

## *Historical/Theoretical Perspectives of Cognitive Self-Instruction*

### **Overview**

Vygotsky's major goal was to develop a psychology of the mind. One aspect of this psychology is Vygotsky's theory of verbal self-regulation. Assumptions that are the building blocks of this theory are delineated. Definitions of the "zone of proximal development" and the "concept of verbal mediation," according to Vygotsky's writing are provided. Briefly, the contributions of A. R. Luria and A. N. Leont'ev, followers of Vygotsky, are described. These contributions are limited to those specific to understanding CSI.

### **Self-Questions**

1. Knowledge. What year was Vygotsky born?
2. Comprehension. Explain the difference between the motoric and the semantic aspect of speech.
3. Application. Based on the motoric aspect of verbal self-regulation predict why restaurant owners who want customers to eat quickly might play rock music, and restaurant owners who want customers to linger and dine for a long time may choose slow, classical music.

4. **Analysis.** Describe the discrete stages in the development of verbal self-regulation, as outlined by Vygotsky. What is the significance of each stage?
5. **Synthesis.** Defend and refute the following statement: although Luria did not intend to stray from Vygotsky's major thesis of verbal self-regulation he, in fact, did.
6. **Evaluation.** In my opinion, was the work of Vygotsky-Luria-Leont'ev (a) psychological, (b) sociological, (c) anthropological, (d) combinations of "a," "b," and/or "c"? Document answer with specific reasons for my choice. If I choose "d," develop a term to describe this unique approach.

Lev Semenovich Vygotsky (1896–1934) considered language the substance of thought, which directs action. According to Vygotsky, meaningful words spoken to one's self guide and regulate human behavior. This idea is the key to understanding cognitive self-instruction.

After Vygotsky died, his work *Thought and Language* was published in Russian in 1934. It was not translated into English until 1962. Vygotsky's motivation was to describe a general theory of the development of the human mind. His ideas are complex, varied, and many. In this particular text, I am interested in describing how students direct their own learning as a result of social transactions in the school setting. Therefore, Vygotsky's ideas are restricted to those related to this goal.

### ***Theory of Verbal Self-Regulation***

***The primary difference between humans and animals is that humans develop playful speech.*** In animals, thought and speech originate from different sources and develop differently. Koehler's experiments with apes substantiate that thinking in animals is not related to their speech. The ape language functions apart from the intellect. On the other hand Premack (1976) provides evidence of the ape's capacity to learn and use symbolic representations. Since 1976, even more advances have been made in understanding the language of apes and other animals that might produce a variety of opinion about the relationship between thought and speech in animals. However, because Vygotsky's focus on intentional self-guiding language is embedded in social context and spontaneity, it is doubtful that Vygotsky would change his claim that "The primary difference between humans and animals is that humans develop playful speech," regardless of these recent findings. To explicate further, the vocal reactions of

apes are a part of emotionality—an emotional reaction that fulfills a biological and psychological need. However, these reactions are not at all akin to the purposeful verbalizations used by humans to inform and direct themselves.

***The thought and speech of animals compared to humans have different genetic roots.*** During the entire life span, animals' thought and speech continue to develop independently of each other (biologically). In contrast the thought and speech of humans converge whereupon thought is verbal and speech is rational. There is a qualitative shift at this convergence point from biological to sociohistorical.

In childhood, there is evidence (Vygotsky, 1962) of a prespeech phase when thought is functional. The actions during the prespeech phase of thought development have been noted in the tenth, eleventh, and twelfth months. Examples of prelinguistic thought are purposeful play with toys, planning motor functions such as crawling to a parent, throwing food on the floor.

In addition to the prelinguistic phase of thought, there is also the preintellectual phase of speech development. The child's word play, babbling, perhaps even first words repeated without thinking are examples of emotional forms of behavior, separated from the development of natural thought. Verbal thought is not predetermined (phylogenetically) but is dependent upon the specific social/linguistic history of each individual (ontogeny). This verbal thought is not subject to the characteristics preset in the natural forms of thought and speech. Knowing this helps us to understand the individuality of inner speech (thought) as it regulates and controls specific human behavior. Once we understand that our self-language possesses the power to motivate, guide, limit, control, and reinforce our actions, we have a concrete means for restructuring education.

