

deal of learning. Yet the deepest and most creative thinkers seem to engage in their work much less self-consciously. They forget themselves and become totally absorbed in the matter at hand (Dewey, 1916, p. 173; Montessori, 1936a, pp. 50–53; Maslow, 1970, pp. 45, 65). Like young children, highly creative people are interested in learning for its own sake. Piagetians and other developmentalists would like all of us to retain this kind of learning.

Piagetians also believe that Bandura overlooks the importance of cognitive structures or stages. Bandura, as we have seen, does acknowledge that cognitive skills set limits on what children can learn and imitate. But he does not believe that cognitive skills are best described as broad stage structures. Instead, he thinks of cognition much more atomistically, as a large number of specific, isolated skills.

Bandura's position has received support in recent years (Flavell, 1985, pp. 290–95), but the concept of general stage is not as untenable as he makes it sound. As we discussed in Chapter 6 on Piaget, there is reason to believe that Piaget's stages, despite certain problems, are valid. And social learning research itself occasionally suggests that the child's general stage is at work. For example, Liebert et al. (1969) found that 14-year-olds, but not eight- or six-year-olds, could imitate a new grammatical rule. The oldest subjects were able to figure out the rule underlying the model's behavior because they had capacities for abstract thinking that the younger children lacked. They had, it seems, formal operations.

It might be, then, that Bandura underestimates the importance of developmental variables. He certainly seems to overlook the extent to which children learn on their own, from an intrinsic interest in the world. He might also overlook the extent to which modeling is influenced by cognitive stages. Nevertheless, Bandura has significantly broadened learning theory and contributed enormously to our understanding of how environmental factors shape behavior.

10

Vygotsky's Social-Historical Theory of Cognitive Development

BIOGRAPHICAL INTRODUCTION

This book focuses on theorists in the developmental tradition—scholars who have seen developmental change primarily in terms of inner forces. For example, Gesell emphasized inner maturational promptings, while Piaget saw children making their own discoveries. By way of contrast, we have also examined the ideas of learning theorists, who have emphasized the role of the external environment.

Some readers, however, may be dissatisfied with this theoretical division. Why, they might ask, must we view development in either/or terms? Can't a theory assign major roles to both inner and outer forces?

The construction of such an integrative theory is a worthy goal, but few people have made much progress in attaining it. Bandura, as we saw, pronounces behavior to be multidetermined—to be influenced by various internal and external variables—but he also continues to discredit the developmentalist perspective on how change comes from within. Later we will discuss the ways Freud and Erikson weave inner and outer forces into their psychoanalytic theories. In the realm of cognitive development, the major theorist who had a deep appreciation of both developmental and environmental forces was the Russian L. S. Vygotsky (1896–1934).

Vygotsky had read the early writings of Gesell, Werner, and Piaget, and he recognized the importance of the kinds of intrinsic development

they were addressing. At the same time Vygotsky was a Marxist who believed that one can only understand human beings in the context of the social-historical environment. Thus Vygotsky tried to create a theory that allowed for the interplay between the two "lines of development"—the "natural line" that emerges from within and the "social-historical line" that influences the child from without (Vygotsky, 1931a, p. 17).

Vygotsky was only partly successful. He had only sketched out an integrative theory of development when, at the age of 38, his life was cut short by tuberculosis. Nevertheless, many psychologists believe that if we eventually do construct a solid integrative theory, it will build on the start Vygotsky gave us.

Lev Semenovich Vygotsky grew up in Gomel, a port city in western Russia. His father was a banking executive, and his mother was a teacher, although she spent most of her life raising her eight children. The family loved interesting conversation, a trait that rubbed off on the young Vygotsky. As a teenager, he was known among his friends as the "little professor" because he was constantly leading them in discussions, mock trials, and debates. Vygotsky also loved to read history, literature, and poetry (Wertsch, 1985, pp. 3–4).

When Vygotsky was 17, he wanted to attend the University of Moscow, but because he was Jewish he had to struggle with the state's quota system; the university's enrollment was only 3 percent Jewish. Initially, Vygotsky seemed assured of a spot because he was so bright. But before he completed his oral examinations, the educational ministry shifted to a lottery system for Jewish applicants. Vygotsky felt he had lost all hope, but then he won a position by chance alone.

At the university, Vygotsky specialized in law, but he also took a wide variety of courses in other fields, as well as courses at Shanyavskii People's University, where a number of professors had gone after being expelled from the University of Moscow for anti-Czarist leanings. Vygotsky graduated with a law degree from the University of Moscow in 1917 and returned to his home of Gomel (Wertsch, 1985, pp. 5–6).

Between 1917 (the year of the Communist Revolution) and 1924, Vygotsky taught literature in a secondary school and psychology at the local teacher's college, and he became interested in the education of the physically disabled. He also worked on his doctoral dissertation on the psychology of art. During this period he became ill with tuberculosis (1985, pp. 7–8).

On January 6, 1924, Vygotsky travelled to Leningrad to deliver a lecture on the psychology of consciousness. The clarity and brilliance of his speech—by the unknown young man from the provinces—had an electrifying effect on the young psychologists in the audience. One, A. R. Luria (1902–1977), recommended Vygotsky for a position at the Moscow Institute of Psychology, which Vygotsky received. During his first year of work at the institute, he finished his dissertation and received his doctorate (1985, p. 8).

In Moscow, Vygotsky soon became a commanding presence. When he lectured, students stood outside the packed auditorium and listened through open windows. When he travelled, students wrote poems in honor

of his journey. Vygotsky inspired such enthusiasm not only because his ideas were exciting, but because he led a group of young Marxists on a mission—to create a psychology that would help build a new socialist society (1985, p. 10).

Perhaps sensing that his life would be short, Vygotsky worked at a breakneck pace. He read, lectured, and conducted research as rapidly as he could, and he also travelled extensively to help clinics working with children and adults with neurological disorders. Vygotsky's daily schedule was often so busy that he did his writing after 2 A.M., when he had a few quiet hours to himself. During the last three years of his life, his coughing spells became so severe that he was sometimes left exhausted for days at a time. Nevertheless, he worked until he died (1985, pp. 12–14).

A few of Vygotsky's writings were published shortly after his death in 1934, but in 1936 the Soviet government banned his work—a ban that lasted until 1956. The primary reason for the ban was that Vygotsky conducted some research with intelligence tests, which the Communist Party condemned. Actually, Vygotsky criticized the conventional use of intelligence tests and employed them in new ways, but such subtleties were lost on the authorities. Fortunately, Vygotsky's colleagues and students kept his work alive, and in the past decade or so, there has been a great interest in Vygotsky's ideas in the West. This interest will doubtlessly grow as more of Vygotsky's writing is translated from the Russian (Cole and Scribner, 1978; Kozulin, 1986, pp. xxiv–xxv).

MARX'S VIEWS ON HUMAN NATURE

Since Vygotsky tried to create a psychology along Marxist lines, it will be helpful to briefly review some of the ideas of Karl Marx (1818–1883) on human nature before discussing Vygotsky in detail.

Marx's comments on human nature were relatively brief, and they primarily appeared in his early writings (Marx, 1844, 1845; Marx and Engels, 1846). Marx recognized that humans have biological needs, but he emphasized the human capacity for tool-use and production. It is by inventing and using tools that humans master their environments, satisfy their needs, and, ideally, fulfill their deepest creative potentials. Production, Marx also emphasized, is an inherently social process. People join together to plant and harvest crops, exchange goods, assemble machines, and so on.

Beyond these general comments, Marx had little to say about human nature. Indeed, he argued that it is a mistake to describe human nature in the abstract, apart from its social-historical context. Although humans are distinguished by their capacity for tool-use and technological production, the conditions under which they work and produce change throughout history. The working conditions of the medieval artisan, for example, were quite different from those of the nineteenth-century factory worker. To understand humans, then, we need to understand history and the dynamics of historical change (Marx, 1845, pp. 107–9; Marx and Engels, 1846, pp. 118–21, 129).

History, in Marx's view, is a *dialectical* process, a series of conflicts and resolutions. New forces of production (e.g., new ways of manufacturing) come into conflict with the existing social system, and a new social system is installed. For example, in eighteenth- and nineteenth-century Europe, the creation of new factories gave a rising class of capitalists the opportunity to make vast sums of money, but the ancient feudal system stood in their way. The result of this conflict was the overthrow of the feudal system and the establishment of a new system—the free enterprise system which allowed the capitalists to make as much money as they liked (Marx, 1859; Marx and Engels, 1872, pp. 336–40; Mills, 1962, pp. 82–83).

Marx believed that his own age—the second half of the nineteenth century—was experiencing a new phase in the dialectic of history. Technological progress was now being impeded by the free enterprise system. The resolution of this conflict would be a communist revolution in which the workers would take over the industries and organize them for the benefit of all.

