prompt level (a) verbal prompting, (e.g. “Do you see what numbers need to be added? Do you see the number line? Do you see the touch points?”), (b) followed when needed by gesturing (e.g. pointing to the first number on the number line or touch points after the verbal prompting has received a response with no further actions from the student), and (c) modeling or demonstrating (ensuring the students repeated what the teacher said and pointed and stated the number and counted correctly).

Replication. During the replication phase, the first strategy to achieve the criterion was then replicated using the content from the nonpreferred strategy. The criterion was answering problems with 100% accuracy for three consecutive sessions.

Reliability

The investigator, classroom teacher, and the paraprofessional in the classroom collected data for inter-observer reliability and procedural reliability measures. Inter-observer and procedural reliability data was collected during the baseline, intervention, and replication phases. The observers independently and simultaneously recorded the number of single-digit addition mathematics problems scored correctly, and the required prompt level. The inter-observer agreement was calculated by dividing the number of agreements of student responses by the number of agreements plus disagreements and multiplying by 100 for 25% of the sessions during each of the phases. Inter-observer reliability ranged from 99% to 100% agreement across all three phases. The inter-observer reliability agreement for each student across baseline, interventions, and replication phases was 99% for Ashley, 99% for Robert, and 100% for Ken.

Procedural reliability probes measured the teacher's performances of implementing the correct mathematical strategy, responding to correct and incorrect responses, prompting hierarchy, and response time. The investigator modeled both intervention strategies (e.g., "touch points" and number line) and prompting hierarchy to both the teacher and paraprofessional using a checklist of specified teacher behaviors. Upon completion of three consecutive trials with 100% accuracy, the teacher was considered to have mastered the procedures. Procedural reliability probes were conducted in 25% of sessions in each phase of this study. The procedural agreement level was calculated by dividing the number of observed teacher behaviors by the number of planned teacher behaviors and multiplying that by 100. Procedural reliability ranged from 98% to 100%, with a mean of 99%.

Results

As illustrated in Figure 1, all three of the students across baseline, interventions, and replication phases of the intervention showed significant improvements using the "touch points" method compared to the number line strategy to solve single-digit addition mathematics problems. Moreover, the results indicated that all three of the students were able to utilize the "touch point" strategy faster and more accurately than the number line intervention. During the baseline phase, the students averaged 4% of the single-digit mathematics problems accurately, however, while in the "touch points" phase the students averaged 92% of the problems correctly, compared to only 30% while using the number line strategy. Furthermore, all three of the students averaged 96% correct during the replication phase.

Ashley. During the baseline phase, Ashley was only able to complete one single-digit mathematical problem correctly. Although she improved with the "touch point" strategy faster, her data indicated an ascending pattern with both strategies, but was able to reach criterion sooner with the "touch point" strategy. In fact, she did not reach criterion until session 28 even though she was able to achieve 90% accuracy by the

fourth session, she could not maintain that accuracy over three sessions until the 28th session. In the replication phase, she dropped to a 90% in the second session of the replication phase, but then she was able to maintain 100% accuracy. Ashley was observed using the "touch point" method during four of the number line strategy sessions. In sessions 9, 16, 20 and 23, Ashley had a peak in her score with using the number line strategy, and a dip of 30% in the "touch point" strategy when she was observed carrying over one strategy to another. However, the use of the touch points was determined to be more effective and efficient based upon Ashley reaching criterion quicker than using the number line. During the replication, the content used during the number line strategy was presented to Ashley. Using the touch-point strategy, Ashley's single-digit addition performance improved to a mean of 98%.

Robert. Robert was unable to complete any of the single-digit addition problems during the baseline phase. However, he was able to attain 100% accuracy by the 8th and 9th sessions for both strategies, but could not maintain that accuracy to achieve criterion until the 25th session using the "touch point" strategy. In the last three sessions in the number line phase, Robert's performance was observed descending following a relatively inconsistent performance for using the number line strategy. When replicated, the content used during the number line strategy was presented and Robert's single-digit addition performance improved to a mean of 100% using the touch-point strategy.

Ken. Ken could not complete with accuracy any single-digit addition problems during the baseline phase. However, Ken was able to obtain 100% accuracy using the "touch point" strategy by the 7th session, but did not achieve criterion until the 17th session. Ken also demonstrated that using the touch point strategy was more effective for him than using the number line. During the number line strategy phase, Ken's performance was ascending, but he was unable to achieve 40% accuracy or better. Ken solved single-digit addition problems and reached criterion faster using the touch point method.

