

## *The Concept of Higher Mental Functions*

Like many of his contemporaries, Vygotsky divided mental processes into lower mental functions and higher mental functions. However, unlike his contemporaries, Vygotsky did not consider lower and higher mental functions to be completely independent of each other but instead proposed a theory of how these two sets of functions interact.

### **Characteristics of Lower Mental Functions**

*Lower mental functions* are common to both higher animals and human beings. Lower mental functions are innate and depend primarily on maturation to develop. Examples of lower mental functions are cognitive processes such as sensation, reactive attention, spontaneous memory, and sensorimotor intelligence. Sensation refers to using any of the five senses in mental processing and is determined by the anatomy and physiology of a particular sensory system. For example, different animals are capable of discrimination between different number of colors—from almost color-blind marine mammals to birds and fish who can discriminate between more shades of color than humans do. Reactive attention refers to attention that is dominated by strong environmental stimuli, as when a dog suddenly reacts to the sound of a car coming up the driveway. The dog's attention is drawn by the noise. Spontaneous memory, or associative memory, is the ability to remember something after two stimuli are presented together many, many times, such as associating a tune from a commercial with a company logo or a dog that salivates when it associates a bell with being fed. Sensorimotor intelligence in the Vygotskian framework describes problem solving in situations that involve physical or motor manipulations and trial and error. Table 2.1 provides some examples of lower and higher mental functions.

### **Characteristics of Higher Mental Functions**

Unique to humans, *higher mental functions* are cognitive processes acquired through learning and teaching. The main difference between lower and higher mental functions is that the latter involve the use of mental tools.

The central characteristic of elementary functions is that they are totally and directly determined by stimulation from the environment. For higher functions, the central

**Table 2.1** Lower and higher mental functions

Lower Mental Functions	Higher Mental Functions
<i>humans and higher animals</i>	<i>humans only</i>
Sensation	Mediated perception
Reactive attention	Focused attention
Spontaneous or associative memory	Deliberate memory
Sensorimotor intelligence	Logical thinking

feature is self-generated stimulation, that is, the creation and use of artificial stimuli which become the immediate causes of behavior. (Vygotsky, 1978, p. 39)

Higher mental functions are *deliberate, mediated, internalized* behaviors. When humans acquired higher mental functions, thinking became qualitatively different from that of the higher animals and evolved with the development of civilization. Higher mental functions include mediated perception, focused attention, deliberate memory, and logical thinking. When we distinguish between different colors, placing sky blue in a different category from turquoise blue, we are using mediated perception. Focused attention describes the ability to concentrate on *any* stimulus, whether or not it is exceptionally salient or striking. Deliberate memory refers to the use of memory strategies to remember something. Logical thinking involves the ability to solve problems mentally using logic and other strategies. All these higher mental functions are built upon lower mental functions in a culturally specific way. In current cognitive theories, many of the mental processes described by Vygotsky as higher mental functions are commonly referred to as *metacognitive*.

Higher mental functions are *deliberate* in that they are controlled by the person, and their use is based on thought and choice; they are used on purpose. The behaviors can be directed or focused on specific aspects of the environment, such as ideas, perceptions, and images, while ignoring other inputs. Young children lacking deliberateness react to the loudest noise or the most colorful picture. When children acquire higher mental functions, they direct their behavior to the aspects of the environment most pertinent to solving a problem. These aspects may not necessarily be the most perceptually obvious or noticeable (see Table 2.2).

*Mediation* is the use of certain signs or symbols to represent behavior or objects in the environment. These signs and symbols may be external as well as internal (see Table 2.3). Vygotsky considered mediation an essential characteristic of higher mental functions. "All higher mental functions are mediated processes. A central and basic aspect of their structure is the use of the sign as a means of directing and mastering mental processes" (Vygotsky, 1987, p. 126). The signs or symbols can be universal, specific to a small group such as a family or classroom, or specific to a particular person. For

**Table 2.2** Examples of nondeliberate and deliberate mental behaviors

Nondeliberate Behavior	Deliberate Behavior
Cannot find a hidden figure in a picture because she searches in an unsystematic way or is distracted by other figures	Searches for hidden figure in a systematic and deliberate way, ignoring other distracting figures
Cannot listen to the teacher when other children are talking	Listens to the teacher and blocks out distracting noises
Begins building with blocks that are nearest at hand and keeps stacking them on top of each other with no idea what the structure is going to be	Begins building with blocks using a mental plan, so blocks that will be best for the future structure are chosen

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**Table 2.3** Examples of nonmediated and mediated behaviors

Nonmediated Behavior	Mediated Behavior
Trying to remember a complicated dance pattern you have just watched	Saying the names of the steps to yourself, such as "two right, three left, kick, kick"
Trying to visually estimate the number of items	Counting the items
Blurting out your comment after the teacher's question	Holding up your hand as a sign that you are ready to answer the question

example, a stop sign or red light is a universal sign for stopping forward motion and is understood the world around. On the other hand, when a teacher places a red dot next to a student's name, it can mean different things depending on the particular classroom. In one classroom it might mean that all children with red dots will go to the blocks area while all children with green dots will do an art project. However, in a different classroom it might mean that a child who received a red dot just got his last warning and if he continues to misbehave he will be sent to a time-out. Sometimes a sign has meaning only for the individual who uses it and is meaningless for everybody else. For example, a circled date on a calendar may be a very important reminder for the person who circled it, but it can mean anything to a stranger—from an anniversary to a dental appointment.