We have encountered the concept of dialectic—of conflict and resolution—earlier (Chapter 6). Marx, like so many other scholars, adopted the concept from Hegel. However, Marx used the concept in a very different way.

For Hegel, the dialectic of history occurs in the realm of consciousness and ideas; one viewpoint comes into conflict with its opposite, leading to a new synthesis. Marx, in contrast, believed that conflicts in ideas are superficial. The conflicts that really matter are social and economic. In fact, most ideas and values merely justify particular social and economic interests. The medieval lords praised loyalty and honor; the rising capitalists heralded liberty and free competition; and both groups believed they were giving expression to the highest of all values. In reality, both groups were merely spouting opinions that justified their own social and economic interests.

Marx, then, was highly critical of those scholars who analyzed the nature of consciousness—people's ideas, values, and outlooks—as if these had an independent existence. What people think, Marx said, depends on their material life—the ways in which they work, produce, and exchange goods—at a certain point in historical development.

But it is not just the *content* of thinking that depends on historical development. Our species' cognitive *capacities*, too, have changed as a result of historical change, especially technological development. This, at least, was the position of Marx's collaborator Friedrich Engels (1820–1895), who forcefully argued that early technology—early tool use—gave rise to uniquely human traits such as advanced intelligence and speech.

Engels on tool-use and human evolution. According to Engels (1925, pp. 47–49, 238–46), our ancestors became capable of tool-use when they came down from the trees and began living on level ground. This new mode of life enabled them to develop an upright posture, which freed the hands for the production of stone implements. Once people began making tools, their minds expanded. They began discovering new properties of natural objects, such as the properties of stone and wood that facilitate

cutting. They also became aware, however dimly at first, of the scientific principles underlying tool-use, principles such as leverage, mass, and force.

Tool-use also led to new modes of cooperation and communication. As technologies advanced, people discovered the advantages of working together. For example, they found that they could more effectively build a hut or a boat by joining forces. But they now needed some way of communicating beyond grunts and gestures. People needed to give one another instructions, such as, "Turn right," and "Pull harder." "Men in the making," Engels said, "arrived at the point where *they had something to say to one another*" (1925, p. 232). Thus, they developed speech.

More generally, technology promoted a new orientation toward the environment. With tools in hand, humans no longer had to accept the environment as they found it. They could change it. At a certain point, for example, they stopped picking fruit and vegetables wherever they found them; they began clearing land and planting their own crops. This new orientation promoted planning and foresight. Successful farming requires people to plan months and years ahead. Such foresight, Engels observed, has not always been a capacity that humans have exercised as well as they should. Nevertheless, once people saw the power of tools and technology, they began transforming the environment according to their own plans and designs.

VYGOTSKY'S THEORY OF PSYCHOLOGICAL TOOLS

In the Marxist view, then, we cannot study human nature in the abstract, as something that is fixed and eternal. Human capacities, as Engels said, have changed as a result of historical development—especially technological development. As our species developed new tools for dealing with the environment, it became more aware of the properties of objects, developed new ways of cooperating and communicating, and developed new capacities for planning and foresight. Further changes in human technology will undoubtedly produce further changes in human cognition.

Vygotsky was deeply impressed by Engels's writing on tool-use, and he attempted to extend Engels's insights. Just as people have developed tools to master the environment, Vygotsky proposed, they also have created "psychological tools" to master their own behavior. For example, early peoples used notched sticks and knotted ropes to help them remember events, much as a person might tie a string around his or her finger today. Later, as cultures developed, they created other mental tools. Voyagers began using maps to help them retrace prior routes and plan future expeditions. Vygotsky called the various psychological tools that people use to aid their thinking and behavior *signs*, and he argued that we cannot understand human thinking without examining the signs that cultures provide (Vygotsky, 1930, pp. 39–40; 1931).

Undoubtedly, the single most important sign system is *speech*. Speech serves many functions, but most fundamentally it frees our thought and attention from the immediate situation—from the stimuli impinging upon us at the moment. Because words can symbolize things and events that

go beyond the present situation, speech enables us to reflect upon the past and plan for the future (Vygotsky, 1930, p. 26; Luria, 1976, p. 10).

For example, I know a farming family whose vegetables were being raided by deer. For a while the family members simply reacted to each immediate situation as it occurred. Whenever someone saw a deer eating the vegetables, he or she chased it away. After a while, however, the family sat down and discussed long-term solutions. They talked about building a new fence, how high it should be, and whether a ditch would be useful. One family member shared an idea she heard from a neighbor a few months earlier. By using words to symbolize things and events that were not immediately present—"a fence," "a ditch," "the neighbor's idea"—the family developed a plan. (They decided to build a higher fence.)

When humans use signs, Vygotsky said, they engage in *mediated* behavior. That is, they do not just respond to environmental stimuli; their behavior is also influenced or "mediated" by their own signs. In the present example, the family did not just respond directly to the environmental stimuli (the deer), but also acted on the basis of a verbally formulated plan ("O.K., we've decided to build a 10-foot fence") (Vygotsky, 1930, pp. 19–40).

The acquisition of speech is of major importance to the growing child; it enables the child to participate intelligently in the social life of his or her group. But speech does more than this. It also facilitates the child's own, individual thinking. By the age of three or four years, Vygotsky noted, children begin to carry out the kinds of dialogues they had had with others with themselves alone. At first they do this aloud, and we can hear children at play saying things such as, "I wonder where this wheel goes? Does it go here?" After a while, at the age of six or seven years, children begin to carry out such dialogues more inwardly and silently. Vygotsky believed that our ability to talk to ourselves—to think with the help of words—contributes enormously to our powers of thought.

Two other important sign systems are *writing* and *numbering systems*. The invention of writing was a great human achievement; it enabled people to keep permanent records of information. For most children, however, learning to write (and read) is a real struggle because writing forces children to detach themselves from physical, expressive speech, which comes so naturally to them, and to use abstract symbols for words. Learning to write usually requires a good deal of formal instruction (Vygotsky, 1934, p. 181; 1935, p. 105).

Numbering systems have also been of great importance in human evolution. Vygotsky suggested that early peoples created numbering systems because they found that they were unable to quantify objects (such as vegetables or cattle) by sight alone. They needed sets of symbols to help them count. For example, the Papuans of New Guinea invented a method of counting that used their fingers and many parts of their bodies to stand for objects. As societies evolved, they developed other numbering systems, such as the abacus and written notation. They also increasingly dealt with quantities in abstract and theoretical ways, apart from particular objects. Algebra, for example, deals with general quantitative categories without even specifying particular numbers. If $a + 10 = b$, then $a = b - 10$,

regardless of the particular values of a and b . The mastery of algebra and other theoretical uses of number, like the mastery of reading and writing, usually requires formal instruction (John-Steiner and Soubberman, 1978).

Vygotsky argued that cultural sign systems have a major impact on cognitive development—an impact overlooked by developmentalists such as Gesell and Piaget. Gesell and Piaget looked at development as if it comes from the child alone, from the child's inner maturational promptings or spontaneous discoveries. Vygotsky acknowledged that such intrinsic development, the "natural line" of development, is important. It even dominates cognitive development up to the age of two years or so. But after this, the growth of the mind is strongly influenced by the "cultural line" of development, the sign systems the culture provides. In fact, all our uniquely human powers of thought—those that distinguish us from other species—would be impossible without speech and other sign systems.

Vygotsky speculated, in addition, that the highest levels of thinking—the levels of purely abstract or theoretical reasoning—require instruction in writing, math, and other kinds of abstract concepts. Children might, to be sure, develop some concepts on their own, in their everyday experience, but they will not develop purely abstract modes of thought without instruction in abstract sign systems. And since this instruction is only widespread in technologically advanced societies, we will find purely abstract thinking prevalent only in these societies (Vygotsky, 1934, pp. 103, 206; 1935, p. 90; Luria, 1976, pp. 8, 161).

In 1931 Vygotsky saw a unique opportunity to test this latter hypothesis—that abstract thinking is a product of relatively advanced levels of social-historical development. At this time, there were many remote areas of the Soviet Union, including Central Asia, where peasants still lived a feudal existence. The peasants worked on small farms and were completely dependent on wealthy landowners and feudal lords. Most were illiterate. The new Soviet government, attempting to develop the entire nation into a modern socialist state, instituted collective farming practices, in which peasants met in groups to plan production, measure output, and so on. The government also gave the peasants short courses in writing, reading, and the theoretical uses of number. Because, in 1931, the government was still phasing in the new programs, Vygotsky saw the opportunity to compare the mental processes of those adults who had begun to participate in the modern forms of social life with those who were still living in the old ways.