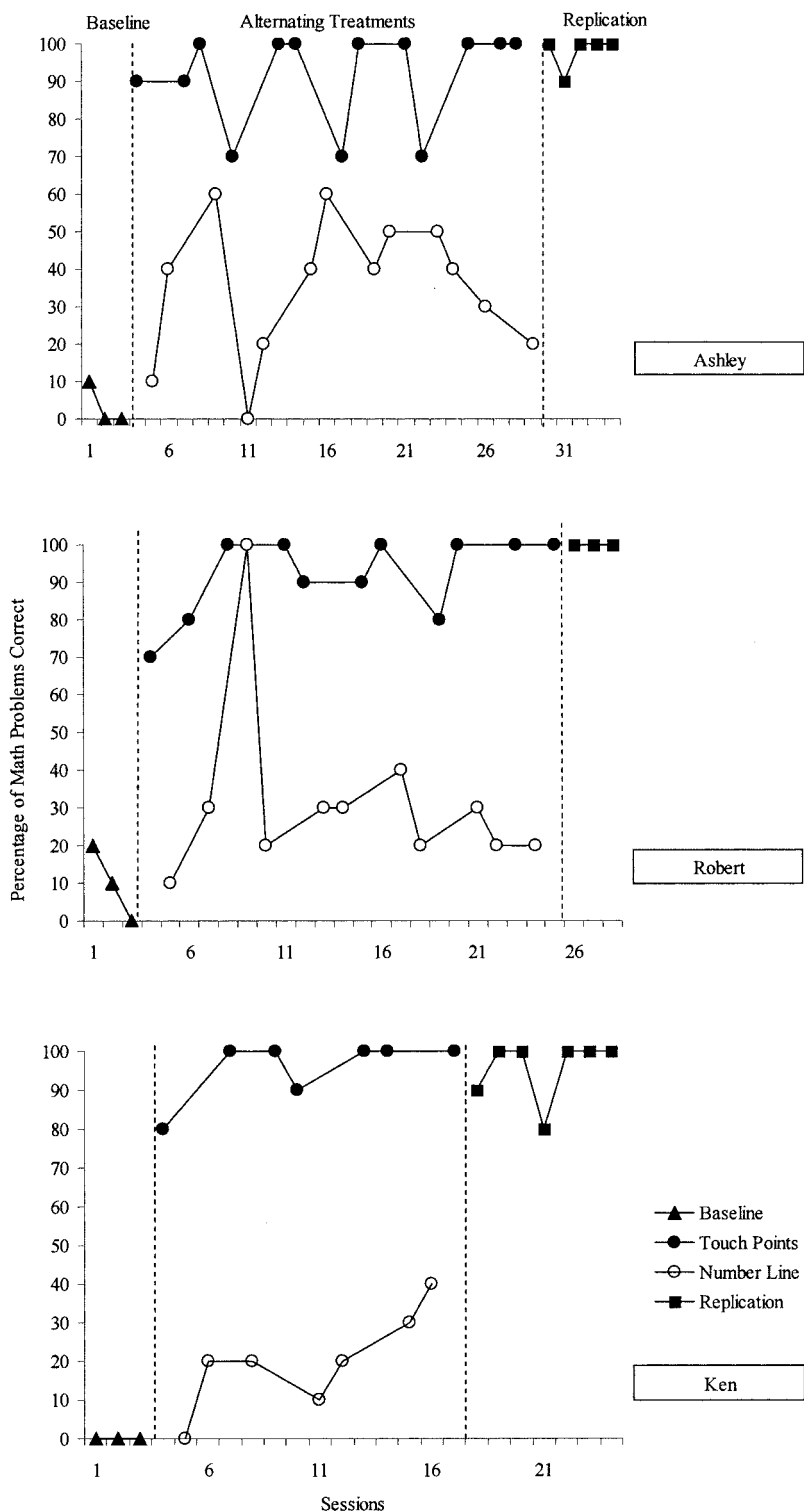


Figure 1. Percentage of single-digit addition mathematics problems using the number line and touch points strategies answered correctly by Ashley, Robert, and Ken

Discussion

The purpose of this study was to *replicate and extend* a previous study by Cihak and Foust (2008) comparing the effectiveness of the *TOUCHMATH* program using “touch points” and number lines for teaching single-digit addition problems to students with moderate intellectual disabilities. The results revealed that the students performed better using the “touch point” strategy over the number line in acquiring single-digit addition problem-solving skills. The “touch points” strategy was functionally more effective when comparing the number lines and touch points. In addition, this study also supports previous research studies that have demonstrated that “touch points” have the potential to be an effective intervention to teach single-digit addition problems to students with a variety of disabilities (Kokaska, 1975; Scott, 1993; Simon & Hanrahan, 2004; Wisnieski & Smith, 2002). However, no previous research besides the Cihak & Foust study was found that could find any comparison differentiating instructional strategies using the *TOUCHMATH* program and number lines, or any other interventions, for teaching computational skills to students in middle school with moderate intellectual disabilities. While there were differences in the students learning and differences in how long it took them to obtain their acquisition of the strategies, all three of the students showed the “touch point” strategy was more effective.