*Internalized* behaviors exist in a person's mind and may not be observable. Internalization happens when external behaviors "grow into the mind," maintaining the same structure, focus, and function as their external manifestations (Vygotsky & Luria, 1993). Adding a group of numbers using your fingers is an external behavior. Adding the numbers in your head is basically the same behavior, but it is internal.

In young children, most behaviors are external and visible. When young children are beginning the process of internalization, we can see the roots of higher mental functions in their overt actions, such as attempts to control memory by chanting or singing something repeatedly to themselves. Older children possessing deliberate memory may not show any overt strategies.

### *The Development of Higher Mental Functions*

Vygotsky believed that higher mental functions develop in a specific way:

1. They are dependent on lower mental functions.
2. They are determined by the cultural context.
3. They develop from a shared function to an individual function.
4. They involve internalization of a tool.

### Building on Lower Mental Functions

Higher mental functions are built upon lower mental functions that have developed to a specific level. Two-year-old Elena cannot remember all the words to “Itsy Bitsy Spider” because her spontaneous memory has not sufficiently developed. Presently, her ability to remember deliberately is limited primarily by the immaturity of the underlying lower mental functions, not by the absence of specific strategies.

When higher mental functions develop, a fundamental reorganization of lower mental functions occurs (Vygotsky, 1994). It means that as children start utilizing higher mental functions more frequently, their lower mental functions do not disappear completely but are used less and less often. For example, as children acquire language, they continue to use their associative memory, but now they depend less and less on their ability to recollect things spontaneously and more and more on the use of various memory strategies.

### The Influence of Cultural Context

Culture affects both the essence of the higher mental functions and the way mental functions are acquired. A classic example of this is found in Luria’s studies of classification in the 1930s. Luria found that the classification system used by people who do not have formal schooling is quite different from those who do. People without formal schooling use an experience-based system of classification that depends on where they have encountered the objects. When asked which object does not belong—apples, watermelon, pears, or plate—they are likely to say all of the objects go together. Since people with formal schooling develop more abstract ways of categorizing, such as fruit and nonfruit, they are likely to exclude plates from the group. Luria’s findings have been confirmed in several cross-cultural studies (Ceci, 1991).

The acquisition of higher mental functions also depends on the cultural context. Abstract thinking, such as using numbers, is learned differently depending on cultural background. In some African cultures children use their hands in a specific rhythm to help them add, in parts of Asia they use an abacus, and in some North American classrooms, children count using Cuisinaire rods. The children in all three cultures learn the same mental skills but in different ways. Individuals may have the same higher mental functions, but the paths to their development may be different.

### Moving from Shared to Individual Functions

Higher mental functions first exist in shared activity between two or more people and only later become *internalized* by an individual. Vygotsky called this transition from shared to individual *the general law of cultural development*, emphasizing that in the course of development of higher mental functions, “social relations, real relations of people, stand behind all the higher mental functions and their relations” (Vygotsky, 1997, p. 106).

Comprehension of complex texts is a process calling for the use of higher mental functions. As primary students are learning strategies such as asking questions or making predictions, there is a time when the entire process is distributed between the teacher and the group of students. At this stage, it is mostly the teacher who models both how to apply a specific strategy and how to know which strategy works for which kind of text. Later, students take over some parts of this process with one child asking

a question about the text, the second one answering the question, and the third one checking if the answer is correct. Finally, each student is able to carry out all of these processes independently, as everyone has mastered the use of comprehension strategies. At this point, what was previously shared becomes individual. To apply the earlier Vygotskian quote, relationships between the teacher and students, in the context of text comprehension, were transformed into the relationships between specific comprehension strategies that each student is now able to apply independently. We will discuss this process in more detail in Chapter 7.

To acquire higher mental functions, the child must have already learned the basic mental tools of her culture. Children use mental tools to modify and restructure lower mental functions into higher mental functions. Mental tools such as language will reorganize the child's lower mental functions. We will discuss several tools and their relationship to higher mental functions in the chapters that follow.