Actually, Vygotsky himself was too ill to go to Central Asia to conduct field work, but he encouraged Luria and others to do so. In one aspect of the study, the interviewers presented the subjects with syllogisms such as the following:

In the Far North, where there is snow, all bears are white. Novaya is in the Far North. What color are the bears there? (Luria, 1976, p. 108)

The nonliterate subjects refused to deal with the question in a purely theoretical way. They said things such as, "I don't know what color the bears there are, I never saw them" (1976, p. 111). When the interviewer

pressed them, asking them to answer "on the basis of my words," the peasants still refused to speak beyond their personal experience. As one said, "Your words can be answered only by someone who was there, and if a person wasn't there he can't say anything on the basis of your words" (1976, p. 109). Those who had been participating in the new programs, in contrast, were willing to deal with the syllogisms on a theoretical plane and they answered them correctly (1976, p. 116).

This study wasn't perfect. In particular, it didn't pinpoint the particular aspects of historical change that had produced the greatest change in the peasants' thinking. Was the main factor the course work in reading and writing, or in math, or was it schooling in general? Or was the main factor collective farm planning? Such questions were left to other investigators (e.g., Scribner and Cole, 1981).

Nevertheless, the study did support the Marxist contention that the mind is a product of social-historical change. The study suggested that we cannot meaningfully discuss the "principles of thinking" or "cognitive development" in the abstract, as psychologists usually do. We need to examine the culture into which the child is growing, and the sign systems the culture provides. For, as Vygotsky said, "If one changes the tools of thinking available to the child, his mind will have a radically different structure" (cited in John-Steiner and Soubberman, 1978, p. 126).

Not all Marxist psychologists, we should note, have enthusiastically endorsed Vygotsky's ideas. Several Marxists have argued that Vygotsky stretched the metaphor of tools too far. Tools, they say, mean real tools—not speech, writing, math, and other "psychological tools" (see Kozulin, 1986, pp. xlviii–l).

But whatever his standing as a Marxist, Vygotsky pointed developmental psychology in a promising new direction. Vygotsky recognized the role of intrinsic forces, but he suggested that a complete understanding of cognitive development requires the study of the psychological tools the culture provides and expects the child to use.

These two forces—intrinsic and cultural—generally seem to be opposed. Perhaps it is for this reason that scholars have generally emphasized one force or the other, but not both. Vygotsky, in contrast, was schooled in dialectical theory and was therefore primed to consider the ways in which opposing forces interact and produce new transformations. The growing child, trying to make sense of the world in her own way, encounters a culture that expects her to use its particular sign systems. These interactions are complex and difficult to study. Vygotsky himself only began to investigate them, and he generally focused on only one side of the dialectic—the impact of culture on the child. In the following sections, we will review his work on the acquisition of memory aids, the internalization of speech, and the impact of schooling.

MEMORY AIDS

Vygotsky suggested that some of humankind's earliest psychological tools were memory aids, and these tools are still very important to us today.

Thus, Vygotsky and his colleagues conducted various experiments to try to gain insights into the ways in which children acquire them.

In one experiment, Vygotsky (1931a, pp. 70–71) instructed children and adults to respond in different ways when they saw different colors. He told them to lift a finger when they saw red, to press a button when they saw green, and so on for other colors. Sometimes he made the task simple, sometimes he made it difficult, and at certain points he offered memory aids.

In such experiments, the youngest children, between the ages of four and eight years, typically acted as if they could remember anything. Whether the task was simple or difficult, they rushed into it as soon as they heard the instructions. When the experimenter offered them pictures and cards "to help you remember," they usually ignored the aids, or used them inappropriately. Young children, Vygotsky concluded, "do not yet know their capacities and limitations" or how to use external stimuli to help them remember things (1931b, p. 71).

Older children, from about nine to 12 years, typically used the pictures Vygotsky offered, and these aids did improve their performance. Interestingly, the addition of such aids did not always improve the memory of the adults. But this was not because they had become like young children and no longer used memory devices. Rather, it was because they now rehearsed instructions and made mental notes to themselves inwardly, without the need for external cues (Vygotsky, 1930, pp. 41–45).

By today's standards, these experiments were very informal. Vygotsky and his colleagues did not systematically test predetermined hypotheses but used the experiments to explore the child's thinking. The investigators tried out various procedures and watched how the child responded, and in this way they tried to gain insights into the steps through which the child acquires some of the cognitive tools of his or her culture.

But as informal as these experiments were, they were pioneering investigations into an area that has become a major topic in contemporary psychology. This is *metacognition*, the awareness people have of their own thought processes. (People's specific awareness of their own memory processes is sometimes called *metamemory*). Like Vygotsky, contemporary psychologists are trying to discover how children become aware of their thinking and how they learn to use psychological tools and strategies to improve it (Flavell, 1985, pp. 105–7, 230–38).

SPEECH

As mentioned earlier, the single most important psychological tool is speech (Vygotsky, 1930, p. 24; 1934, p. 256). Speech frees our thought and attention from the immediate perceptual field. This freedom sets us apart from other species.

To illustrate this difference, Vygotsky called attention to research by Kohler (1925) on the problem-solving of apes. Kohler found that if one places a banana within an ape's visual field—but behind some bars so the ape cannot grab it—the ape's attention will be so riveted on the banana

that it will hardly consider anything else. The ape won't even consider using a stick lying nearby, unless the stick also happens to lie directly in front of the bars. The stick, that is, must also be part of the immediate visual field (Kohler, 1925, pp. 37–38; Vygotsky, 1930, pp. 35–37).

Human thinking, in contrast, can range much more freely beyond the immediate perceptual field, and it is speech that enables it to do so. Because words frequently refer to absent objects, we can, in a situation like that of the ape, ask ourselves, What object might reach that banana? Is there a stick or a pole around here that will reach it? Thus, we use words to contemplate and direct our search for objects not in our visual field.

Vygotsky suggested that the ability to engage in such internal dialogues develops in three steps.

1. Initially, references to absent objects occur in the child's interactions with others. For example, a two-year-old girl might ask her mother to help her find something. Or the mother might say, "We're going to the park now, so get your pail and shovel," directing the girl's attention to objects she had not been looking at.
2. Next, at the age of three years or so, the child begins to direct similar comments to herself. While playing with her toys, she might say, "Where's my shovel? I need my shovel," and begin looking for an object that had not been within her immediate surroundings.

For a time, this self-guiding speech is said aloud; we frequently hear children talking as they play or work on problems. Then, beginning at about six years of age, children's self-directed speech becomes increasingly quiet, abbreviated, and less comprehensible to us.

3. Finally, by age eight or so, we cannot hear this talk at all. But the child's self-directed speech has not disappeared; it has merely gone underground. It has turned into *inner speech*, the silent dialogue that one has with oneself (Vygotsky, 1934, pp. 29–40).

The general process, then, is one of *internalizing* social interactions. What begins as an interpersonal process, occurring between the parent and the child, becomes an intrapsychic process, occurring within the child. Vygotsky believed that this general progression characterizes the development of all the "higher mental processes," all the forms of thought and attention that depend on cultural signs. In fact, he stated that the progression is a general law:

Any function in the child's cultural development appears on the stage twice, on two planes, first on the social plane and then on the psychological. (1931a, pp. 44–45).

This law, in the view of Vygotsky and his followers, was a cornerstone of a Marxist psychology. A Marxist does not seek the origins of thinking within the individual child, spontaneously sprouting from the child's mind, but in external social existence (Vygotsky, 1930, p. 45). "The child," Vygotsky said, "learns the social forms of behavior and applies them to himself" (1931a, p. 40).

Egocentric Speech

In the process of internalizing social speech, children go through a phase (step 2) in which they spend considerable time talking to themselves aloud. The first person to call attention to this kind of speech was Piaget (1923), who called it *egocentric speech*. Piaget observed, for example, that if two five-year-old girls are playing in a sandbox, each might talk enthusiastically about topics without considering the fact that the other couldn't possibly know what she was referring to. Piaget called this speech "egocentric" because he thought it reflects the child's general egocentrism; the child doesn't adjust her speech to the perspective of the listener because she egocentrically assumes that the listener's perspective is the same as her own. Piaget estimated that between the ages of four and seven years about 45 percent of all speech is egocentric (1923, p. 51).

Vygotsky agreed that egocentric speech is very prevalent in this age group, but he disagreed with Piaget about its theoretical meaning. In Piaget's view, egocentric speech is basically useless. It merely reflects a deficiency in the child's thinking. Vygotsky, in contrast, emphasized its positive function; it helps the child solve problems. In one of Piaget's studies (1923, p. 14), 6½-year-old Lev says to no one in particular, "I want to do that drawing, there . . . I want to draw something, I do. I shall need a big piece of paper to do that." In Vygotsky's view, Lev's self-directed talk helps Lev plan and direct his activities (Vygotsky, 1934, p. 29).

