

# Afterword

VERA JOHN-STEINER Y ELLEN SOUBERMAN

♦ In this essay we hope to highlight several of Vygotsky's major theoretical assumptions, in particular those that could be the resource of contemporary psychological research.

After working for several years with the manuscripts and lectures that make up this volume, we came to recognize that Vygotsky's theory was primarily inductive, constructed midstream as he explored diverse phenomena such as memory, inner speech, and play. Our purpose is to explore in a systematic way those concepts that have had the greatest impact on us personally and intellectually while editing Vygotsky's manuscripts and preparing this work.

♦ As readers, we discovered that the consequences of internalizing Vygotsky's ideas have a dynamic of their own.

• *At first, an increasing familiarity with his ideas helps one go beyond the polarities of contemporary psychological writings; he offers a model for new psychological thought and research to those who are dissatisfied with the tension between traditional behaviorists and nativists.*

To some readers Vygotsky may seem to represent an intermediary position; but a careful reading reveals his emphasis on the complex transformations that constitute human growth, the understanding of which requires active participation on the part of the reader.

## ♦ Vygotsky's conception of development

To Vygotsky, development is not merely a slow accumulation of unitary changes, but rather, "a complex dialectical process, characterized by periodicity, unevenness in the development of different functions, metamorphosis or qualitative transformation of one form into another, intertwining of external and internal factors, and adaptive processes" (chapter 5). *And indeed, in this sense, his views of the history of the individual and the history of the culture were similar.* In both cases

Vygotsky rejects the concept of linear development and incorporates into his conceptualization both evolutionary and revolutionary change. The recognition of these two interrelated forms of development is for him a necessary component of scientific thought.

Because it is not easy to conceptualize a dialectical process of change, we found that his concept did not make their full impact until we attempted to combine our own research with his seminal ideas. This process required working through, again and again, the expansion of his condensed but powerful concept and applying them either to our work or to daily observations of human behavior. The cryptic nature of Vygotsky's writing, thought it can be explained by the conditions of his life during his last years, forced us to search deeply for his most significant concepts. In this way we isolated those ideas that were strikingly original and which, forty years after his death, still offer new and unfulfilled promise for both psychology and education.

## ► Concepts of Development

◆ **Each chapter of this volume deals with some aspect of developmental change as Vygotsky conceived it.**

• *His approach differed from theirs in that he focused upon the historically shaped and culturally transmitted psychology of human beings.*

Although he is clearly committed to a theoretical position distinct from those of his influential contemporaries—Thorndike, Piaget, Koffka—he constantly returns to and analyzes their thinking in order to enrich and sharpen his own.

While his contemporaries also addressed the issue of development, Vygotsky's approach differed from theirs in that he focused upon the historically shaped and culturally transmitted psychology of human beings.

◆ **His analysis also differs from that of the early behaviorists.**

Vygotsky wrote:

In spite of the significant advances attributable to behaviorists methodology, that method nevertheless is seriously limited. The psychologist's most vital challenge is that of uncovering and bringing to light the hidden mechanisms underlying complex human psychology. Though the behaviorist method is objective and adequate to the study of simple reflexive acts, it clearly fails when applied to the study of complex psychological processes. The inner mechanisms characteristic of processes remain hidden. The naturalistic approach to behavior in general does not take into account the qualitative difference between human history and that of animals. The experimental ramification

of this kind of analysis is that human behavior is studied without regard to the general history of human development.

◆ **In contrast, Vygotsky emphasizes a theoretical approach, and consequently a methodology, that telescope change.**

• *His effort in charting developmental change is, in part, to show the psychological implications of the fact that humans are active, vigorous participants in their own existence and that at each stage of development children acquire the means by which they can competently affect their world and themselves.*

Therefore, a crucial aspect of human mastery, beginning in infancy, is the creation and use of auxiliary or “artificially” stimuli, through such stimuli an immediate situation and reaction linked to it are altered by active human intervention.