### *Individual Differences in the Development of Mental Functions*

#### **Lower Mental Functions**

Vygotsky proposed that lower mental functions were culture-free, or independent of any cultural context. They seem to be part of our biological heritage. All people can solve sensorimotor problems regardless of whether they live in Papua, New Guinea, or the United States. Lower mental functions depend primarily on maturation and growth, and not on any particular type of instruction. However, all people do not develop the same level of lower mental functions. The problem may be organic and due to the underdevelopment of, or damage to, a particular area of the brain. Children with certain learning disabilities lack some aspects of lower mental functions, such as being able to discriminate between some visual or auditory stimuli or to hold a specific amount of information in their memory. Sensorimotor stimulation, the opportunity to manipulate objects and explore the environment, also affects lower mental functions. Extreme deprivation can lead to individual differences, especially in the first years of life when lower mental functions are developing.

#### **Higher Mental Functions**

Individual differences in higher mental functions may be influenced by factors described previously, but there are other contributing factors. One is the quality of language environment. Opportunities to hear and practice language will directly influence the future development of higher mental functions.

Another factor is social context. Some social contexts are more conducive to the development of higher mental functions. Vygotsky insisted that formal schooling was one of the most beneficial social contexts. Some aspects of higher mental functions can be learned only by going to school. The development of taxonomic categories (mammal, carnivore) is an example of "schooling" behavior. However, a child's informal experiences may be very different from those taught at school, especially when the child's culture is different from the mainstream culture. Most likely, white, middle-class children will have an informal context that is quite similar to that found in most schools in

the United States. For them, the process of developing higher mental functions builds upon their previous accomplishments. Children from other cultural backgrounds have varying degrees of similarity between school and their other social contexts. The degree of dissimilarity will influence how much mental restructuring must occur before the child can acquire the higher mental function presented in school. This is an important point for parents and educators to understand. This mental restructuring will require special support. It cannot happen by just dropping the child into that setting.

### *Compensating for the Deficits in the Development of Higher and Lower Mental Functions: Vygotskian Approach to Special Education*

Abnormal psychology and special education for Vygotsky were more than simply the applications of his general ideas on learning and development. In fact, Vygotsky was able to formulate or refine some of his major theoretical principles while studying the development of children and adults with disabilities. Vygotsky's view of disabilities is consistent with his major principle of social determination of the human mind: for him a disability is a sociocultural and developmental phenomenon and not a biological one.

#### **Social and Cultural Nature of Disabilities**

Vygotsky strongly opposed views that were dominant in special education during his time where the focus of diagnosis and intervention was on the handicap itself. He argued that these views reflect a simplistic—he called it “arithmetic”—view of a human as a “sum of its parts.” From this perspective, a child with an auditory or visual impairment is considered to be no different than a normally developing child—“minus the disability.” In contrast, for Vygotsky, the development of children with sensory, cognitive, or speech impairments takes a completely different course from the development of their healthy peers. To emphasize the complex and systemic nature of this development, Vygotsky used the term “disontogenesis” or “distorted development.”

The major components that determine the course of this developmental path include the primary disability (e.g., visual impairment or restricted movements) and the social context in which the child develops. This social context would determine the extent to which this child would be considered (and will consider himself) “disabled.” According to Vygotsky, “For the daughter of an American farmer, for the son of a Ukrainian landowner, for a German duchess, for a Russian peasant or a Swedish proletarian, blindness represents absolutely different psychological factors” (Vygotsky, 1993, p. 82). Another way to illustrate this principle is to compare children experiencing similar problems in coordinating movements of their eyes while focusing on near objects. For a child living in a Western industrialized country, this problem will interfere with his ability to track print when reading. On the other hand, a child living in a herding community might not even have a need for tracking small objects since most of his daily tasks involve looking at larger objects at a distance. Evidently, the same visual “deficit” may go virtually unnoticed in a society that does not rely on written texts for carrying out essential tasks. But it might put another child at risk for developing a reading disability and even for



academic failure associated with the possibility of subsequent social and emotional complications.

As a result of the interaction between the primary disability and the social context, a secondary disability can develop. While the child's primary disabilities affect primarily lower mental functions, secondary disabilities are the distortions of higher mental functions. Secondary disabilities develop because primary disabilities often prevent a child from mastering cultural tools that are critical for engaging in social interactions. In turn, limited social interactions prevent the child from acquiring even more cultural tools, which eventually leads to systemic distortions in the child's mental functioning. On the other hand, if the social context provides this child with an opportunity to learn an alternative set of cultural tools, the child may be able to participate in a wide range of social interactions and, as a result, develop higher mental functions.

In his own writings, Vygotsky frequently used examples of children who were deaf or blind (primary disability) and who did or did not develop secondary disabilities depending on whether or not they were able to master alternative tools, such as sign language instead of oral language and Braille instead of written language. Today, with an ever-increasing number of assisting devices, the mastery of cultural tools is becoming possible for children with various primary disabilities.

### **Remediation as a Means of Remediation**

Vygotsky's approach to remediation differs greatly from the approaches of his contemporaries, as well as many of today's educators. The proponents of the "arithmetic" approach to disabilities believed that remediation is possible at the level of an isolated function—the one affected by the primary disability. The way to "fix" this isolated function was to provide training to overcome the deficit (e.g., doing numerous exercises in blending isolated sounds into syllables and then into words to compensate for an auditory processing deficit) or to train an alternative function to take over for the one that is not working (e.g., training a blind person to develop more acute hearing or more differentiated tactile perception).