However, there are several limitations in this study that need to be addressed. First, the study employed a single-subject design and only examined single-digit mathematics problems using only three students with moderate intellectual disabilities in a self-contained classroom in a middle school, which limits the generalizability of the intervention to larger populations. So, larger samples must be investigated before broad conclusions can be made and more rigorous treatment-control designs are needed. Second, prior knowledge of the *TOUCHMATH* program was unknown at the time of this study and with the carry over effects that were noted with Ashley, the potential of this prior knowledge can alter the outcome of the study. If the students were exposed to using the *TOUCHMATH* program in elementary school, what happens to their abil-

ity to use the “touch points”? Do the students with various disabilities need to be constantly reminded? Do they need to be refreshed in the “touch point” methods? For example, with Ken, he was quickly able to achieve high scores after the instructional sessions using the “touch points” strategy. Perhaps more longitudinal studies are needed using the *TOUCHMATH* program with students with a vast array of disabilities beginning in the elementary schools and following the students throughout their secondary grade levels.

This was the beginning skills in using *TOUCHMATH* and further acquisition skills would include counting-on rather than the counting-all method that was performed in this study. In addition to learning these basic beginning skills obtained using the *TOUCHMATH* program, students are eventually using their skills and adding or subtracting without the use of the dots on the numbers. This phase of the *TOUCHMATH* program was not examined in this study. Using the dot-notation method allows those students who struggle with rote memorization to use the count-all or count-on strategy. This strategy also is more feasible to use out in the public, for example, while shopping and purchasing grocery items as there is no other manipulative to carry around such as a number line or blocks, which often can be cumbersome and uncomfortable to carry around as a manipulative.

Future research is warranted to investigate the learning of other mathematical problem-solving skills, such as multiple-digit addition and subtraction problems with and without re-grouping and multiplication and division using the *TOUCHMATH* program for students with a variety of diverse learning and academic disabilities. In addition, further research is needed to explore the use of the *TOUCHMATH* program for students with and without disabilities in self-contained and inclusive classroom settings across a range of age, grade, and disability categories.

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Social Skills Instruction Carried Out by Teachers Working at Private Special Education Institutions in Turkey

Ayten Uysal and Yasemin Ergenekon
Anadolu University

Abstract: As social beings, humans have to learn social behaviors, too. The social behavior repertoire is increased by learning, and is affected by any factors that may impact learning. Individuals with developmental disabilities need systematic teaching in order to acquire social skills (SS) in natural settings. Via SS instruction, SS are taught to individuals who have social inadequacies or, in other words, such individuals are taught how to use the skills they already have in their repertoire. In this study, in order to determine the SS teaching practices of teachers who work at private special education centers, semi-structured interviews were conducted and the data collected have been analyzed by using inductive analysis procedures. The participants of this study were 14 teachers. The results demonstrated that teachers were having serious problems and inadequacies regarding SS instruction. It can be said that, there is a need for supportive services for systematic planning of SS instruction for pre-service and in-service teachers.

Humans are defined as social beings. In order to be a social being, a person has to learn social behaviors just like any other behavior. SS instruction is supposed to be a lifelong learning process (Driscoll & Carter, 2004). The most critical time in a child's life in this process is the early childhood period. Any delay in the child's SS development during early childhood may result to some limitations in this area in adulthood (Driscoll & Carter, 2004; Elliott & Gresham, 1987; Odom et al., 1999).

The social behavior repertoire, increased as it is by learning, is affected by any learning impacting factors (Guralnick, Neville, Connor & Hammond, 2003). Thus, some of the individuals who have typical development and most individuals with developmental disabili-

ties have difficulties to adapt in social environments, to build up relationships, to demonstrate self-control and to obtain a job during both school years and adulthood (Cartledge & Kiarie, 2001; Hillier, Fish, Cloppert & Beversdorf, 2007; Pierce-Jordan & Lifter, 2005).