***The cognitive development of humans is determined by language, in particular the social/linguistic experiences of a child.*** The development of inner speech (verbal thought) is determined by outside factors. The outside factors are outside the natural development of the child, and are usually the social interactions between parent and child. Children's intellectual development is framed by the verbal environment created within the social transaction between adult and child. If children have parents who are excellent language users, who model verbal problem-solving, who cope and reinforce themselves verbally; then these children will be more advanced intellectually than those in a deprived verbal environment. "The speech structures mastered by children become the basic structures of their thinking" (Vygotsky, 1962, p. 51). This is similar to the idea that expressive language is influenced by receptive language—what goes

in, comes out, or garbage in, garbage out! But Vygotsky takes this a step beyond, when he contends that the language of significant adults during the social/linguistic experiences of children becomes the means for children to verbally guide their own lives.

**Speech becomes verbal thought through a development of three stages: external, egocentric, and inner speech.** When children are born, they do not live alone. They develop in a typical social milieu of parents, grandparents, sisters, brothers, aunts, uncles, and cousins. These more experienced members of the family unit talk to the child, labeling the world and directing the child's activity. The child comes to know the world through the verbalizations of these others. The child is being externally directed through verbalizations. For example, the child soon learns that the configuration of sound "Come here" means a corresponding motoric reaction of walking toward the speaker. The child may come to associate car keys with the parent's directive, "It's time to go ride." The jingle of the keys may prompt the child to find his/her coat even without the usual parent verbal directive. When parents say "bath time," the child may start to shed clothes on the way to the tub. In any event the activity of the child is directed by the verbalizations of an external agent. This is what is termed the "External Stage" of Vygotsky's theory of verbal self-regulation (Stage 1).

The second stage of development is called the "Egocentric Stage." This is when children have internalized the parents' verbal messages in Stage 1 to the point that they are talking aloud to themselves. They are using words that strikingly resemble the parents' messages in Stage 1. This second stage has been referred to as the "Private Speech Stage." Private speech is defined as overt speech-to-self. Some researchers object to the name of this stage, "Egocentric," because it is confused with Piaget's meaning of egocentricism. In actuality it is far removed from Piaget's meaning that children see themselves as the center of the universe and are unable to role-take. Vygotsky was interested in the development of verbal self-regulation, instead. I will refer to Stage 2 as the "Private Speech Stage." Within this stage there are three sub-stages. The progression of these stages illustrate the movement of the child from impulsivity to reflectivity. This progression is also an account of the term *internalization*. Internalization of the parent message into the cognitive constructs of the child's intellect begins during Stage 1. It is impossible to parcel out exactly when internalization begins and ends. Wertsch and Stone (1985) defined internalization as the relationship between external and internal activity when external activity is transformed into internal activity. The external verbal messages from others are internalized to become an integral part of children's internal cognitive directives.

In Stage 2, children first act and then describe their activity verbally.

Next, they act and talk to themselves aloud simultaneously. Finally, they verbally direct, then act in accordance with their verbal guidance. In Stage 2, all substages are in the form of overt self-verbalizations. The child is talking aloud. Gross predictions of age have been ages three (substage a), four (substage b), and five (substage c). Of course, as with any developmental theory, the specific ages are less important than the order of events.

To give several examples a child in substage 2a will go to a television, turn the knobs, step back, and tell him or herself "no," "no." This self-direction is actually the parent message which has been internalized by the child, from the External Stage. During substage 2b, the child goes to the television and tells him or herself "no," "no" while at the same time turning the knobs. Finally, in substage 2c, the child has the capability to go to the television, to say "no," "no" prior to turning the knobs, and to follow this self-direction accordingly.