For Vygotsky, however, the primary disability should not be the main focus of the remediation efforts. He argued that, contrary to common wisdom, the primary disability is the hardest one to remediate because it affects lower mental functions. As we discussed earlier in this chapter, lower mental functions are biologically determined (in today's language, we would call them "hardwired"). It is exactly because of their biological nature that they cannot be changed by any means other than radical medical intervention such as inserting a hearing implant to improve hearing. On the other hand, higher mental functions are culturally and socially determined and as such can be successfully remediated in the course of specifically designed educational interventions. Vygotsky advocates focusing on higher rather than lower mental functions in remediation contending that "the developmental limitations in higher knowledge go beyond sensorimotor training which is possible in the elementary processes. Thought is the highest form of compensation for the insufficiencies of visual perception" (Vygotsky, 1993, p. 204).

For Vygotsky and his students, the way to engage higher mental functions to compensate for the deficiencies in lower mental functions is to use mental tools such as language. In a series of studies focusing on the self-regulatory role of speech in motor

behaviors, Vygotsky's colleague Alexander Luria observed changes in behaviors of extremely impulsive children after they were taught to verbalize their actions while carrying them out (Luria, 1979). At the beginning of the study, these children had a hard time following an experimenter's directions to press a rubber bulb when a green light came on and not to press it when a red light came on. Instead, they pressed the bulb every time they saw the light—any light—or did not press it at all. After being taught to say "press" in response to the green light and "no" or "do not press" in response to the red light, these children were able to gain control over their reactions and began to respond according to the directions. In essence, Luria had re-built the behavior that was lacking internal regulatory mechanisms by replacing the mechanisms with the children's own self-directed speech. This speech mediated the children's responses to external stimuli; therefore their new, more self-regulated behavior was not simply the result of remediation but also the result of re-mediation (Cole, 1989).

### **Application of Vygotsky's Theory to Special Education**

Vygotsky's ideas had a profound impact on the field of special education in Russia and are gaining popularity in the West (Gindis, 2003). We will not be able to describe the specific intervention strategies or particular programs that have been developed, but we will summarize two major ways Vygotsky's approach is being currently applied to special education.

**Differential Diagnosis of Impairment of Higher and Lower Mental Functions.** In extreme cases of severe visual or hearing impairment, it is clear which of the lower mental functions is affected. However in most early childhood classrooms, we are dealing with a system of interactions between a primary disability and subsequent deficiencies in social interactions and the acquisition of mental tools. Often children with neurological or sensory conditions exhibit symptoms similar to those of children with no such conditions who have been subject to cultural deprivation or educational neglect. Differentiated diagnoses of these cases is critical for planning successful instructional interventions. In his work with special needs children, Vygotsky pioneered a new type of assessment that allows for such a differentiated diagnosis. Based on the idea of Zone of Proximal Development (see Chapter 4), this assessment provides information not only about children's current mastery of certain content and skills but also about their responsiveness to adult assistance and their amenability to instruction in general (Gindis, 2003). In contemporary literature, this type of assessment is called Dynamic Assessment (see Chapter 14). A special type of dynamic assessment has been developed for cases in which a child's low performance is thought to be fully or partially due to the gaps in the child's acquisition of certain mental tools. Some examples of such cases—studied at the time by Vygotsky himself and now studied by R. Feuerstein and his associates (Feuerstein, Rand, & Hoffman, 1979; Kozulin, 1999)—include children brought up in poverty or displaced as a result of war. Other cases include children who have been institutionalized and/or adopted internationally (Gindis, 2005).

**Preventing "Secondary Disabilities" by Promoting the Development of Higher Mental Functions.** According to Vygotsky, the major efforts of special education should focus on creating alternative pathways of development for children with special needs. These pathways involve introducing special mental tools geared toward the unique needs of



children with different kinds of disabilities and designing strategies to facilitate their acquisition. An example of this approach can be found in the work of the Russian Institute of Corrective Pedagogy—the Institute that emerged from the laboratory of abnormal developmental psychology founded by Vygotsky. Methods of corrective pedagogy developed by the researchers working in this institute included an innovative approach to teaching 2- and 3-year-old children who are deaf to read in order to equip them with a tool alternative to oral language early enough to participate in a wider variety of social interactions (Kukushkina, 2002).