Individuals with developmental disabilities need systematic teaching experiences to learn SS as well as the other skills necessary in their daily lives, since the acquisition of SS is related to the adequacy of their cognitive and communication skills (Driscoll & Carter, 2004; Guralnick, 1999; Guralnick et al., 2003). Demonstrating social behaviors requires the exhibition of an appropriate reaction to a prompt that is received from a situation or a person. Individuals with developmental disabilities learn social behaviors in forms, but they have trouble in using these forms in the appropriate situations (Driscoll & Carter, 2004).

SS instruction is one of the most important developmental areas that needs to be taken into consideration in different periods of development with different approaches (Driscoll & Carter, 2004; Licciardello, Harchik & Luiselli, 2008; Pierce-Jordan & Lifter, 2005). SS practices have to be appropriate for the age of the child concerned. Especially, for children between the ages of 0 and 3, practices should

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focus on the important adults in the child's life. However, the families' beliefs, attitudes and knowledge of the child's adequacy, impact his/her SS learning process. If the beliefs, attitudes and knowledge in question are positive it would be possible for the family to raise a child that has positive relationships with both peers and adults (Guralnick, Connor, Neville & Hammond, 2006; Guralnick et al., 2003). If, however, the family's attitudes are negative, it becomes crucial to include SS instruction as a part of the special education services received by the child, in order to reduce the impacts of the family's negative attitudes.

With SS instruction, SS teaching is offered to individuals who have social inadequacies, or, in a similar vain, such individuals are taught how to use the skills they already have in their repertoire in appropriate settings. However, in school, academic instruction is prioritized, and therefore, most frequently, teachers assign very little, if any, time to SS instruction. Hence, it appears to be quite important to include SS instruction in curricula for individuals with developmental disabilities and inadequate SS (Cartledge & Kiarie, 2001). During the instruction planning stage, the utilization of evidence-based practices on SS instruction can provide teachers with effective teaching practices and efficient educational time.

There are various methods of improving the social functions of individuals with developmental disabilities referred to in the relevant literature. These methods can be listed as direct instruction (Sargent, 1991; Sugai & Lewis, 1996), peer-mediated practices (Gena, 2006), collaborative teaching (Avcioglu, 2005), social stories (Cartledge & Kiarie, 2001; Delano & Snell, 2006), cognitive process approach (Cifci & Sucuoglu, 2004), adult mediated methods (Disalvo & Oswald, 2002), written prompts (Thiemann & Goldstein, 2004), natural instruction methods (Brown, Odom & Conroy, 2001), and video supported recordings, discussion and role playing (Elias & Maher, 1983). There are also methods such as modeling, prompting, shaping, behavioral practices, providing feedback, social reinforcement, and fading used in SS instruction (Schloss & Smith, 1994; Zirpoli & Melloy, 1997). In addition to these methods, video-

mediated SS instruction (Hansen, Nangle & Meyer, 1998), activities related to play, and generalization of spare time play are mentioned in the SS instruction related literature (Pierce-Jordan & Lifter, 2005; Vauhg et al., 2003).

SS instruction consists of the introduction of positive behavior and strategies, behavior and strategy modeling, trying positive behaviors and strategies in natural or pretend settings, and teaching self-observation, evaluation, and reinforcement in different settings (Rutherford, Chipman, Digangi & Anderson, 1992; Kenneth & Forness, 1999). Moreover, individual and small group SS instruction is usually based on working together, sharing, and collaborating (Bierman, 2001).

Teachers should have the necessary competencies to implement the aforementioned instruction methods and arrangements. There are some courses providing practice skills in programs which train special education teachers in Turkey. However, there is not a separate course for teaching SS. Programs usually try to close this gap by providing such knowledge in courses that are related to skills instruction in general.

The perceived necessity of including SS teaching in the education programs of children with developmental disabilities (Licciardello et al., 2008) directed the researchers of this study to determine the practices of teachers in this area, and to initiate some necessary programs of SS instruction development. Thus, the purpose of this study was to determine the practices related to SS instruction of those teachers who work at private special education centers for children with developmental disabilities.

Method

Participants

The subjects were 10 female and four male teachers who volunteered to participate in this study and who worked at private special education centers in Eskisehir at least for one year. Six of the participants had undergraduate degrees in special education, and eight of them were elementary school teachers who received in-service training and had obtained a certificate in special education.