Another example can be illustrated when asking children to draw a picture. A child in substage 2a will impulsively make scribble marks on the paper and then label the scribbles as "tree." A child in substage 2b will talk to self as he/she draws: "Here's a tree, a sky, under here, etc." A child in substage 2c will cognitively direct self prior to drawing anything, "Now, I will draw a tree, a house, and a bird on my paper." Only in the last instance is the child verbally planning the drawing. The child has moved from impulsivity (substage 2a) to purposeful, planned behavior based on self-verbalization (substage 2c). Stages 1 (External) and 2 (Private) are alike in the form of verbalizations: both are overt verbalizations. They differ in the source of control: Stage 1 is an external, other-regulation; whereas Stage 2 is self-regulated, overt speech-to-self.

Stage 3 is called "Internal Verbal Self-Regulation." In this stage the verbalizations have become covert. They are silent. It is important to note that mental problem-solving and verbal thought are occurring just as in Stage 2. However, the self-regulatory speech is now spoken inaudibly, rather than audibly. Vygotsky says that the speech-to-self has gone "underground." I prefer to think of it as taking a different form but being in every way just as instrumental in determining behavior outcomes. Therefore Stage 2 (Private) and 3 (Internal) are alike in that they both are characterized by verbal self-regulation of behavior. They differ because Stage 2 is overt; while, Stage 3 is covert speech-to-self.

To sum, the three stages of verbal self-regulation are external, egocentric (private speech), and internal. External is when children are regulated by the verbalizations of a more experienced member of society; private speech is when children talk aloud to themselves to bring behavior under verbal control. There are three substages in the private speech stage. First children act, then verbalize about the activity. Next they act and speak to themselves simultaneously. Finally they use self-verbalization in a purposeful, deliberate

way to regulate their subsequent behavior. It is not until "2c" that children are exercising cognitive planning. In the final stage they continue to verbally regulate behavior; however, language to self is covert, silent, inhibited speech-to-self. Nonetheless, the power of self-verbalization is still operating in Stage 3 and planful thought is now inner speech.

When individuals are stressed or in disequilibrium, they revert to Stage 2, private overt speech and they talk aloud to attempt to establish equilibrium. Examples are "lost keys," "heavy traffic," or "finding a new location." In all three examples we often talk aloud to ourselves to regulate our behavior: "Where did I have those keys?" "Crazy drivers, look at that!" and "Where was I supposed to turn?" These verbalizations spoken to self are aides to equilibrium or problem resolution.

The progression through the stages is often referred to as movement from an interpsychological to an intrapsychological plane of functioning. In reality, I believe individuals move from intrapsychological, to interpsychological, back to intrapsychological during initial growth and development. To explain, first children are growing from a biological pre-set timetable in speech and thought (phylogenetically). They are very much "within themselves." This is the intrapsychological development. As children shift to the ontogenetic verbal thought as a result of social transaction, they also shift to an interpsychological plane. As they internalize the social messages needed to regulate behavior, they shift back to intrapsychological functioning.

It appears that the progression from intra- to inter- to intra- is more cyclical than linear. Throughout life as we interact with others, especially when learning a new area of study, we move from what we bring uniquely to the learning situation (intra), to what we learn from someone else (inter), back to how we internalize this information for ourselves (intra), to how this new internalized knowledge impacts on future social transactions (inter). This progression has implications for learning and teaching. It will be used for the foundation of cognitive self-instruction in classroom processes.

***The major characteristic of verbal self-regulation is purposeful, self-directed speech aimed inward to promote human accomplishment of goals.*** Although there are many areas of confusion and disagreement about Vygotsky's theory of verbal self-regulation, one area of consensus has been goal-directed, planful behavior based on verbal thought. Inherent in the definition of verbal self-regulation has been the concept of goal-directedness. If a human purpose is not present, then another area of cognition is operating. Verbal self-regulation does not encompass the entire study of human cognition. It relates to the area of metacognition, rather than cognition. Metacognition is awareness and regulation of one's own thinking. Verbal self-regulation is intrapsychological

awareness and control of human behavior via speech-to-self as a goal is sought. While studying this book, it is important to remember that verbal self-regulation is not referring to all of the mind's functioning. The characteristics to remember are awareness, purposeful self-directed speech on an intrapsychological plane aimed at goal achievement.