Probably the most impressive example of the implementation of Vygotsky's ideas in special education is the unique system of educating children who are born blind and deaf. Developed by Luria's student, Alexander Meshcheryakov, this approach builds on the intact lower mental functions of these children, such as their sense of touch or muscle memory, to develop complex higher mental functions (Meshcheryakov, 1979). Teachers in the school for children who are blind and deaf founded by Meshcheryakov help their students engage in a series of joint activities focused first mainly on their self-help routines. Gradually, movements used by children in performing these routines (e.g., pulling on pants or holding a dish) develop into symbolic gestures used to communicate to adults and other children. For example, holding a dish acquires a generalized meaning of "eating" and the gesture imitating pulling on pants would mean "going outside." After children develop simple gestures that serve as "symbolic equivalents" for the words, they proceed to learning special (dactylic) language based on different combinations of hand and finger movements. This allows children to develop progressively more abstract concepts. A graduate of Meshcheryakov's program who himself became a psychologist and who researches the development of children who are deaf and blind says, "Gesture equivalents become a kind of prism through which the child sees the real world" (Sirotkin, 1979, p. 58). At this point, children have developed higher mental functions using alternative but essentially equivalent pathways to cultural development that Vygotsky placed in the center of remediation efforts.

### *For Further Reading*

- Gindis, B. (2003). Remediation through education: Socio/cultural theory and children with special needs. In A. Kozulin, B. Gindis, V. S. Agueyev, & S. M. Miller (Eds.), *Vygotsky's educational theory in cultural context* (pp. 200–222). New York: Cambridge University Press.
- Luria, A. R. (1979). *The making of mind: A personal account of Soviet psychology*. Cambridge, MA: Harvard University Press.
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CHAPTER 3

*The Vygotskian  
Framework and Other  
Theories of Development  
and Learning*

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In this chapter, we will first compare Vygotsky's theory with other theories of child development and then give a general critique of the Vygotskian approach. These comparisons focus on the major principles of his Cultural-Historical Theory described in Chapter 1. More detailed comparisons of specific concepts appear in later chapters as each Vygotskian concept is introduced.

Vygotsky studied and commented on the work of constructivists (Piaget), behaviorists (Watson), Gestalt psychologists (Koffka), and psychoanalysts (Freud), as well as the work of educators (Montessori). Vygotskian theory also complements many of the ideas in information processing theory, which was developed after his death.

## *Piaget's Constructivist Approach*

Vygotsky was familiar with the early works of Jean Piaget such as *The Language and Thought of the Child* (Piaget, 1926). In his book *Thought and Language* (Vygotsky, 1962), Vygotsky criticized the Piagetian perspective on the relationship between thought and language, and proposed his own approach. Piaget accepted some of Vygotsky's criticisms and modified some of his later ideas, but this did not happen during Vygotsky's lifetime (Tryphon & Vonèche, 1996). The works of some of Vygotsky's students (e.g., Leont'ev) have more in common with Piaget than the works of Vygotsky himself. These similarities have caused many psychologists to erroneously consider the Vygotskian framework as part of Piaget's constructivist tradition.

### **Similarities**

Both Piaget's and Vygotsky's theories are best known for their insights into the development of thought processes. Piaget placed thinking at the center of child development (Beilin, 1994; DeVries, 1997). Although the bulk of Vygotsky's work was concerned with the development of thinking, Vygotsky had planned to study other areas of development that he considered equally important (such as emotions), but his early death did not allow him to complete this work.

Piaget and Vygotsky agree that a child's development is a series of qualitative changes that cannot be viewed as merely an expanding repertoire of skills and ideas. For Piaget, these changes occur in distinct stages (Ginsberg & Oppen, 1988). Vygotsky, however, proposed a set of less well-defined periods. He wrote primarily about the restructuring of the child's mind that takes place during the periods of transition from one stage to another and placed less emphasis on each stage's characteristics (Karpov, 2005).

Both Piaget and Vygotsky believed that children are active in their acquisition of knowledge. This belief differentiates them from the proponents of behaviorism, who view learning as determined primarily by external (environmental) variables. Instead of seeing the child as a passive participant, a vessel waiting to be filled with knowledge, both Vygotsky and Piaget stress the active intellectual efforts that children make in order to learn (Cole & Wertsch, 2002).

Both theories describe the construction of knowledge in the mind. Piaget believed that young children's thinking is different from that of adults and that the knowledge

children possess is not *just* an incomplete copy of what adults have. Vygotsky and Piaget agree that children construct their own understandings and that with age and experience these understandings are restructured.

In his later writings, Piaget acknowledges the role of social transmission in development (Beilin, 1994). Social transmission is the passing of the accumulated wisdom of the culture from one generation to the next. Vygotsky also believed in the importance of culture in transmitting knowledge. Piaget, however, believed that social transmission influences primarily the content of knowledge. For Vygotsky social transmission plays a much greater role; it influences not only content but the very nature and essence of the thinking process.

Finally, for both theorists the elements of mature thought are quite similar. Piaget describes formal operational thinking as abstract, logical, reflective, and hypothetical-deductive. Vygotsky's higher mental functions involve logic, abstract thinking, and self-reflection.