Vygotsky also disagreed with Piaget about egocentric speech's ultimate fate. Piaget implied that as children overcome their egocentrism, egocentric speech simply dies out. Vygotsky argued that it doesn't just fade away, but it goes underground and turns into inner speech, the kind of silent dialogue that we so often have with ourselves when we try to solve problems. Interpreting the decline of egocentric speech as an indication that it is dying, Vygotsky said, "is like saying that the child stops counting when he ceases to use his fingers and starts adding in his head" (1934, p. 230).

Vygotsky argued, then, that egocentric speech is highly useful and is an important way station on the road to inner speech. But even if one were to agree with Vygotsky on these points, one would still have to agree with Piaget that there is something puzzling about it. The child seems to be talking to someone, yet doesn't do so in any full way. For example, a child playing alone with a tinkertoy while an adult is silently seated across the room says,

The wheels go here, the wheels go here. Oh, we need to start it all over again. We need to close it up. See, it closes up. We're starting it all over again. Do you know why we wanted to do that? Because I needed it to go in a different way. (Kohlberg et al., 1968, p. 695)

The child seems to be talking to the listener (e.g., asking him, "Do you know why . . . ?"), but the child doesn't wait for the listener to respond.

According to Vygotsky, the child's self-directed speech is puzzling because it is not yet differentiated from social speech. The child is trying

to use speech to direct her own activities, but she still casts her speech in the form of social communication. It takes a while for self-directed speech to "differentiate out" and take on its own character. Only gradually does self-directed speech become quieter and more abbreviated and turn into inner speech (Vygotsky, 1934, pp. 229–32).¹

Studies Bearing on the Vygotsky-Piaget Issue

Vygotsky and others have conducted a number of studies bearing on the Vygotsky-Piaget debate on egocentric speech.

Task difficulty. Vygotsky reasoned that if egocentric speech serves a problem-solving function, it should increase when tasks become more difficult. Because Piaget saw no positive function to egocentric speech, his theory makes no such prediction.

So Vygotsky did various things to make children's tasks more difficult. "For instance, when a child was getting ready to draw, he would suddenly find that there was no paper, or no pencil of the color he needed. In other words, by obstructing his free activity, we made him face problems" (Vygotsky, 1934, pp. 29–30). In these situations, the proportion of egocentric speech (the amount of egocentric speech compared to all speech) nearly doubled among five- to seven-year-olds (Luria, 1961, p. 33). The children tried to solve problems by talking to themselves. For example, one boy said, "Where's the pencil? I need a blue pencil. Never mind, I'll draw with the red one and wet it with water; it will become dark and look like blue" (Vygotsky, 1934, pp. 29–30). This study suggested, then, that egocentric speech does serve a problem-solving function in young children, a finding that has been replicated by Kohlberg et al. (1968).

Age trends. Vygotsky also suggested that his theory, in comparison to Piaget's, predicts different age trends. If, as Piaget implied, egocentric speech merely reflects the child's cognitive immaturity, it should decline as the child develops. It should simply drop off, as indicated by the solid line in Figure 10.1.

In Vygotsky's view, in contrast, egocentric speech is a new achievement, a new alternative to social speech. It provides the child with a new problem-solving tool—one that we might expect the child to increasingly use. Thus Vygotsky predicted that egocentric speech would actually rise before it declines as it turns into inner speech. This trend is indicated by the dotted line in Figure 10.1.

Basically, the empirical research on age trends has supported Vygotsky's position, as has nearly all other research that has pitted Vygotsky's views versus those of Piaget on this matter (Kohlberg et al., 1968). Nevertheless, it still seems possible that Piaget was partly correct. Even if some

¹As evidence that the child's overt self-directed speech is still partly social, Vygotsky reported that the child stops talking aloud when it is clear that the listener cannot hear (1934, p. 233). Vygotsky believed that this evidence contradicted Piaget's view that the egocentric child isn't trying to communicate, but Piaget denied that this was ever his belief. The child, Piaget said, wants to communicate but cannot (Piaget, note in Vygotsky, 1934, p. 275).

egocentric speech serves the self-guiding function that Vygotsky emphasized, it also seems that *some* egocentric speech might reflect the child's inability to consider the audience's viewpoint. Thus it may be that both Piaget and Vygotsky were correct.

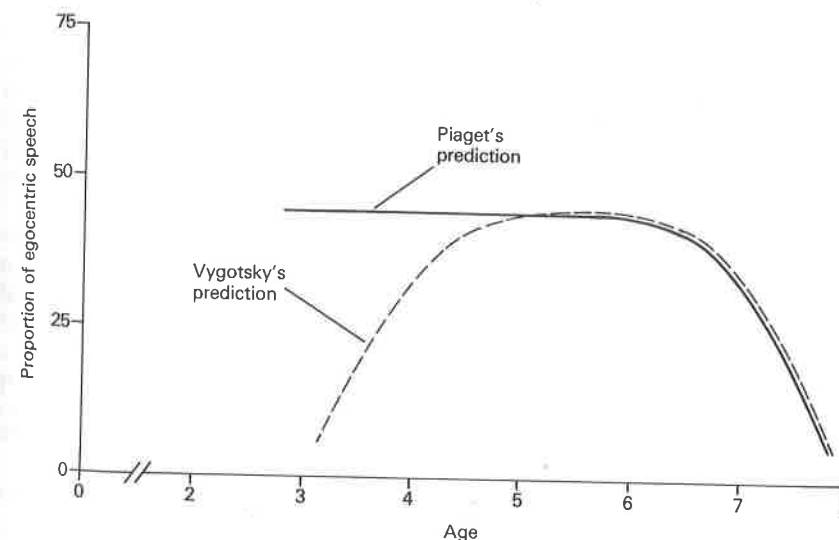
Verbal Self-Regulation and Personality Development

So far, we have focused on the way children use speech to help them solve problems of an intellectual sort. For example, we saw how a boy talked to himself to figure out how to draw a picture despite the absence of a blue pencil. But verbal self-regulation also helps us understand personality development more broadly. In particular, it helps account for those personality traits we ordinarily associate with character strength, such as conscience and will power.

Conscience. As we shall see in Chapter 11, Freudians suggest that at six or seven years of age, children begin to behave as if they are governed by internal moral standards. They no longer seem solely concerned with parental punishments; they begin to criticize themselves for thoughts and actions that no one else is even aware of. In Freudian terms, they are developing a *superego*.

Many of Freud's thoughts on the superego have to do with the Oedipus complex, and these thoughts go beyond Vygotsky's concerns. But when Freud discussed the process by which the superego develops, his explanation was completely in tune with Vygotsky's theory. Children develop a superego, Freud said, by internalizing parental prohibitions; they

FIGURE 10.1. Piaget's theory predicts a general decline in egocentric speech as children overcome their egocentrism. Vygotsky's theory predicts a curvilinear trend; since egocentric speech is a positive new achievement, it should increase for a time before declining as it turns into inner speech.



reproach themselves in the same way their parents had reproached them (Freud, 1933, p. 62). Vygotsky would have added that this internalization occurs largely through speech, and that there is a period when we can directly observe it because children speak to themselves aloud. Munn provides an example.

A three-year-old, awakening full of pep at six A.M., starts tuning up for the day. His weary and irate father from the next bedroom tells him in no uncertain terms to get back into bed, and adds, "Don't you dare get me up until seven o'clock."

The boy obeys, but within a few moments mutterings from his room again disturb the father.

Getting out of bed, and going to the door of the boy's room, this is what the father hears:

"Not till seven o'clock," to his arm as he jerks it back from the edge of the bed.

And, as his body squirms half out of bed, he throws himself back vigorously, saying, "You heard what I told you." (1946, p. 255)

Thus, this little boy gives himself moral directions in the same way his father had given them to him a short time earlier.

Will-Power. Another dimension of personality is will or will-power. Most of us feel that will-power is an important matter in our daily lives, but psychologists largely ignore it. Skinnerians believe that will-power doesn't exist. We might believe we are exercising our wills, but we are really behaving according to external reinforcements. Other psychologists avoid the concept because they would rather leave issues of free will and determinism to the philosophers.

Vygotsky, however, thought that will-power is a real phenomenon and a legitimate topic for psychological study. Basically, the question of will-power is: How is it possible for us to take action in situations in which forces pull us strongly against it? How, for instance, do we stop watching TV and go study instead?

Vygotsky's (1932) answer was that we use words to create artificial stimuli to direct our behavior. If we are watching TV, we might say to ourselves, "O.K., I'm going to watch it until 8:00 o'clock; then I'll study." We create a new, verbal signal to control our behavior.