◆ **These auxiliary stimuli created by humans have no inherent relation to the existing situation; rather, humans introduce them as a means of active adaptation.**

• *Vygotsky views auxiliary stimuli as highly diverse: they include the tools of the culture into which the child is born, the language of those who relate to the child, and the ingenious means produced by the child himself, including the use of his own body.*

One of the most striking examples of this sort of stool use can be seen in the play activity of poor children who do not have access to prefabricated toys but who, nevertheless, are able to play house, train, and so on with whatever resources are available to them. Theoretical exploration of these activities in a developmental context are a recurrent theme of this volume, for Vygotsky sees play as the primary means of children’s cultural development.

◆ **Piaget shares Vygotsky’s emphasis upon an active organism. They share, as well, the ability to observe children astutely.**

• *However, Vygotsky’s skills of observation were enhanced by his knowledge of dialectical materialism and his view of the human organism as highly plastic and of the environment as historically and culturally shifting contexts into which children are born and which they, too, will eventually change.*

• *While Piaget stresses biologically supported, universal stages of development, Vygotsky’s emphasis is on the interaction between changing social conditions and the biological substrata of behavior.*

He wrote that “in order to study development in children, one must begin with an understanding of the dialectical unity of two principally different lines [the

biological and the cultural], to adequately study this process, then, an experimenter must study both components and the laws which govern their *interlacement* at each stage of a child's development.”<sup>3</sup>

Note 3. In this volume, the editors have interpreted Vygotsky's use of “natural” aspects of behavior to mean biologically given features, such as reflexes present at birth. An additional interpretation of “natural” can be gained from the following passage taken from A.N. Leontiev's, A. R. Luria's, and B. M. Teplov's preface to *Vygotsky's Development of higher Psychological Functions*.

His attempt to show that it was impossible to reduce the formation of man's higher mental functions to the process of the development of their elementary forms leads to the false division at the genetic plane and at the plane of coexistence at higher levels of development. Thus, for example, memory development is presented as going through two stages: the stage of purely natural memory which terminates at a preschool age and the following stage of development of a higher, mediated memory. The development of coexisting forms of memory is treated in the same way. One form rests exclusively on biological foundations, and others are the product of the child's social and cultural development. This opposition which appears in L. S. Vygotsky's writing and in the research of his collaborators justifiably was criticized in its time. It is truly without foundation: after all, even in very young children psychological processes are formed under the influence of verbal interaction with adults and consequently are not “natural.” The young child's memory processes are not “natural” because they already have changed as a result of language acquisition. We can say the same with regard to cases of the preservation of a sharply distinguished “natural” eidetic memory which turns out to be subject to transformation in man.

While pointing out the inadequacy of Vygotsky's false contrast between natural (organic) and higher (cultural) forms of mental processes, we must emphasize that this contrast in no way is implied from his general theoretical position.

Although Vygotsky has been criticized for posing this artificial duality between the natural and the cultural, as Leontiev and Luria point out, the distinction is in fact an abstraction, a vehicle for describing a very complex process. “The child's mental development is a continuous process of gaining active control over initially passive mental functions. To gain this control the child learns to use signs and thus converts these ‘natural’ mental functions into sign-mediated, cultural function.” Edward E. Berg, “L. S. Vygotsky's Theory of the Social and Historical Origins of Consciousness” (Ph.D. Diss., University of Wisconsin, 1970), p. 164.

♦ Although the work of a great number of psychological theorists, including Piaget, has been characterized as interactionist, the premises of such an approach are still lacking full formulation.

Some of the concepts described in this volume constitute the basis for a more fully articulated interactionist—dialectical analysis of development.

## THE FUNCTIONAL LEARNING SYSTEMS

♦ One of the critical issues in any theory of development is the relation between the biological bases of behavior and the social conditions in and through which human activity takes place.

• *A key concept Vygotsky proposed to represent this important interaction is the functional learning system.*

In the development of this notion he departed significantly both from the then existing psychology and from concepts of learning strongly bound up with the study of animal behavior.

♦ Vygotsky recognized, as had others before him, that functional systems are rooted to the most basic adaptive responses of the organism, such as unconditioned and conditioned reflexes.

• *His theoretical contribution, however, is based on his description of the relation among these diverse processes:*

They are characterized by a new integration and co-relation of their parts. The whole and its parts develop parallel to each other and together. We shall call the first structures *elementary*; they are psychological wholes, conditioned chiefly by biological determinants. The latter structures which emerge in the process of cultural development are called *higher structures* ... The initial stage is followed by that first structure's destruction, reconstruction, and transition to structures of the higher type. Unlike the direct, reactive processes, these latter structures are constructed on the basis of the use of signs and tools; these new formations unite both the direct and indirect means of adaptation.