The emphasis on abstract, logical thinking has led some psychologists to criticize Piaget and Vygotsky for being Eurocentric because they place a higher value on the mental processes that are more prevalent in Western, technologically advanced societies (Ginsberg & Oppen, 1988; Matusov & Hayes, 2000; Wertsch & Tulviste, 1994). Although Vygotsky did place more emphasis on logical thought, he believed that, given exposure, all humans are capable of developing it, and that the lack of development of logic in a particular culture was due to the fact that it was not "useful" in that culture.

### Differences

Initially for Piaget, intellectual development has a universal nature independent of the child's cultural context. Thus, all children reach the stage of formal operations at about the age of 14. For Vygotsky, the cultural context determines the very type of cognitive processes that emerge. Cultures that do not employ formal reasoning extensively would not foster the development of formal operations in their young. Vygotsky's ideas have been supported by the data obtained in cross-cultural studies of societies where children do not develop formal operations (Bruner, 1973; Jahoda, 1980; Laboratory of Comparative Human Cognition, 1983; Scribner, 1977). The research of some of Piaget's students (Perret-Clermont, Perret, & Bell, 1991) has led to a greater stress on the contribution of the cultural context.

While Piaget emphasizes the role of the child's interactions with physical objects in developing mature forms of thinking (Beilin, 1994), Vygotsky focuses on the child's interactions with people. For Piaget, people are of secondary importance, and the objects and the child's actions on objects are of primary importance. Peers may create cognitive dissonance, but they are not an integral part of the learning process. For Vygotsky, a child's actions on objects are beneficial for development only as long as they are included in a social context and mediated by communication with others.

For Piaget, language is more a by-product of intellectual development than one of its roots (Beilin, 1994). Language can increase the "power of thought in range and rapidity" by representing actions, liberating thought from space and time, or organizing actions (Piaget & Inhelder, 1969). However, the way a child talks merely reflects the present stage of the child's cognition; it has no impact on the progression from one stage to another. For Vygotsky, language plays a major role in cognitive development and forms the very core of the child's mental functions.

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Piaget views the child as an “independent discoverer” who learns about the world by creating his own construction of it on his own. (DeVries, 2000 Wadsworth 2004). Vygotsky argues that there is no such thing as completely independent discovery for children who grow up in human society. Instead, a child’s learning takes place in a cultural context, and both the things to be discovered and the means of discovery are products of human history and culture.

Piaget believed that only the discoveries children make independently reflect their current intellectual status. Knowledge of how children acquire or apply knowledge that is transmitted by adults is not relevant in determining a child’s developmental level. Vygotsky, in contrast, believed that appropriation of cultural knowledge is key to a child’s cognitive development. Therefore, a child’s shared performance is as valuable as her independent performance for determining her intellectual status (Obukhova, 1996).

The effect of learning on development is viewed differently by Piaget and Vygotsky. For Piaget, a child’s current developmental status determines his ability to learn. Accordingly, all teaching should be adjusted to the existing cognitive abilities of a child. For Vygotsky, the relationship between learning and development is more complex. For certain knowledge or content and for certain ages, one step in learning may mean two steps in development. In other cases, learning and development proceed at a more even pace. However, teaching should always be aimed at the child’s emerging skills, not at the existing ones.

### *Behaviorist Theories*

In Russia during the 1920s and 1930s, when Vygotsky did most of his writing, behaviorism in its various forms was one of the most influential psychological theories. Vygotsky lived in the epoch of early behaviorism represented by John B. Watson (Watson, 1970) and was not familiar with later developments within this framework. Although Vygotsky disagreed strongly with behaviorists, the influence of this theory is evident in his language.

#### **Similarities**

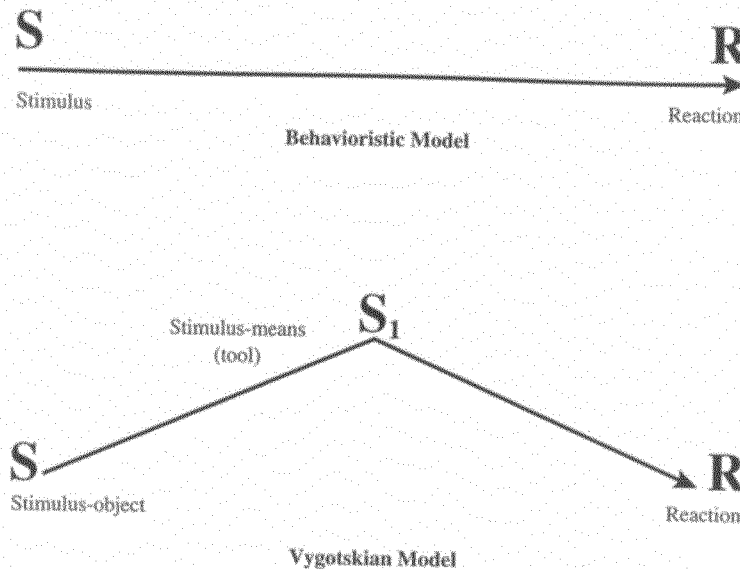
Like the behaviorists, Vygotsky favored the use of objective methods in psychology. His approach was not purely speculative but was based on observations, measurements, and experiments. Vygotsky criticized the use of introspection as an experimental method, as did the behaviorists.