Before the study, the authors explained the goal of the study and the process to be followed to the participants. Furthermore, they stated that the interviews could be recorded and both the recordings and transcriptions would only be handled by the authors with no exceptions. Teachers and authors signed the informed consent forms specifying the above information.

Development of Data Collection Instrument

Interview questions were prepared in order to determine the practices of the SS instruction practice of teachers who work with children with developmental disabilities in private special education centers. The last form of questions was given after the inspection of the specialists in the field. Seven questions were asked during the interviews.

Data Collection

Data were collected between February 19th and 27th of 2008. Interviews were carried out on the dates and times that teachers determined at the centers they worked. All the interviews were conducted by the first author. The interviews took 12–25 minutes and all interviews were tape recorded. As a result of the transcription of these interviews a total of 145 pages of data were collected. All teachers were given pseudonyms in order to be used during the study.

All interview questions were asked of all participants by the first author. If needed, the author would ask extra questions to elaborate the subject. If teachers could not understand the questions, the author proceeded to clarifications, cautious of any possible diversion.

Design

In this study semi-structured interviews were conducted with the teachers who worked at private special education centers for at least one year and the data collected were analyzed by using inductive analyses procedures.

Data Analysis

The data were analyzed inductively (Creswell, 2005). The purpose of inductive analysis pro-

cedures is to constitute the themes or categories that were driven from raw data in order to make the complex data understandable to readers (Thomas, 2003). The steps of analysis are explained below:

1. Each interview was transcribed verbatim.
2. The second author checked if the transcriptions were correct and separated the paragraphs of related interview documents.
3. The first author checked the paragraphs of related interview documents.
4. The second author collected the answers of each participant for each question in different folders.
5. Both authors coded the data independently.
6. Then, the authors worked together until they reached an agreement on codes.
7. Both authors created themes and sub-themes from the codes independently.
8. The authors worked together until they agreed on the themes and sub-themes.
9. Themes and sub-themes were written from the raw data after the agreement of the authors in order to reach the results of the study.

Results

As a result of the data analysis, seven main themes were found. These were:

1. Determining the SS that will be taught
2. The content of SS instruction
3. The cause of inadequacy throughout SS instruction
4. The stages that were felt inadequate throughout SS instruction
5. The importance of SS instruction
6. The self-evaluation of teachers regarding SS instruction
7. Suggestions regarding SS instruction

Determining SS that will be Taught

The participants' opinions on this issue were divided in two.

a. The criteria for determining SS. Teachers take into account different criteria when determining the SS that will be taught. Six of the teachers reported that they determine SS ac-

cording to the current environment of the children, whereas two of them said that they determine SS in relation to their future environment. For example, Banu stated that she determines SS by “looking at the relationship of children among each other” in the current environment, and Zeynep said she preferred to determine SS by considering “what could happen in the future in children’s life, what would await them in the future.”

Moreover, five teachers reported that they determine SS according to the child’s performance, four teachers reported that they determine SS as a result of observation, three of them said they consider the family’s requests and two of them said they determine SS according to the needs of the children. For example, Ziya said he decided SS that he would teach by looking at “the results of rough evaluations,” while Gulsum and Hande reported that they decide to teach those “skills that children lack.”

b. SS that are a priority according to teachers. Four of the teachers reported that they teach those SS that they consider a priority. Asli and Yesim said they taught children how to say “hello, how are you, goodbye” prior to any other skills, and Banu said she preferred to teach children how to use “you” politely when they interact with elders as a sign of respect.

Content of SS Instruction

Three different opinions surfaced on this theme.

a. Teachers who were unaware of the content of SS. Seven of the teachers gave some examples of SS they were teaching. Dilek taught “how to wear a sweater,” Zeynep taught “cooking pasta and doing laundry,” and Ferhat taught “which bus to take and finding home” as SS. Also, Banu said she taught “going to bakery, post office, and picnic and riding a horse as SS, whereas Mehmet asked the interviewer to give him an example of SS.

b. Teachers who did not have any background related to SS instruction. Most of the teachers (10) reported that they did not have any training on SS instruction during undergraduate courses and certificate programs. Ziya said he took courses about skills and concept instruction during his undergraduate studies, but he did not receive any knowledge about SS in-

struction. Moreover, Banu, Dilek and Serpil said “I would have remembered SS instruction, if they would have taught.”

c. Teachers who did not have adequate knowledge on SS instruction. Seven of the teachers stated that they did not receive adequate information about SS instruction during their undergraduate education and certificate programs. Only one teacher stated that he gained some skills during his last year practicum. Hasan said they were “given some notes as undergraduates and trained themselves by reading them.” However Asli, Ferhat and Gulsum said that “SS instruction was not emphasized and they were not given any kind of documents about the subject.” They also added that had they been given “any kind of information, they would have developed their skills on SS instruction.” Ziya reported that they gained “some knowledge and learned how to prepare some programs during the last year practicum.”