As always, Vygotsky argued that we initially acquire such signals through social interactions. When we were young, adults frequently used signals to direct our behavior. They might have told us, "I want you to jump in the water on the count of three," or, "You can watch TV until the big hand on the clock reaches the 12." Thus, when we find ourselves in situations when we need to motivate ourselves, we apply the same signals to ourselves.

Luria's Research on the Verbal Regulation of Behavior

Vygotsky described the stages through which children internalize speech and regulate their own behavior, but his description was fairly general. A more fine-grained analysis was provided by his student Luria.

Luria focused on the internalization of adult commands. He wanted to see how the child comes to obey adult commands and then applies them to herself, regulating her own behavior. Vygotsky, we should note, did not imply that all self-regulation is limited to the internalization of commands. Children internalize all kinds of dialogue. But Luria focused on commands.

Luria found that the child's ability to follow adult commands develops rather slowly. Suppose a toy fish is lying on a table. If we tell a 14-month-old child, "Bring me the fish," the child will do so. But if we place a shiny toy cat closer to the child and again say, "Bring me the fish," the child will bring us the shiny cat. Our verbal instructions cannot overcome the power of an attractive stimulus (Luria, 1960, p. 360).

There are other difficulties as well. In one experiment, Luria gave a two-year-old a rubber balloon and told him to press it, which the child did. But Luria noted, "He does not stop his reaction, for he presses a second, a third, and a fourth time" (1960, p. 360). Luria gave the boy only one instruction, but the boy's action *perseverated*—it kept going.

What's more, our commands, which can so easily set a child's behavior in motion, do not have nearly the same power to *inhibit* it. If an experimenter tells a two-year-old who is pressing a balloon, "That's enough," the command usually has little effect. In fact, in many cases the command only intensifies the child's reaction; the child presses even more energetically (Luria, 1961, p. 53).

To get an idea of the difficulty, Luria said, "Try . . . giving a child of twenty months or two years verbal instructions to take its stockings *off* while it is pulling them *on* . . . and you will see that your verbal instructions are unable to alter the action already begun; on the contrary, they will merely intensify it" (1961, p. 53).

By the ages of three or three-and-a-half, children can follow specific adult commands fairly well (Luria, 1961, p. 70; Slobin, 1966, p. 131). But can they follow their *own* verbal instructions?

In one experiment, Luria told children to say "Press" and press a balloon when they saw one light and to say "Don't press" and to refrain from pressing when they saw another light. But three- and three-and-a-half-year-olds pressed at every light. They said "Press" and pressed, and they said "Don't press" and pressed. Once again, words excite action, but they have a weak inhibiting effect (Luria, 1960, pp. 374–75; 1961, pp. 90–91).

Luria believed that a good part of the difficulty is that young children respond to the *excitatory* function of speech rather than to its *semantic* content or *meaning*. Thus, the phrase "Don't press" excites action simply because it is a signal, regardless of its meaning. Luria found that the only way to prevent three- and three-and-a-half-year-olds from responding to a light is to tell them to remain silent when they see it. Then they won't press. But if they give themselves any verbal signal at all, they will press, regardless of the meaning of their words (1960, pp. 374–75; 1961, pp. 90–91).

A number of Luria's experiments suggest that children can verbally regulate much of their own behavior by the age of five or six years. They

can easily handle the kinds of experiments previously described. In fact, an experimenter need only give them instructions at the outset, and they will perform correctly without saying anything to themselves aloud. But Luria believed that they are still giving themselves verbal instructions—only now they are doing so silently, through inner speech. To support his interpretation, Luria reported that when he made tasks more complicated or speeded them up, the five- and six-year-olds spontaneously began giving themselves instructions aloud once again (1961, p. 93).

Self-regulation and neurological functioning. Luria emphasized the social origins of self-regulation. First children submit to the commands of others; then they command themselves. At the same time, Luria recognized that the child's ability to regulate his or her behavior depends on the maturation of the nervous system. In fact Luria devoted a great portion of his life studying the neurological mechanisms underlying self-regulation and other mental functioning, and he is considered one of history's great neurologists.

Many of Luria's insights came during his work with patients who suffered brain injuries during the Second World War. Luria, like others, found that the kinds of difficulties the patients experienced depended greatly on the specific location of their injuries. The ability to regulate one's own behavior, Luria found, is tied to the frontal lobes, particularly in the left hemisphere. Patients who suffered frontal lobe injuries could still speak and perform simple habitual tasks, such as greeting others and dressing themselves. But in new situations, they were unable to regulate their own behavior and, as a result, they were slaves to environmental stimulation.

For example, one patient was supposed to take a train to Moscow, but when he arrived at the station he stepped onto the first train he saw boarding and travelled in the opposite direction. Apparently the call "All aboard" and the sight of the others getting onto the train was more than he could resist. He couldn't tell himself, "This isn't my train," and use these words to regulate his own behavior.

Patients with severe frontal lobe damage also have problems with perseveration; once they begin an activity, they cannot easily stop it. Luria told about a patient "who began occupational therapy after the war. He was instructed to plane a piece of wood. He planed a board down completely and continued to plane the work bench, being unable to stop" (1982, p. 111).

In such cases, we must guess that the patients were unable to use speech to control their behavior. We suppose that they could not effectively tell themselves, "Stop," or "Hold it." Some of Luria's other research added more direct support for this speculation.

In one study, Luria asked patients to imitate him and raise a finger or a fist whenever he did so. This they could do. But when Luria reversed the instructions, they had difficulty. They could repeat his instructions, but they couldn't apply them to their behavior. A patient would say, "Yours is a fist, so now I must raise my finger," but he still imitated Luria and raised his fist. Such studies more directly suggest that frontal lobe damage impairs the self-regulatory function of speech (1982, p. 112).

Inner Speech

Under ordinary circumstances, adults have developed the capacity to give themselves verbal instructions inwardly and silently, through inner speech. Inner speech, however, is very difficult to investigate. Vygotsky obtained some clues from writers and poets, but he relied primarily on the study of egocentric speech in children. That is, he assumed that the changes we see in egocentric speech just before it goes underground forecast what inner speech is like (Vygotsky, 1934, pp. 226–27).

Inner speech, in comparison to social speech, seems more abbreviated. In particular, it omits the "psychological subject" of a sentence while preserving the "psychological predicate"; it omits that which we already know and focuses upon that which is new. Sometimes we can observe the same phenomenon in social situations. Vygotsky asked us to imagine several people waiting for a bus. "No one will say, on seeing the bus approach, 'The bus for which we are waiting is coming.' The sentence is likely to be abbreviated to 'Coming,' or some such expression because the subject is plain from the situation" (1934, p. 236). Similarly, when we talk silently to ourselves, we already know the subject that is on our minds, so for the sake of brevity, we restrict our words to what is new (1934, pp. 220, 236).

Another characteristic of inner speech is the dominance of "sense" over "meaning." The sense of a word is the feeling it arouses in us, and this feeling is heavily dependent on the context in which the word occurs. For example, the word *lion* may evoke feelings ranging from fear to tender sympathy depending on the story in which the word appears. The "meaning" of a word, when contrasted with its sense, refers to its precise meaning, as in its dictionary definition. A word's meaning is stable across contexts and is very important when we wish to communicate clearly. But in our inner experience, when we are using words to think about something just to ourselves, we are strongly affected by the sense of words (1934, pp. 244–45).

To understand inner speech more fully, Vygotsky (1934, pp. 245–49) said, we need to examine its role within a microgenetic process. Microgenesis, you will recall from Chapter 5, is the relatively brief developmental process that occurs every time we form a thought or a perception. The formation of a verbal statement, too, unfolds microgenetically, and inner speech enters this process at a critical point.

The act of making a verbal statement begins with a motive—an interest, a need or a problem. This is followed by some dim stirring of a thought, and it is at this point that inner speech comes into play. We engage in inner speech to try to formulate and articulate our thoughts. This process is fluid and dynamic, and both our thoughts and our words undergo several transformations as we struggle to make a clear statement without losing the inner sense of our original thought.

Recently I wanted to tell my nine-year-old daughter about a vivid personal experience. I had found that every time I jogged past a certain part of a park, I was attacked by a red-winged blackbird. Inwardly, two words strongly evoked my *sense* of the experience, my emotional image of the bird in the context. These words were *red* and *black*. Before speaking, however, I realized that these words wouldn't mean much to anyone who

hadn't shared my experience. So I changed my words so that my daughter would have a clearer image of what had occurred, while still preserving my own sense of the experience as best I could.

Sometimes we cannot find words to express our thoughts at all. By way of illustration, Vygotsky referred to a novel by Gelb Uspensky, in which "a poor peasant, who must address an official with some life-important issue, cannot put his thoughts into words" (1934, p. 249). The poor man asks the Lord for help, but to no avail.