Although Vygotsky stressed unique features of the human mind, he also recognized that humans and animals have certain common behaviors. Like the behaviorists, Vygotsky believed that animals and humans are part of the same evolutionary continuum, not completely different forms.

Another similarity of the behaviorists and Vygotsky is their mutual interest in learning. Behaviorism and the Vygotskian framework both focus on the learning process, although they approach it from different directions.

#### **Differences**

Unlike early behaviorists, Vygotsky was not satisfied with measuring only overt behaviors. Vygotsky did not believe that thinking could be understood by considering only



**Figure 3.1** Comparison of behaviorist and Vygotskian views of behavior

those behaviors that can be measured and observed by another person. He always tried to explain covert behaviors using inferences based on broader theoretical categories. Later theories of behaviorism also use concepts that are inferred from overt behaviors but cannot be directly observed (Horowitz, 1994).

The major disagreement Vygotsky had with the behaviorists concerned the nature of the "stimuli" that trigger certain behaviors in animals and humans. Behaviorists assert that the relationship between stimuli and behavior is the same for all organisms. For Vygotsky, the fundamental difference between humans and animals lies in the fact that humans are able to respond to stimuli that they generate for themselves. By responding to these specifically created stimuli, or "tools," humans actually gain control over their own behavior (see Figure 3.1).

In addition, Vygotsky opposed Watson's view of speech as no different from other overt behaviors. Watson believed that thinking was just "silent speech." For Vygotsky, speech plays a unique role in the process of mental development, and thinking is substantially different from speech in its form and function (see Chapter 6).

The views of Vygotsky and the behaviorists on the relationship between learning and development also differ. Behaviorists do not distinguish between these two processes and do not address development as a separate concept. From this, Vygotsky concluded that behaviorists believe that learning is development. Behaviorists, indeed, maintain that a developing child is always the same child but becomes more knowledgeable and skillful as a result of learning. For behaviorists, there are no qualitative changes in mental structures; learning is simply cumulative (Thomas, 2000). Vygotsky argues that there are qualitative changes not explained by growth in the number of things a child knows. He states that certain learnings can reorganize and qualitatively change the structure of thought. For example, when children acquire language, they begin to think in words, thereby changing both their sensorimotor thinking and their problem-solving abilities.



Finally, Vygotsky and the behaviorists differ on the idea of construction of knowledge. Behaviorists see the child as relatively passive, with knowledge being a product of associations strengthened through reinforcement (Thomas, 2002). Vygotsky claims that children construct knowledge and are active in acquiring knowledge. Children act based on these mental structures and understandings. For behaviorists, the environment (including physical objects and other people) is in control of the child's thoughts and actions, selecting the appropriate ones and increasing them through reinforcement. In contrast, Vygotsky argues that the acquisition of knowledge and tools gives the child a means to control her own thoughts and actions.

### *Information Processing Theory*

Information processing theory (Atkinson & Shiffrin, 1968) was developed long after Vygotsky's death. Even so, many of the concepts that Vygotsky developed and predicted are consistent with the research findings of information processing theory.

#### **Similarities**

Both the Vygotskian framework and information processing theory stress the importance of metacognition in mature thinking and problem solving. In both theories, metacognition includes the concepts of self-regulation, self-reflection, evaluation, and monitoring. Both theories are concerned with self-regulation of mental processes as a key to effective problem solving. Information processing theorists use the terms *executive function* and *inhibitory control* to describe the ability to stop one's first reaction to something and to enact a different strategy. Both theories agree that this is fundamental to effective problem solving. Recent brain research (Blair, 2002) supports the importance of self-regulation as a central process.

In addition, information processing theorists and Vygotsky agree that the child must make a mental effort to learn. There is nothing passive about this process. Furthermore, new learning is not merely added to existing structures but modifies present knowledge. Vygotsky speaks of comprehension as a dialogue in which the child communicates with the teacher or the author of a text to build new meanings rather than simply copying existing ones.

Finally, information processing theorists and Vygotsky stress cognitive processes and semantics, or the meaning of words. Both theories place attention, memory, and metacognition at the center of the learning process (Cole & Wertsch, 2002; Frawley, 1997).

#### **Differences**

Information processing theory is not really a developmental theory. It describes processing at different ages but does not explain why children are better at it as they grow older. On the other hand, Vygotsky is primarily concerned with how these processes develop and how they are taught to children.