### ***Zone of Proximal Development***

The zone of proximal development as defined by Vygotsky in *Mind in Society* (1978, p. 86) is "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."

This Vygotskian concept has important implications for parenting and teaching. Inherent in the definition is that instruction should precede cognitive developmental levels of children. This learning by social transaction is the means by which children reach higher, more abstract levels. These new levels create more awareness, consciousness, and control over the environment. Vygotsky promoted the idea that social interaction is the means to educating our young. He did not view "good learning" in the paradigm of children, left unaided, struggling to bring about sensible, rational answers that may be meaningless without adult explanation and guidance.

From a Vygotskian perspective, children advance in consciousness and control through the aid of adults and more competent peers. Bruner (1985, pp. 24–25) termed such aid "scaffolding." "The tutor in effect performs the critical function of scaffolding the learning task to make it possible for the child, in Vygotsky's word, to internalize external knowledge and convert it into a tool for conscious control." In this way knowledge and skills are mastered first in collaboration with others. Once the knowledge and skills are mastered, children internalize this information as part of their verbal thought. At this point children are able to use speech-to-self dialogues to exercise conscious control over new related learning. The child's language becomes a tool for further learning and deliberate control over the ever-widening environment.

Many researchers (e.g., Ann Brown, James Wertsch) used the "zone of proximal development" concept to formulate systems of educational evaluation and instruction. Brown encourages the use of the zone as an aspect of intelligence testing, beyond the usual way intelligence is tested (see Brown & Ferrara, 1985 for a complete discussion). She points out that a measure of intelligence is possible when child A (CA = 10; MA = 8) deals with problems up to a twelve year old level with adult guidance, and child B (CA = 10; MA = 8) only deals with problems up to an eight year old's level with the same adult

guidance. This is a measure of the capability of children of the same chronological and mental age varying to a high degree under teacher guidance. Brown proposes that this capability with adult guidance becomes an added dimension to understand and assess learning potential. Traditional IQ measures do not indicate what a student may be capable of when learning is structured and/or aided by a more capable person. Since the instructional process in classrooms is often one of teachers structuring, guiding, and controlling the learning environment to insure optimal gain from learners, it would seem very important to know a student's potential for learning, when aided. As Brown and Ferrara (1985, p. 275) state; "the substantial improvement over initial response (working independently) that is achieved via the interaction of the adult and child (working jointly) is precisely what learning potential methods aim at measuring." These authors discuss three programs which address such an assessment of learning potential. These three programs are Feuerstein's Learning Potential Assessment Device (LPAD), Budoff's Learning Potential and Educability Program, and the Soviet clinical assessments of the zone of proximal development. Readers who wish to know the specifics of these programs are referred to the Brown and Ferrara (1985) reading.

Two important educational implications should be emphasized when considering the zone of proximal development. First, consideration should be given for using this idea in diagnostic intelligence testing previously discussed. Second, instruction should be aimed at the upper, not lower limits of a student's zone. If educational methods/curricula are reserved for only what students can perform independently, then they may be denied the challenge necessary for educational advancement. Both of these implications are extremely important for educational practice.

### ***Concept of Mediation***

Verbal mediation is the fundamental unit of analysis for cognitive self-instruction processes. For this book, mediation is word(s) spoken-to-self to reconcile between stimulus and response. In the case of tutors, the tutors' verbalizations can serve as a social mediator of learning. Later, the verbalizations of the tutor are internalized by the learner and become the learner's self-structures of mediation.

Vygotsky called word meanings, "psychological tools." For him, the word is a "symbol with a definite meaning that evolved in the history of culture" (Davydov & Radzikhovskii, 1985, p. 54). This approach enabled Vygotsky to add a third dimension to the S-R of behaviorism. The "psychological tools" were an intervening link in the behavioristic chain. Meaningful words serve as the determiner that mediates mental functions.