Some writers have felt that the process of translating thoughts into words so routinely distorts the original thought that, as the poet F. Tiutchev put it, "A thought once uttered is a lie" (Vygotsky, 1934, p. 254). Vygotsky recognized this danger. Nevertheless, he argued that we need words to develop our thoughts. A thought that fails to realize itself in words remains unfulfilled. A "voiceless thought," as the poet O. Mandelstam said, "returns to shadow's chambers" (Vygotsky, 1934, pp. 210).

SCHOOLING

Children master most speech spontaneously, with hardly any direct teaching (Vygotsky, 1935, p. 105). Indeed, they learn speech so readily that they seem biologically programmed to do so. In this sense, speech seems to be as much a part of the natural line of development as the cultural line. The acquisition of other sign systems, however, usually requires more formal instruction. Most children learn writing and mathematics in school, and Vygotsky was one of the first psychologists to give careful consideration to the impact of school instruction on the mind of the developing child. As was his custom, he developed his ideas by comparing them to those of others, particularly to the ideas of Piaget.

Vygotsky vs. Piaget

Piaget drew a sharp distinction between development and teaching. Development, he said, is a spontaneous process that comes from the child. It comes from inner maturational growth and, more importantly, from the child's own efforts to make sense of the world. The child, in Piaget's view, is a little intellectual explorer, making her own discoveries and formulating her own positions.

Piaget did not mean that the child develops in isolation, apart from the social world. Other people do have an impact on the child's thinking. But they do not help the child by trying to directly teach her things. Rather, they promote development by stimulating and challenging the child's own thinking. This often occurs, for example, when children get into discussions and debates with friends. If a girl finds that a friend has pointed out a flaw in her argument, she is stimulated to come up with a better argument, and her mind grows. But the girl's intellectual development is an independent process. For it is the girl herself—not an outside person—who must construct the new argument.

As a proponent of independent thinking, Piaget was highly critical of the teacher-directed instruction that occurs in most schools. Teachers try to take charge of the child's learning, acting as if they could somehow pour material into the child's head. They force the child into a passive position. Moreover, teachers often present abstract concepts in math, science, and other areas that are well beyond the child's own grasp. Sometimes, to be sure, children appear to have learned something, but they usually have acquired mere "verbalisms"; they repeat back the teacher's words without any genuine understanding of the concepts behind them. If adults want children to genuinely grasp concepts, they must give children opportunities to discover them on their own (Piaget, 1969).

In Vygotsky's view, spontaneous development is important, but it is not all-important, as Piaget believed. If children's minds were simply the products of their own discoveries and inventions, their minds wouldn't advance very far. In reality, children also benefit enormously from the knowledge and conceptual tools handed down to them by their cultures. In modern societies, this usually occurs in schools. Teachers do, as Piaget said, present material that is too difficult for children to learn by themselves, but this is what good instruction should do. It should march ahead of development, pulling it along, helping children master material that they cannot immediately grasp on their own. Their initial understanding might be superficial, but the instruction is still valuable, for it moves the children's minds forward.

Scientific Concepts

Vygotsky saw particular value in the kinds of abstract concepts that are taught in schools. He called them *scientific concepts*, and he included in this category concepts in math and science (e.g., Archimedes' Law) as well as concepts in the social sciences (e.g., class conflict). He contrasted these concepts with the *spontaneous concepts* that children learn on their own. Because children develop most of their spontaneous concepts outside of school, in their everyday lives, Vygotsky also referred to spontaneous concepts as *everyday concepts* (although there is no reason why schools cannot also give children opportunities to make their own discoveries, as Montessori, Dewey, and Piagetians such as Kamii have shown).

In any case, Vygotsky argued that instruction in scientific concepts is very helpful because it provides children with broader frameworks in which to place their spontaneous concepts. For example, a seven-year-old boy might have developed the spontaneous concept of *grandmother*, but his concept is primarily based on his image of his own grandmother. If we ask him to define the term, he might reply, "She has a soft lap." Formal instruction, in which the teacher diagrams family trees (including concepts such as *grandparents*, *parents*, and *children*) can give the child a broader framework in which to place his spontaneous concept and help him understand what a grandmother really is (Vygotsky, 1930, p. 50).

Vygotsky argued that this kind of formal instruction brings two specific benefits. First, it brings consciousness to the child's thinking. As long as the child thinks of the concept *grandmother* as a particular person,

he is not really conscious of the concept. His awareness is directed to the person, not the concept. Only when he sees that *grandmother* is a category within a more general system of categories does he become aware of the concept as such (Vygotsky, 1934, p. 171).

Second, as children gain awareness of their concepts, they can put them to deliberate use. A 10-year-old girl who has some understanding of the concept of *grandmother* can use the concept to compare the size and composition of her family to that of a new friend. She can ask, "How many grandmothers do you have?" Later on, she might use this formal category to study genetics or kinship systems in anthropology. She can use the concept in various ways.

By learning concepts on a more general or "scientific" level, then, children become more aware of the concepts and can put them to deliberate use.

A similar process occurs when children learn to write. Before they are introduced to writing, they have mastered a great deal of spoken language, but their mastery is not at a very conscious level. Speaking is a bit like singing; it is physically expressive and flows rather naturally. Writing, in contrast, uses more formal and abstract systems of symbols and forces one to behave much more consciously and deliberately. When one writes, one is constantly making conscious decisions with respect to the proper verb form, the point at which a sentence should end, and so forth. Learning to write takes great effort, but it helps children see how language is structured. Writing, Vygotsky said, "brings awareness to speech" (1934, p. 183).

Support for Vygotsky's speculation has come from the research of Sylvia Scribner and Michael Cole (1981, pp. 151–56) on the effects of literacy among the Vai people in Liberia. The investigators presented both literate and nonliterate Vai adults with several sentences, some of which were ungrammatical. Both groups were perfectly able to say which sentences were ungrammatical. But the literate Vai were better able to explain why (for example, to explain that the subject and the verb of a sentence didn't agree). Apparently, literacy training had given them a greater conceptual awareness of their speech. In contemporary terms, they had gained *metacognitive* knowledge of their own speech.

To get a better sense of what it feels like to learn on a newly conceptual level, we might recall the experience of studying a foreign language in school. The process probably felt awkward, scholastic, and self-conscious. But we might also have felt that we were becoming aware of our native language for the first time because we were seeing it within a broader, abstract framework, as employing one set of rules where other options are possible (Vygotsky, 1934, p. 196). As Goethe said, "He who knows no foreign language does not really know his own" (Vygotsky, 1934, p. 160).

Vygotsky, then, saw much more value in scientific concepts than Piaget did. In Vygotsky's view, both scientific and spontaneous concepts have their own specific virtues. Spontaneous concepts, such as the child's own concepts of *grandmother* and *brother*, are "saturated with experience" (1934, p. 193); they are full of rich personal sensations and imagery. Scientific concepts, such as *Archimedes' Law* and *class conflict* are comparatively dry

and abstract. But scientific concepts give children broader frameworks in which to view their own concepts, thus enabling children to gain awareness of and control over them.

Interactions between scientific and spontaneous concepts. In school, the two kinds of concepts typically influence and benefit each other in the following way. Scientific concepts, which the teacher hands down "from above," lead the way. They give cognitive development a new goal, pressing children to think more abstractly than they ordinarily would.

For a while, however, children usually have difficulty understanding the new concepts. That the children understand them at all must be credited to their spontaneous concepts. When, for example, a typical Soviet class of third graders listens to the teacher discuss the concept of *class conflict*, it is only because the children have already developed spontaneous concepts of rich and poor people that they have an inkling of what the teacher is talking about. In this sense, spontaneous concepts pave the way for scientific concepts (1934, p. 194).

In any event, the teacher presses on and gives more instruction, prompting the children to think about the concepts further. After a while the pupils come to a fuller understanding of them.

Instruction, then, propels the mind forward. Instruction, Vygotsky emphasized, does not just add something new to the child's development, like adding clothes to the child's body. Rather, it interacts with development, awakening it, charting new paths for it. Vygotsky said that psychologists should do all they can to learn about this interaction (1935, pp. 80, 91).

Vygotsky himself, however, found that this interaction is difficult to study; the developmental processes stimulated by instruction are largely hidden from view. The one thing that is certain, Vygotsky found, is that development does not follow instruction in any straightforward way. When he plotted the two curves—one for the course of instruction, the other for the child's subsequent mental development—he found that the curves do not coincide. For example, it often happens that three or four steps in instruction produce no change in the child's understanding of arithmetic, and then

... with a fifth step, something clicks; the child has grasped a general principle, and his developmental curve rises markedly. For this child, the fifth operation was decisive, but this cannot be a general rule. The turning points at which a general principle becomes clear to the child cannot be set in advance by the curriculum. (1934, p. 185)

Thus, the teacher cannot prescribe the manner in which the child learns. The teacher might create a curriculum that progresses in a step-by-step manner, but this doesn't mean that the child will develop according to the teacher's plan. Development has its own rhythms. Still, adult teaching is necessary. Without it, the child's mind wouldn't advance very far (Vygotsky, 1934, p. 185).