The Causes of Inadequacy throughout SS Instruction

Four different opinions were stated regarding this theme.

a. Teachers who find the instruction theoretical. Five teachers reported that SS instruction was described briefly or they were only given course notes and the information they were provided was theoretical. Asli, Gulsum, Hasan and Mehmet described the information that was provided as “theoretical.” Moreover Ferhat said that they were given photocopies and CD’s and added “I guess they thought this is a classroom teacher, he should know how to teach SS to a child.”

b. Teachers who could not apply theoretical information in practice. Four teachers reported that they were provided with information on SS instruction during undergraduate and certificate programs, but they were unable to apply this knowledge. Banu, Hande and Mehmet said; “We cannot implement anything that training provided us with. We are doing everything by experience.”

c. Teachers who did not know what to do. Five teachers stated that they did not know where, when, and how to start SS instruction. Banu, Gulsum and Serpil expressed their opinions by saying; “I don’t know and I can’t say any-

thing else”, while Mehmet said; “It is necessary to handle children with love.”

d. Teachers who did not do systematic teaching. Six teachers reported that they do not plan in advance, they taught when the proper time came and when it was necessary. Hande said, “We are doing it whenever necessary. There is no planning but we do it when we think it is necessary.” Serpil explained how she taught SS by saying, “I am always talking to the student and encouraging him/her to talk. There is nothing else I can do right now.”

The Stages when Teachers felt Inadequate Regarding SS Instruction

Teachers expressed two different opinions about this theme.

a. Teachers who felt inadequacy about planning. Seven teachers reported that they feel inadequate when planning SS instruction. Dilek, Ferhat and Mehmet had trouble about finding “books or resources” regarding planning. Ziya and Pakize had trouble “making decisions on the method” that is appropriate for the SS, which they planned to teach.

b. Teachers who felt inadequacy about generalization. Most of the teachers (13) declared that they feel inadequate about generalization. Five teachers stated their opinions on inadequacy about teaching generalization and eight teachers stated their opinions about family involvement on SS instruction.

b1. Teachers who had inadequacy about teaching generalization. Five teachers stated that the SS taught by them in the educational environment were not observed functioning in the natural environment of children. Melek and Yesim reported that they mostly taught SS in a structured environment more than in daily, living ones. Zeynep stated that there was a problem with the generalization of the skills she taught, due to the resilience of the people in the given environment that such a generalization occurs.

b2. Teachers who found family involvement insufficient. Eight teachers sustained that families should exhibit some more interest in their children acquiring SS. They also stated that family plays a very important role when it comes to the generalization of learned SS. Gulsum emphasized the importance of the role of the family by saying, “If there is no

collaboration with the families, my work will not have any results.” Ferhat, Hande and Mehmet stated that the family role on SS instruction is “of the utmost importance.” However, Banu and Melek reported that families were often somewhat overprotective, a fact which, in turn, would prevent them from allowing their children to practice the acquired SS in their natural settings.

The Importance of SS Instruction

Eight teachers expressed the opinion that it is important for children with developmental disabilities to receive SS instruction in order to be accepted by the community and live independently. Ferhat, Melek and Ziya emphasized the importance of SS instruction by saying that children without SS are “more recognizable” in the community and their families are “bothered” by this. Pakize stated that SS instruction helps children have better acceptance levels in inclusion classrooms.

The Self-Evaluation of Teachers Regarding SS Instruction

Teachers expressed four different opinions on this topic.

a. The preferred methods of teaching SS. Eleven teachers stated their views on their preferred methods of SS instruction. Teachers preferred to teach SS by using modeling (7), drama (4), story telling (3) and teaching by doing and living techniques (3). They reported other techniques as well, such as providing verbal reminders (2), creating needs (2), errorless instruction (2), reinforcing (2), showing models (2), explaining what to do (1), demonstration (1), taking roles (1), peer training (1), and repetition. Asli, Dilek, Gulsum, Hande, Hasan, Melek and Ziya declared their preference for modeling, as evidenced by the phrase “First I do, and then I wait for the kids to do as well.”