Since information processing theory uses the computer as the primary analogue for the human mind, the social context and the way it forms thinking processes are not considered. Culture influences input—knowledge and facts—but not the method of processing information. For Vygotsky, culture influences both the content of thinking and the way humans process information; it affects the nature of attention, memory, and

metacognition. For example, Vygotskian researchers found that primacy and recency effects, which are described by information processing theorists as universal phenomena in memory, are influenced by the type of schooling children have. Whether children remember only the last thing they heard (recency effect) or the first and the last things they heard (primacy and recency effects) depends on the culture they belong to (Valsiner, 1988). Recent research done within the information processing paradigm confirms that formal education does affect such cognitive processes as visual-perceptual processing, attention, and visual and verbal memory (Ostrosky-Solis, Ramirez, & Ardila, 2004).

Finally, emotional and motivational aspects of learning are ignored by information processing theorists. Vygotskians believe that emotions and motivation are important in the learning process. Children learn best when they feel emotionally engaged in learning activities. Leont'ev (1978) did extensive research to identify what makes an activity motivating and beneficial to young children (his research is summarized in Chapter 5). Furthermore, Vygotskians believe that cognitive and social-emotional self-regulation are linked and that the development of one influences the development of the other.

### **Montessori's Approach**

Maria Montessori and Lev Vygotsky were of the same era and although Montessori never wrote about Vygotsky, Vygotsky was aware of her methods (Bodrova, 2003). Montessori came from a different research paradigm than Vygotsky, developing her theory through observational methods and borrowing from anthropology and medicine (Montessori, 1912, 1962). Vygotsky came from the psychological tradition with its use of testing and experimentation.

### **Similarities**

Both Montessori and Vygotsky argued for the importance of instruction and learning in development, however, their definitions of development differed. Montessori believed that development was the natural unfolding of innate abilities, but Vygotsky argued that the nature of development was actually determined by the cultural tools that children acquired in the course of instruction. Both are constructivists, believing that children learn by developing their own understandings of phenomena. Montessori called this autoeducation (self-education), in which the teacher supports the child's quest for discovery and learning. For Vygotsky, learning occurs through co-construction. The child requires the mind of another person to learn.

### **Differences**

There are two main points on which Montessori and Vygotsky disagree. The first is the role of language in development, and the second is the role of play. Montessori, similar to Piaget, believed that language was a by-product of knowledge and that it expressed what the child had already perceived or concluded on his own (Montessori, 1912). For example, learning words to describe different colors was the outgrowth of the child's eye already being trained to see the differences. Vygotsky argued that language was the engine of development, that it helped children to acquire concepts. Knowing the words for the colors orange and red helped children to see that there was a difference between the two colors. The role and importance of written language was another point on which they differed. For Montessori, children learned to write to help them meet the demands

of primary grades and to practice motor control. For Vygotsky, writing was a cultural tool whose acquisition influenced the child's mental processes. It was given a much more elevated position in development.

Montessori and Vygotsky also differed on the importance placed on play in development. Montessori believed that play was not necessary and that children should forgo play for more productive activities. Vygotsky argued that play was a central activity to preschool and that without it children did not develop the creativity, self-regulation, and other underlying skills necessary for later development.

### *Critique of the Vygotskian Approach*

Vygotsky died before many of the ideas he proposed were researched so many of the questions he posed were left unanswered. Therefore, his writings do not form a coherent, well-organized theory. Consequently, his ideas about some areas of development, such as the relationship between emotions and learning, are not fully explained, elaborated, or demonstrated empirically.

One common criticism is that Vygotsky placed too much emphasis on the role of speech in cognitive development and did not adequately explore how other types of symbolic representations contribute to higher mental functions. Later research completed by Zaporozhets and Venger showed how nonverbal cultural tools promote the development of perception and thinking in young children (Venger, 1977; Zaporozhets, 1977).

Another criticism is that Vygotsky himself, as well as his followers, focused on the role of social factors in child development at the expense of biological factors such as heredity or maturation. Summarizing recent findings of behavioral geneticists and other developmental scientists, Karpov (2005) suggests that an incorporation of these findings interpreted from the cultural-historical perspective will enrich the Vygotskian theory of child development "without losing its emphasis on the role of mediation in the context of children's joint activity with adults and peers as the major determinant of their development" (Karpov, 2005, p. 239).

Vygotsky has also been criticized for placing too much emphasis on the role that others play in shared activity and not enough on what the child must do to be an active participant. It was partly in response to this criticism that his colleague Leont'ev developed his "activity theory," which stresses the child's active participation in shared activity (Leont'ev, 1978).

As we will see in the following chapters, the Vygotskian framework provides a view of the developing child that is distinct from the ideas in Western psychology. The framework has the potential to help us understand the learning and teaching process in a more precise way.

### *For Further Reading*

- Bodrova, E. (2003). Vygotsky and Montessori: One dream, two visions. *Montessori Life*, 15(1), 30–33.
- Tryphon, A., & Vonèche, J.-J. (Eds.). (1996). *Piaget-Vygotsky: The social genesis of thought*. Hove, UK: Psychology Press.