The Zone of Proximal Development

Most teachers would probably agree with Vygotsky's general viewpoint. They would agree that it is their job to move the child's mind forward, and to do this they must directly teach children new concepts, not wait for them to make their own discoveries. At the same time, however, teachers know that they cannot teach any concept to any child. They cannot, for example, effectively begin teaching algebra to most first graders. Teachers need ways of determining the kinds of lessons that children are ready for.

Most schools have made such decisions with the help of standardized achievement and intelligence tests. A school might give a third grade child an achievement test, find that he or she is doing math at the third grade level, and assign the child to a middle level math group. Vygotsky argued, however, that the conventional tests are inadequate. They only measure the child's actual level of development, telling us how far the child has developed so far. They do not tell us about the child's ability to learn new material beyond his or her present level.

The reason for this shortcoming, Vygotsky said, is that conventional tests only evaluate what the child can accomplish when working independently. But before children can perform tasks alone, they can perform them in collaboration with others, receiving some guidance or support. To determine a child's potential for new learning, then, we need to see how well the child can do when offered some assistance.

Vygotsky asked us to consider two boys who scored at the eight-year-old level on a conventional intelligence test (1934, p. 187). They scored at this level, that is, when working independently, as the test requires. Then, however, the examiner presented some new problems, too difficult for the boys to solve on their own, and offered each some slight assistance, such as a leading question or the first step in a solution. With this help, one boy scored at the nine-year-old level while the other boy scored at the 12-year-old level. Clearly, the boys' potential for new learning was not the same. Vygotsky called the distance that children can perform beyond their current level the *zone of proximal development*. More precisely, he defined the zone as

the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (1935, p. 86)

The zone of proximal development, Vygotsky hoped, would give educators a much better indication of each child's true potential.

Actually, Vygotsky wrote just as enthusiastically about the concept's usefulness to developmental psychology. He discussed the concept as if it provides a new, improved searchlight that illuminates not only those functions that have already matured, but those that are in the process of maturing. By focusing on the activities that children can accomplish with assistance, the zone reveals those abilities that are just beginning to de-

velop—like the ability to walk in an infant who can do so only if she has a hand to hold. The zone of proximal development casts light not so much on “the ripe as the ripening functions”—those that the child can only carry out with assistance today but will be able to perform alone tomorrow (Vygotsky, 1934, p. 188).

But how do we know that Vygotsky was correct, that the zone of proximal development does illuminate the stirrings of inner development? When a *slight* amount of assistance quickly enables a child to succeed, we can be fairly certain we are observing a spontaneously developing capacity. The rapid success suggests that the adult aided a capacity that had already been emerging from within.

But Vygotsky also suggested that adults occasionally provide a *great deal* of assistance. He approvingly noted, for example, that a child could use an abstract concept “because the teacher, working with the child, [had] explained, supplied information, questioned, corrected, and made the pupil explain” (1934, p. 191). In this case, the teacher appears to have treated the child like a puppet, and it isn't clear that the teacher has stimulated anything spontaneous within the child.

Perhaps the only way to know if the child's spontaneous development is activated is to watch the child. Is the child enthusiastic, curious, and actively involved? Or does the child look off into space? In fact, some research (e.g., Rogoff et al., 1984) suggests that adults who teach effectively within the zone of proximal development do continually look for signs of spontaneous interest on the child's part.

PRACTICAL APPLICATIONS

Education

Vygotsky wanted to help build a new society, and he deliberately set out to construct a theory that addressed practical matters. As we have just seen, he tried to show how school instruction can promote child development, and he offered a new concept, the zone of proximal development, to assess each child's potential for new learning. If we want to know what a child is ready to learn, Vygotsky said, we cannot look at what the child can do when working alone; we must see how far ahead he can go when offered some assistance.

The idea of the zone of proximal development has captured the interest of a growing number of researchers. For example, Ann Brown and her colleagues (e.g., Brown and Ferrara, 1985) have evaluated the extent to which the concept does in fact help test a child's potential for new learning, and Brown's findings have been encouraging. The concept has also stimulated new interest in the teaching process itself—in what happens when adults help children solve problems that they cannot solve by themselves (e.g., Rogoff et al., 1984; Griffin and Cole, 1984; Valsiner, 1984). These studies are providing new insights into the ways in which adults gradually shift the responsibility for solving a problem from themselves to the child, how adults monitor the child's interest and enthusiasm, and other details of the teaching process.

Vygotsky also made another major educational contribution—one for which he has only recently begun to receive credit. He was perhaps the first theorist to call attention to the importance of metacognition, the person's awareness of his or her own thinking. Vygotsky did not use this particular term, but his work on memory aids and on scientific concepts indicated ways in which children become conscious of their thinking and ideas and begin to exercise some control over them. Vygotsky tried to show that consciousness and deliberate control are "the principal contributions of the school years" (1934, p. 186). In the past two decades, there has been an enormous amount of research into these processes, and educators are increasingly inclined to agree with Donaldson (1978, p. 129) that Vygotsky put his finger on the essential value of formal education.

Clinical Applications

Although Vygotsky's theory has had its widest impact in educational circles, it has also influenced other areas of practical activity. As we saw in our discussion of Luria's work, Vygotsky's insights into the self-regulative function of speech have informed the thinking of those who diagnose people suffering from neurological disorders. In addition, Vygotsky's ideas on verbal self-regulation have inspired several new psychological treatment approaches for many kinds of problems. A good example is provided by Meichenbaum and Goodman (1971), who showed how one can train hyperactive second graders to use self-directed speech to gain self-control.

First an adult experimenter modelled self-guiding speech. The following is an excerpt of what the experimenter said aloud while the child observed:

Okay, what is it I have to do? . . . I have to go slow and be careful. Okay, draw the line down, down, good; then to the right, that's it; now down some more and to the left. Good, I'm doing fine so far. Remember to go slow. . . . No, I was supposed to go down. That's okay, just erase the line carefully. . . . Good. (Meichenbaum and Goodman, 1971, p. 117)

After this modeling, the experimenter gave the child similar instructions while the child performed the task.

Up to this point, the child's behavior was controlled by the adult's verbal commands. The next step was to shift the control to the child; the child was asked to perform the task while instructing herself aloud. Finally, the experimenter helped the child fade out her vocalized instructions; the child performed the task while whispering to herself, and then without making any sounds or lip movements at all.

Step-by-step, then, Meichenbaum and Goodman trained the impulsive children to acquire verbal control over their behavior and to exercise this control on an increasingly covert level. Meichenbaum and Goodman reported that the children who received this training subsequently outperformed the other impulsive children in their class on cognitive tasks and measures of self-control.

Other psychotherapists have also focused on self-directed speech, even if they have not traced the historical origins of their work to Vygotsky.

This is the case, for example, with Albert Ellis and his rational-emotive therapy (Ellis, 1962). Ellis zeroes in on the irrational content of his clients' silent sentences. For example, one man reported that he felt miserable because his golfing partners didn't like him. The man assumed that the event, the golfing partners' reactions to him, caused his unhappiness. In reality, Ellis contends, it was the man's internal dialogue, his telling himself that it was terrible that they didn't like him, that caused his misery (1962, pp. 126–27). And invariably it is some irrational belief, such as the belief that one must have everyone's love and approval, that causes neurotic suffering. Ellis therefore tries to get his clients to think and talk to themselves in more realistic ways. In general, psychotherapies that focus on internal dialogues come under the heading of cognitive-behavioral therapies, and they are becoming more popular every day (see Bandura, 1986, pp. 515–22 for a review).

EVALUATION

Much as psychologists rediscovered Piaget in the 1960s, they are rediscovering Vygotsky today. Vygotsky's impact is unlikely to reach the monumental proportions of Piaget's, but Vygotsky's ideas are generating a great deal of excitement because they suggest important ways to expand and balance traditional developmental theory.

Vygotsky recognized that intrinsic development, as studied by Gesell, Piaget, and others, is important; children do grow and learn from their inner maturational promptings and their active curiosity. But these forces alone, Vygotsky said, will not take children very far. To fully develop their minds, children also need the intellectual tools provided by their cultures—tools such as language, memory aids, numerical systems, writing, and scientific concepts. Thus a major task of developmental theory is to understand how these tools are acquired.

Vygotsky's proposal was that children first learn these tools in their social interactions with others; then they apply them to their own, individual thinking. For example, children first learn to speak in order to communicate with others; then they internalize their speech, talking to themselves to plan and direct their thought and behavior. Similarly, children learn many conceptual tools in social interactions in schools before they use these tools on their own. Vygotsky's accounts of the internalization of cultural tools are now recognized as classic contributions to the psychological literature.