### **A. R. Luria and A. N. Leont'ev Contributions**

The work of Vygotsky was disseminated by A. R. Luria (1902–1977) and A. N. Leont'ev (1904–1979). Luria is credited with bringing Vygotsky to the Western world. In addition, Luria tested the development of the “other- and self-regulated” motoric aspect of speech upon behavior in a laboratory setting.

In Luria's bulb-press experiments, children pressed a bulb as the experimenter issued commands to start, stop, or simultaneously press with a flashing light and/or with their own speech. Luria was able to document a stage-like progression of abilities from 1<sup>1/2</sup> to 5<sup>1/2</sup>. At 1<sup>1/2</sup> to 2<sup>1/2</sup> there is: “1) the initiating function of speech by another person, but there is not yet the 2) inhibiting function of speech by another; and there are neither 3) initiating nor 4) inhibiting functions of children's own speech . . . at three to four years there are both initiating and inhibiting functions of another's speech and the initiating function of the children's own speech, but the inhibiting function of their own speech has not yet developed: they can do the two tasks the younger children failed . . . if the three or four year olds are asked to say, ‘shall press twice’, they will verbalize correctly, but make one protracted press that lasts for the duration of the utterance; on the other hand if they say ‘Go! Go!’ they will press correctly” (Zivin, 1979, pp. 31–32).

When children reach 4<sup>1/2</sup> to 5<sup>1/2</sup> Luria's experiments show that they can easily perform (1), (2), (3), and (4). They are then able to inhibit and initiate behavior response by means of the rhythmic motor patterns of speech spoken by others or by themselves (Luria, 1961). Therefore, Luria believes that by 4<sup>1/2</sup> to 5<sup>1/2</sup> children have fully transferred from the first to the second signal system. Once the control is apparent, Luria did not study silent verbal planning. His interest went in the direction of clinical study of how to reteach verbal control to patients who had lost this ability. Luria's experiments document the beginning of the internal stage of verbal self-regulation at age 5<sup>1/2</sup>, while Vygotsky's naturalistic studies indicate age 8. This discrepancy is most likely due to the fact that the two men were studying two very different phenomena: Luria, the motoric and Vygotsky, the semantic, as well as two different research settings: Luria, the laboratory and Vygotsky, naturalistic, as well as two different forms of verbalizations: Luria, induced and Vygotsky, spontaneous.

The third member of the sociohistorical school with Vygotsky and Luria was Leont'ev. Leont'ev promotes that goal-directed activity is central to a cultural theory of cognition. Leont'ev believed that knowing human motivation is critical to understanding a culture's activities. He defines activity as “the goals, means, and constraints operating on a person” (Cole, 1985, p. 151). Leont'ev's contributions include illuminating the concept of activity that was previously “fuzzy” and also for demonstrating the weaknesses in Luria's cross-cultural research. In addition, he is credited with the Soviet theory of activity which

has dominated the “major theoretical underpinnings for psychology in the USSR since 1969” (Wertsch, 1979, p. 85).

### *Cognitive Analysis: Definition of Terms*

**Bulb-press experiments** Luria’s laboratory experiments whereby children, ages 1<sup>1/2</sup> to 5<sup>1/2</sup>, pressed a rubber bulb at the verbal command of the experimenter or themselves, or in rhythm with a flashing light, to initiate and inhibit motor behavior.

**Covert speech-to-self** Speech spoken silently to self. The form of speech in the third stage of Vygotsky’s theory of verbal self-regulation.

**Cultural theory of cognition** This is another reference to Leont’ev’s approach to Vygotsky’s ideas. The concept of activity is the central thesis in this theory.

**Disequilibrium** This is a term used in Piagetian theory. For this book the term does not keep with a strict Piagetian definition. Here it simply means that an individual is not in a state of balance. Some factor has caused the individual to experience a feeling of maladjustment.

**Equilibrium** This is a term used in Piagetian theory. For this book, a strict Piagetian definition is not used. Here it simply means that an individual is in harmony with the forces present in his/her life. There is a balanced state between conflicting desire, interests, etc.