b. Teachers who thought they possessed an inadequate SS instruction competence. Four teachers affirmed that they found themselves inadequate regarding the subject without stating a reason for their feeling. Banu, Gulsum, Hasan and Pakize stated that they were “inadequate” as regards SS instruction, and Pakize added

that “she felt very inadequate in real life SS instruction.”

c. Teachers who found themselves adequate in planning SS instruction. Two of the teachers mentioned that they had no trouble while planning SS instruction. Zeynep and Hasan said “there isn’t anything too difficult for me” in this.

d. Teachers who did not take responsibility of SS instruction. Two teachers stated that there is nothing that they can do about SS instruction as teachers. Banu stated her opinion on SS instruction by saying, “there is nothing we can do for them.” Furthermore, Ferhat said, “we are asking from these children to exhibit SS that are possible only for children who are typically developed.” Thus he stated his opinion that children with developmental disabilities could not acquire SS like their peers without disabilities.

Suggestions Concerning SS Instruction

Eleven teachers made suggestions about SS instruction. Those teachers’ suggestions were as follows: (a) practice opportunities should be provided while teachers were trained, in order to acquire the competencies necessary for SS instruction (6), (b) teachers should have the opportunity to watch examples of SS instruction (4), (c) teachers in training should be provided with the time necessary for the development of a SS instruction competence (3), (d) there should be a separate SS instruction course (2), (e) there should be in-service training or conferences on the subject (2), (f) there should be planning for generalization (2), (g) there should be a variety of instructed techniques (2), (h) there should be community training (1), (i) there should be more research on SS instruction (1), (j) the concept of SS instruction should be broadened (1), (k) teachers should be given examples of SS instruction plans (1), (l) teachers should be given examples of different SS in different environments (1), (m) children should be taught SS by group instruction (1), (n) there should be separate SS programs for every child (1), (o) there should be an appropriate environment for SS instruction (1), (p) there should be two or more teachers in the classroom (1). Banu, Hande and Yesim emphasized the importance of practice opportu-

nities by saying “I may ace the exam, but this is not important. What is important is how to implement this knowledge.” Hande, Hasan, Pakize and Zeynep stated that it would be helpful “if videos were played in the classes.” The numerals in the brackets show the frequencies of the statements.

Discussion and Suggestions

The purpose of this study was to examine the practices of teachers who provided services to children with developmental disabilities at private special education centers.

Half of the teachers emphasized the importance of SS instruction for children with developmental disabilities. This coincides with the literature on this area (Cartledge & Kiarie, 2001; Driscoll & Carter, 2004; Elliott & Gresham, 1987; Hillier et al., 2007; Odom et al., 1999; Pierce-Jordan & Lifter, 2005). However, it was interesting to see that teachers do not exercise any systematic planning and practices of SS instruction even though they constantly emphasized the importance of it. Although some teachers emphasized the importance of SS instruction, it was interesting to see that they did not feel responsible for SS instruction. In this context, it is possible to increase the awareness of teachers by emphasizing the function of SS for the children with DD in their daily lives.

Like all other skills instruction, the first step for SS instruction is to decide which skills to teach. The literature suggests deciding which skills to teach according to the child’s developmental level and his/her performance (Cartledge & Kiarie, 2001; Driscoll & Carter, 2004; Licciardello et al., 2008; Pierce-Jordan & Lifter, 2005). However, participants in this study determined the SS to be instructed by looking at the skills that children lack in the environment where they work together. It is possible for teachers to have expectations according to the child’s physical development and chronological age, when they do not take into account the developmental level and performance of the child. In this situation, teachers may be unsuccessful in teaching SS, which children were not developmentally ready to be taught. In fact, in this study teachers felt unsuccessful without stating any reason which supports this possibility. Also, teachers re-

ported that they did not know which skills to work on in the concept of SS instruction. This feeling may be a result of the lack of knowledge of SS instruction in the undergraduate courses and in-service trainings they received. In order to close this knowledge gap, there could be separate courses for SS instruction specifically, in special education departments, or the content of SS instruction could be increased in other skills courses. For teachers who are in the field at the moment, there could be seminars and in-service training on SS instruction.

