

2000). For our discussion, however, much more important is the analysis of this concept in relation to the problem of the interrelationships between instruction and development.

To introduce his solution to the problem of the interrelationships between instruction and development, Vygotsky contrasted it to the alternative solutions to this problem suggested by other researchers at that time. The first such solution was presented in early writings of Piaget (1923/1959). In Piaget's approach, "development is seen as a process of maturation subject to natural laws, and instruction as the utilization of the opportunities created by development" (Vygotsky, 1934/1986, p. 174). Thus, according to Piaget, instruction "hobbles behind development" (Vygotsky, 1934/1986, p. 175); it can refine the already developed cognitive structures, but it cannot result in developing new structures. Vygotsky's analysis of early writings of Piaget is applicable to Piaget's later views on the interrelationships between instruction and development as well. In one of his later works, Piaget clearly indicated that a child can learn new ideas "only if he is capable of assimilating them, and he can do this only if he already possesses the adequate instruments or structures" (Piaget, Gellerier, & Langer, 1970/1988, p. 14). As Siegler (1991) summarized:

Piaget's views concerning the possibility of accelerating cognitive development through training are among his most controversial. Some of his comments appear to rule out the possibility of any training being successful. Others suggest that training might at times be effective, but only if the child already possesses some understanding of the concept and if the training procedure involves active interaction with materials. (p. 53)

Although the influence of Piaget's ideas on the research of contemporary American psychologists is not as great as it was in the 1970s, his view on the interrelationships between instruction and development is still dominant in American psychology. Ormrod (1995), for example,

summarized the views of American cognitive psychologists on this topic as follows:

A student's level of cognitive development affects the kinds of learning and behavior that are possible. Teachers must consider their students' levels of cognitive development (perhaps in terms of Piaget's stage characteristics) when planning topics and methods of instruction. For example, explanations based on concrete operational logic may be ineffective ways of presenting ideas to kindergartners not yet capable of such logic. (p. 190)

Another reason for a broad acceptance by American psychologists of the view that instruction should follow development may be the influence of nativist theories of child development. As I briefly discussed in the Introduction, nativists have seen genetically predetermined maturation as the major determinant of children's development and the reason for individual differences in development. Therefore, instruction, from their point of view, just realizes the potentials created by development without determining development. As Scarr (1992) wrote, "Feeding a well-nourished but short child more and more will not give him the stature of a basketball player. Feeding a below-average intellect more and more information will not make her brilliant" (p. 16).

Vygotsky (1934/1986) considered instruction to be the major avenue for mediation in the period of middle childhood. Sometimes he even used the term instruction in the broadest meaning of the word as a synonym for mediation: "Instruction and development do not meet for the first time at school age; in fact, they are interrelated from the child's very first day of life" (Vygotsky, 1956, p. 445). Therefore, he strongly disagreed with the view that instruction should "hobble" behind development. Of course, Vygotsky was far from claiming that instruction should be organized without taking into consideration the actual level of the child's development. He indicated that "it remains necessary to determine the lowest threshold at which instruction in,

say, arithmetic may begin, since a certain minimal ripeness of functions [mental processes] is required" (Vygotsky, 1934/1986, pp. 188–189). Correctly organized instruction, however, should not target the actual level of development of these mental processes. Rather, like any other type of mediation, instruction "marches ahead of development and leads it; it must be aimed not so much at the ripe as at the ripening functions [mental processes]" (Vygotsky, 1934/1986, p. 188).

The second alternative solution to the problem of the interrelationships between instruction and development that Vygotsky analyzed was introduced, in particular, by Thorndike (1914), who was an antecedent of behaviorism. Thorndike "sees the intellectual development of the child as a gradual accumulation of conditional reflexes; and learning is viewed in exactly the same way" (Vygotsky, 1934/1986, p. 176). Therefore, students' learning in the course of instruction and the process of their development are viewed within this theoretical perspective as identical. Similar views were formulated by such behaviorists as Watson (1925) and Skinner (1953). Because behaviorists' ideas have lost their popularity among American psychologists since the 1960s, their solution to the problem of the interrelationships between instruction and development does not have many supporters these days (for one of a few exceptions, see Bijou, 1976, 1992).

Although behaviorists seem to emphasize the leading role of instruction in children's development, Vygotsky indicated that their approach has an important shortcoming. For behaviorists, any learned knowledge and skills contribute to the child's development, and this contribution is equal to the amount of learned knowledge. For Vygotsky, first, learning does not lead to students' development if instruction targets the level of actual rather than potential development of their mental processes. Second, under properly organized instruction, students' development is not reduced to the amount of acquired knowledge. As Vygotsky (1956) indicated, "one step in learning may mean a hundred steps in development" (p. 256). For example, as

discussed earlier, children's acquisition of language leads to the development of their self-regulation.

Thus, according to Vygotsky, instruction should be organized in accordance with general principles of mediation. It should lead development through targeting the level of potential development of the child's mental processes. Such instruction "awakens and rouses to life those processes that are ready to develop, that are in the zone of proximal development" (Vygotsky, 1956, p. 278).

Motivational Factors in Child Development

The theoretical ideas of Vygotsky just described are mostly related to the analysis of children's cognitive and metacognitive development as the outcome of social mediation, but not to the analysis of the role of children as active contributors to their development. Because the familiarity of Western psychologists with Vygotsky's theory is often limited to these ideas, they sometimes criticize Vygotsky for viewing children as passive recipients of social influences. Kuhn (1992), for example, wrote: "In emphasizing the external influences stemming from social interaction, [Vygotsky] neglects the complementary part of the individual–environment interaction, that is, the role of the individual" (p. 259). Although some of Vygotsky's writings may lead to this impression (this issue is discussed in more detail in the next chapter), such an interpretation of Vygotsky's general theoretical position is simply wrong. Discussing children's development, Vygotsky (1984/1998) emphasized that "not just the child's habits and psychological functions (attention, memory, thinking, etc.) are developing – at the base of mental development lies, first of all, an evolution of the child's behavior and *interests* [emphasis mine], a change in the structure of the direction of his behavior" (p. 4). This is the development of new interests (that is, motives) in children that, according to Vygotsky, results in their active