**First signal system** Pavlov (1927) termed as the perceptual signal system. This term is categorized as part of the Soviet theory of activity developed by Leont’ev. The way an infant responds to the environment which is conditioned by physical contingencies. The young reacts and controls behavior based on the physical properties of conditional stimuli such as touches, sights, and perceptible sounds of words (Zivin, 1979).

**Goal-directed behavior** Vygotsky’s concept of speech-to-self is to direct one’s behavior toward the accomplishment of a goal.

**Impulse part of speech** A synonym of the motoric aspect of speech. A stimulus transmitted in a muscle or nerve, which causes or inhibits activity in the body.

**Inhibiting function of speech** The power of verbalization to stop a behavior response. Luria used this function as one of the conditions in his bulb-press experiments.

**Inner speech** Covert speech-to-self, spoken silently to regulate behaviors. The inner speech form is used during the third stage of Vygotsky's theory of verbal self-regulation. Vygotsky says that the speech has gone "underground." During this stage the inner speech is considered "verbal thought." Inner speech continues to direct behavior even though the form now is covert, rather than overt.

**Internalization** The process by which children draw information into their existing cognitive structures. At this point they are able to use the knowledge to serve their individual purposes.

**Interpsychological functioning** When psychological functioning occurs between two people and one is being mediated by the other. The adult or more experienced member of the two is serving as a substitute cognitive guide for the less experienced learner. This interaction is on an interpsychological social plane. These interpsychological processes are the basis for higher mental processes in human learning.

**Intrapsychological functioning** This term was a part of Vygotsky's "general genetic law of cultural development." Any functioning within humans, including learning, first appears on a social plane between people and later within the human. When learning from social interactions is internalized, within the human, we say it has moved from an interpsychological plane to an intrapsychological plane. When the learning is internalized, (intrapsychological) the individual can now use it to govern his/her own environment. Therefore a transformation in structure and function occurs as the psychological function (e.g., voluntary attention, formation of concepts) goes to an intrapsychological plane.

**Metacognition** Mental awareness and regulation of one's own thinking (including cognitive, affective, and psychomotor mental activity). Flavell (1987) defines it as knowledge and cognition about anything cognitive (p. 21). One of my third graders defined it as "spying on your own thinking."

**Motor system of speech** A synonym of the "motoric aspect of speech."

**Motoric aspect of speech** The nerve carrying impulses from the central nervous system to a muscle producing motion. That part of speech which Luria studied in laboratory experiments; the rhythmic, excitation, physical aspect of verbalizations.

**Neuropsychologist** The branch of science dealing with disorders of both the mind and the nervous system integratively. A. R. Luria was called the greatest neuropsychologist of the twentieth century.

**Ontogeny** The life cycle of a single organism; development of the individual.

**Other-regulation** Much of learning occurs in the presence of others who promote cognitive advancement. Vygotsky argues that all psychological processes are initially social. This socialization/regulation by others before a child is able to gain conscious use of a particular bit of knowledge is referred to as "other-regulation." Other-regulation occurs on the interpsychological plane, prior to internalization of the knowledge by the learner. In addition, other-regulation occurs in the first stage of Vygotsky's theory of verbal self-regulation.

**Other-regulated motoric aspect of speech** When the motoric aspect of speech originates from an external agent. The external agent's verbalizations regulate the motor response of someone else.

**Overt speech-to-self** Speech spoken aloud to self. The form of speech in the second stage of Vygotsky's theory of verbal self-regulation.

**Physical/regulatory effect upon motor behavior** Another way of referring to Luria's focus on the motoric aspect of speech as it inhibits and initiates behavior. The physical/regulatory effect refers implicitly to overt, verbal regulation from the excitation, rhythmic part of speech as it impacts on an inhibitory or initiatory motor response.

**Phylogeny** The racial history of evolutionary development of any plant or animal species.

**Planful speech** Goal-directed speech spoken to oneself. Private or inner speech that purposefully guides, directs, and controls human activity. According to Vygotsky the most important means for self-regulation is through self-directed or planful speech.

**Preintellectual speech** Speech without thought. Examples are babbling, crying, and word play.

**Prelinguistic thought** Thought without the regulation of word meanings. Examples are purposeful play with toys, planned motor functions such as crawling to a parent, or throwing food on the floor.