But Vygotsky did more. He suggested that we should study how intrinsic developmental and cultural forces interact and produce new transformations. It is the interaction between these conflicting forces that psychology must eventually understand.

Vygotsky's suggestion is more impressive than it might initially sound. Many psychologists have called for eclectic approaches, saying we need to consider a variety of intrinsic and environmental variables when we study development. Such statements sound reasonable, but they overlook the legitimate conflicts between theorists who emphasize one force or the other.

Piagetians believe the child grasps a concept on his own; environmentalists believe that he learns it from others; how can both be right? There is a logical contradiction.

Vygotsky, as a dialectical theorist, offered a new perspective. According to dialectical theory, life is full of contradictions, and what we need to study is what happens when opposing forces meet. We need to see what happens when the growing child, trying to figure things out for herself, encounters adults who try to teach her things. These interactions, Vygotsky observed, are complex and largely hidden from view. Indeed, Vygotsky frequently used the metaphors of magnifying glasses, x-rays, and telescopes to convey the need to get a better view of them (1933, p. 102; 1935, p. 91; Cole and Scribner, 1978, p. 12). Nevertheless, by calling attention to the interactions between opposing forces, Vygotsky pointed developmental theory in an exciting new direction.

At the same time, Vygotsky has been criticized for one-sidedness. For example, Wertsch (1985, pp. 43–48, 57, 72–73) argues that although Vygotsky said we should study the interactions between developmental and cultural forces, his own research focused largely on cultural forces. He studied the ways in which speech, memory aids, writing, and scientific concepts transform the child's mind, but he didn't examine the ways in which the child's inner, spontaneous development might affect cultural forces (1985, p. 43). He gave us a good picture of how children internalize their culture, but he told us little about how they might challenge or criticize their culture, as a stubborn two-year-old or an idealistic adolescent might do.

In a sense, it is easy to forgive any one-sidedness in Vygotsky's own research. A person can only do so much in his or her research career, and Vygotsky's career was cut tragically short. Others can study the interactions between development and culture in fuller and more balanced ways.

The problem is that Vygotsky did not restrict himself to academic matters. He also tried to shape educational practices, and his educational ideas are rapidly gaining popularity. In this realm, then, any one-sidedness becomes a more urgent matter, and we need to take a close look at it. In the following comments, I will evaluate Vygotsky's educational theory from a strongly developmentalist perspective—the perspective of writers such as Rousseau, Montessori, and Piaget.

Vygotsky, compared to developmentalists, was enthusiastic about school instruction. Instruction, he said, gives development a forward thrust. It “does not preclude development, but charts new paths for it” (1934, p. 152).

On a day-to-day basis, the teacher moves the child forward by working within the zone of proximal development. That is, the teacher does not just give children tasks that they can solve by themselves, but more difficult tasks, tasks that they can only solve with some assistance. In this way, instruction stimulates capacities that are still in an embryonic state and pushes development forward.

At first glance, this kind of forward-looking instruction would seem desirable. But developmentalists have always been wary of attempts to

accelerate development. One danger is that we can push children forward before we give them the chance to fully develop their capacities at their present stage.

Imagine an ordinary five-year-old, let's say a boy. If Piaget is right, he is more strongly influenced by his perceptions than by logic. He is impressed by what he sees, hears, and feels—not rational discourse. His imagination is lively, and he likes to be physically active. In outlook and temperament, he is a natural artist; he loves to draw, sing, dance, and engage in dramatic play. As mentioned in our discussions of Werner and Piaget (pp. 92–93, 132), it is quite possible that children this age are naturally disposed to develop the artistic side of their personalities.

The danger is that the child's parents and teachers, armed with Vygotsky's ideas about instruction, will focus too exclusively on the child's future development. They will want to get him started on the 3 R's and conceptual and analytic reasoning. And the adults will probably find that they can, by providing assistance, get the boy to work on academic tasks. But in the process they may ignore the boy's need to develop his current capacities—his senses and perceptions and his artistic orientation.

In the Rousseauian view, every stage of life has its own particular virtues, and children need the time to perfect their capacities at each stage. If we constantly try to move children forward, we will deprive them of the opportunities they need to do so.²

But Vygotsky's educational philosophy contains a second, equally serious danger. Instruction, Vygotsky said, propels the child forward because teachers and more capable peers give the child assistance. With the help of others, children can solve problems that are beyond them as individuals. Vygotsky was undoubtedly correct about this, but he overlooked the extent to which outside assistance undermines the child's independence. Developmentalists have repeatedly warned that when we give children assistance and direction, we encourage them to depend on others to know what and how to think, undermining their ability to think for themselves.

Vygotsky, to be sure, usually recommended that we only provide children with slight amounts of assistance (such as a leading question or the first step in a solution). In such cases, the threat to the child's independence does not seem too great. But on occasion, Vygotsky implied that we might give the child a great deal of assistance. He implied this, for example, when discussing his research on the concept of *because*.

Vygotsky found that eight-year-olds frequently use *because* correctly when speaking on theoretical topics learned in school before they do so with respect to their everyday concerns. For example, a girl might correctly say, “Planned economy in the USSR is possible because there is no private property” (1934, p. 191). The reason for the girl's success, Vygotsky said,

²In a small number of writings, Vygotsky showed a definite appreciation of childhood's special qualities. He wrote, for example, on the child's natural inclination to draw and to play (1935, pp. 105–119; 1933, pp. 92–104). But even in these writings, he valued art and play because they move development forward. Art can lead to writing; play frees the child from the concrete situation and leads to abstract thought. Vygotsky focused on the child's future, not on the child's need for time to fully develop his or her current orientation toward life.

is that "the teacher, working with the child, has explained, supplied information, questioned, corrected, and made the pupil explain" (1934, p. 191). So, when the girl responds alone, she speaks correctly because the teacher's help is "invisibly present" (1934, p. 191).

To a developmentalist, however, the girl's correct response is no cause for celebration. When the teacher's assistance is this pervasive, it is difficult to imagine that the girl is in any way thinking for herself. She is merely saying what the teacher has trained her to say.

Vygotsky (1935) had little patience with the developmentalists' concerns. Developmentalists, he said, are so worried about the harmful effects of instruction that they constantly keep it at bay. They only introduce instruction when the child is "ready" for it, which usually means waiting for a capacity to fully mature before adding any relevant instruction. Instruction then becomes superfluous, doing nothing to move the child forward.

Actually, developmental educators—educators in the tradition of Montessori, Dewey, and Piaget—are also concerned about the child's forward movement. But they believe that children themselves will tell us the experiences they need to move forward. When a task enables a child to develop an emerging capacity, the child will show a keen interest in it and work on it with tremendous energy and concentration. For example, Montessori found that children of four years or so become deeply engrossed in cutting vegetables and other practical activities, probably because these activities help them develop their perceptual-motor skills. Thus, the teacher's job is to observe the child's interests and inclinations and to provide activities that engage the child in a full way.

Teachers will, of course, be tempted to introduce materials that they know the child will need in the future. But education is most effective when it is geared to the child's own interests and inclinations, not the teacher's goals for the future. And in no case should the teacher present tasks that are so far ahead of the child that the child can only solve them with the teacher's assistance. The teacher should introduce activities that stimulate, challenge, and engage the child, and then let the child solve them on his or her own.

In recent years, several of Vygotsky's followers have narrowed the gap between Vygotsky and the strong developmentalists. Rogoff et al. (1984), Griffin and Cole (1984), and others believe that we should pay close attention to the child's interest and enthusiasm as we lead children through tasks. These investigators do not want to squash the child's imagination, creativity, or participation in the learning process. In fact, in one essay, Vygotsky (1935, pp. 116–19) himself argued that writing instruction should arouse the child's vital interests and correspond to the child's natural way of learning.

Yet neither Vygotsky nor his followers have completely endorsed a thoroughgoing developmental position. They resist the idea that the child should take the sole initiative with respect to his or her own development. As Bruner (1984, p. 96) has said, Vygotskians oppose the "image of human development as a lone venture for the child," in which the child must figure everything out on his or her own. Instead, society has a responsibility to

provide the child with the intellectual tools it has developed, and this means providing the child with instruction and assistance. If this assistance forces the child to lean on others for intellectual support, so be it. Children simply cannot discover everything on their own. To develop their minds they need the help of adults and more capable peers.

In the last analysis, then, Vygotsky and the developmentalists disagree over the extent to which development can be entrusted to the child, to the child's own interests and efforts. And this disagreement, at least on the practical level, is likely to continue for a long time. But this may be a good thing. For disagreement can be part of an ongoing dialectic, a series of challenges and responses that keep both sides thinking and coming up with new ideas.