The second step of SS instruction is to decide how to teach. The literature suggests deciding how to teach SS according to the child's developmental level and to the severity of the disability of the child. The literature also suggests that for young children it is appropriate to teach SS with their parents and peers in play, and that in later years it is appropriate to teach SS by peer tutoring (Driscoll & Carter, 2004; Guralnick et al., 2006; Guralnick et al., 2003; Licciardello et al., 2008; Pierce-Jordan & Lifter, 2005). Moreover, the selection could be planned according to the severity of the disability in environments that are natural or very structured (Rutherford et al., 1992; Kenneth & Forness, 1999). However, teachers in this study reported that they taught SS when necessary, without any systematic planning and that they used role modeling as the teaching method. These results are inconsistent with the literature on this subject. However, some participants stated that the information they received on SS instruction was very theoretical and they did not feel competent to determine a method according to the child's developmental level, the severity of the disability and the particular skills that need to be taught. Also, they stated that they felt inadequate to put their knowledge into practice. Almost fifty percent of the participants reported that they did not know what to do about SS instruction. It seems impossible for teachers to implement appropriate methods of SS instruction without previously closing the gap of knowledge in this area. Although it might not be possible to have time to practice SS instruction in courses, it might be possible to show videos of suggested methods supported by research.

The last and one of the most important

steps of SS instruction concerns the generalization of skills (Driscoll & Carter, 2004). In this study, fifty percent of the participants found family involvement to be insufficient in order for the children to use SS functionally and to become able to generalize these skills in their natural environments. The low expectation of families may prevent encouraging their children to use SS in their daily lives (Guralnick et al., 2006). However, teachers can solve the generalization issue in systematic instruction by using effective teaching methods. This situation once again brings to mind the participants' inadequacy when it comes to planning. As a remedy for this, the course contents could be widened, in order to give the necessary skills for generalization instruction to pre-service teachers.

In sum, interviews demonstrated that teachers in the field had serious problems and inadequacies regarding SS instruction. The situations reported by the participants, in which they feel inadequate, such as determining which skills to teach and planning SS instruction, impacted negatively their other teaching practices. The participants required information related to a training that would help them increase their skills on SS instruction. As a result, in order to have a systematic planning and practicing on SS instruction, there should be supportive services for both pre-service and in-service teachers. In a few years, another study could be conducted with the same participants to see the effect of such supportive services for these teachers.

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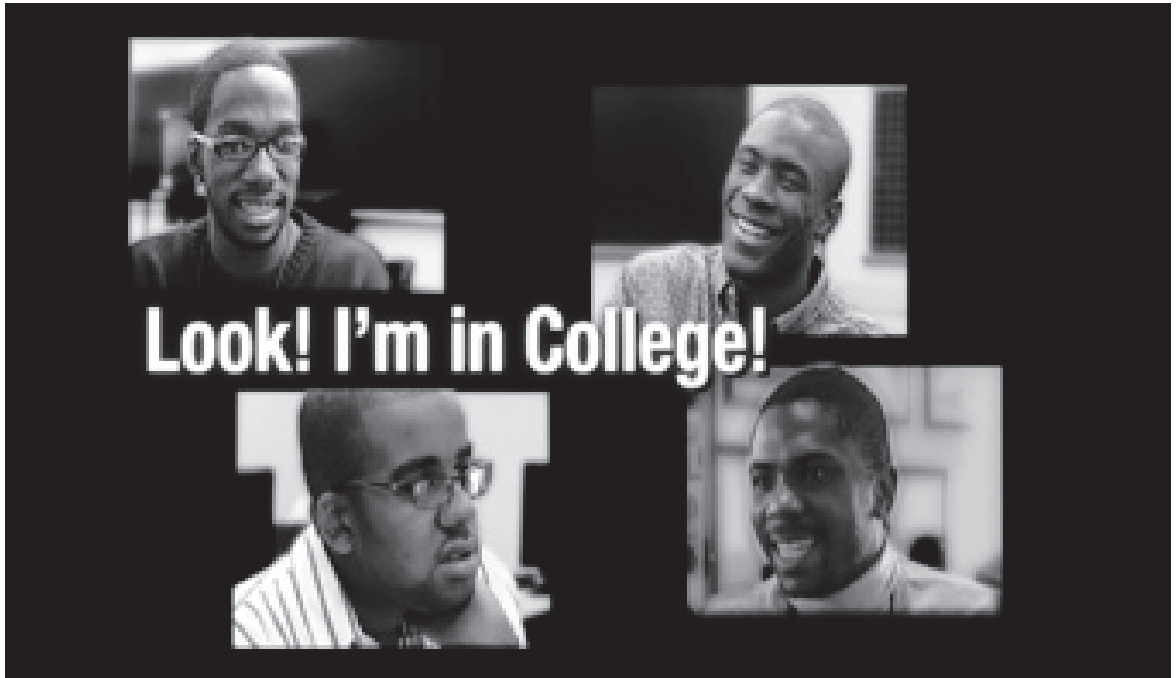
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