**Private speech** The second stage of Vygotsky's theory of verbal self-regulation. During this stage children talk aloud (overt self-verbalizations) to regulate behavior. There are three developmental substages: a) children act first and then speak b) children act and speak simultaneously and c) children speak first and then act in accordance with their own verbal directions. These verbal self-directions are a result of internalized parent verbal messages received during Stage 1, the External Stage. It is not until substage "c" that the child's overt speech-to-self is serving a planning function.

**Scaffolding** Jerome Bruner's term used to describe how the more experienced member of a social team structures learning tasks to promote higher mental processes. In Vygotsky's terms, scaffolding causes internalization of external knowledge as it is transformed into mediation for conscious regulation by the learner.

**Second signal system** Pavlov (1927) termed this system the "linguistic signal system." This term is categorized as part of the Soviet theory of activity developed by Leont'ev. When the meaning of words becomes understood to the point that individuals can use their own spoken words to guide behavior. The second signal system begins when verbal self-regulation directs purposeful goal-oriented activity.

**Self-regulated motoric aspect of speech** When the motoric aspect of speech originates from individuals whose behavior is being regulated by their physical act of speaking.

**Self-regulation** Although much initial learning originates in the context of the social setting; "continuous adjustments and fine-tuning of action occurs via self-regulating processes" (Marshall & Morton, 1978, p. 227). Self-regulation occurs in the second and third stages of Vygotsky's theory of verbal self-regulation. After internalization of parent messages, the child has moved to the intrapsychological plane of functioning and is capable of verbal self-regulation.

**Semantic aspect of speech** The meaning factor of verbalization; that part of speech which Vygotsky studied, mainly during spontaneous, natural occurrences.

**Social-cultural/historical** This term is in reference to Vygotsky's explanation for the psychological development of the mind. It refers to the context in which intellect is born. It is where nature meets nurture, and there is a qualitative shift to a higher plane of mental functioning in light of the social context of interaction.

**Social/linguistic experiences** These experiences are comprised of an individual's social, verbal interactions with the more experienced members of a culture. It is through these verbal dyads that children initially develop their knowledge of the world.

**Social transactions** The interaction between the more experienced members of society and the learner. According to Vygotsky social transaction is the vehicle through which individuals are able to move from a lower to a higher level of mental functioning.

**Theory of verbal self-regulation** Another name for Vygotsky's theory. It means the conscious awareness and control of one's actions or behavior through the

medium of word meanings spoken initially by others, internalized, and spoken later by the child, first overtly and then covertly. The child's overt and covert verbal messages to self have a regulatory effect upon his or her own behavior.

**Verbal mediation** The use of words to intervene between stimulus and response for the learner. Lee (1985) explains how words can be mediators: "Speech is reversible because words can be both stimulus (heard word) and response (spoken word is a reflex producing the same stimulus)" (p. 76). Lee says that the first property of language is a "mediating device" (p. 76).

**Vocalized speech** Egocentric speech (private speech) is in the form of vocalized speech. It is audible speech spoken by self. In addition vocalized speech may be spoken by others. Luria's studies were confined to the study of vocalized speech.

**Zone of proximal development** "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," (Vygotsky, 1978, p. 86).

### *Cognitive Synthesis: A Summary*

One aspect of Vygotsky's notion of cognitive development is the theory of verbal self-regulation. As per this theory the sociolinguistic experiences of children are internalized by the children and used later as cognitive self-guides. Therefore, individuals' ability to serve as competent cognitive self-guides is dependent upon the linguistic richness and social soundness of a particular individual's history. Students in school who lack the ability to direct themselves at developmentally appropriate times may be suffering from a lack of qualitatively rich, sociolinguistic experiences in their past. Teachers may need to fill this gap by serving in the role of a strong verbal mediator and emotional supporter for these children until such students have sufficient direction to be enabled to internalize the teacher mediation for their own use as a cognitive guide. Without such social and linguistic support, some students may be deficient in school autonomy and social responsibility.