♦ Vygotsky argued that in the course of development psychological systems arise which unite separates functions into new combinations and complexes.

• *This concept was further elaborated by Luria, who states that the components and relations into which these unitary functions enter are formed during each individual's development and are dependent upon the social experiences of the child.*

The functional systems of an adult, then, are shaped essentially by her prior experiences as a child, the social aspects of which are more determinative than in traditional cognitive theory (including that of Piaget).

◆ **In this theory perhaps the most characteristic of the developmental change is the manner in which previously separate and elementary functions are integrated into new functional learning systems: “Higher psychological functions are not superimposed as a second story over the elementary processes; they represents new psychological systems.”**

• *These systems are changeable and are optimally adaptive to the particular tasks confronting the child as well as to the child’s stage of development.*

Even though it may appear that children are learning in a purely external manner, that is, mastering new skills, the learning of any new operation is in fact the result of, and dependent on, a child’s process of development. The formation of new functional learning systems includes a process akin to that of nourishment in body growth, wherein in any particular time certain nutrients are digested and assimilated while others are rejected.

An approach analogous to Vigotsky’s has emerged from the contemporary discussions of the role of nutrition in development. Birch and Gussow, who conducted many cross-cultural studies of physical and intellectual growth, have advanced the following interactionist theory: “The effective environment of any organism is never merely the objective situation in which he finds himself, but is rather the product of an interaction between his unique organismic characteristics and whatever opportunities for experience his objective surroundings may provide. In a similar vein, Vygotsky argues that because the historical conditions which determine to a large extent the opportunities for human experience are constantly changing, there can be no universal schema that adequately represents the dynamic relation between internal and external aspects of development. Therefore, a functional learning system of one child may not be identical to that of another, though there may be similarities at certain stages of development. Here, too, Vygotsky’s analysis is different from that of Piaget. Who describes universal stages that are identical for all children as a function of age.

This point of view, which aims at linking the biological substrata of development to the study of functions culturally and historically achieved, may be oversimplified and give rise to misunderstandings. Luria, Vygotsky’s student and collaborator, sought to clarify the complex physiological implications of this view of the cognitive evolution of *homo sapiens*:

- The fact that in the course of history man has developed new functions does not mean that each one relies on a new group of cells and that new “centers” of higher nervous functions appear like those so eagerly sought by neurologists during the last third of the nineteenth century. The development of new “functional organs” occurs through the formation of new functional systems, which is a means for the unlimited development of cerebral activity. The human cerebral cortex, thanks to this principle, becomes an organ of civilization in which are hidden boundless possibilities, and does not require new morphological apparatuses every time history creates the need for a new function.

## THE SOCIALLY ELABORATED LEARNING

◆ **The focus upon socially elaborated learning in Vygotsky’s work emerges most clearly in his studies of mediated memory. It is in the course of interaction between children and adults that young learners identify effective means for remembering—means made accessible to them by those with more highly developed memory skills.**

*• The lack of recognition among educators of this social process, of the many ways in which an experienced learner can share his knowledge with a less advanced learner, limits the intellectual development of many students; their capabilities are viewed as biologically determined rather than socially facilitated.*

In addition to these studies of memory (chapter 3), Vygotsky explores the role of social and cultural experiences through an examination of children’s play (chapter 7). In their play children both depend on and imaginatively transform those socially produced objects and forms of behavior made available to them in their particular environment.

◆ **An ever-present theme in this volume is the Marxian concept of a historically determined human psychology.**

- *The higher mental functions are socially formed and culturally transmitted.*

Some of Vygotsky’s other writings, which are still unavailable in English, develop further his fundamental hypothesis that the higher mental functions are socially formed and culturally transmitted:

*“If one changes the tools of thinking available to a child, his mind will have a radically different structure.”*

## IN REGARD WITH THE SIGNS

◆ **Through signs children are able to internalize the adaptive social means already available to them from society at large.**

• *For Vygotsky, one of the essential aspects of development is the increasing ability of children to control and direct their own behavior, a mastery made possible by the development of new psychological forms and functions and by the use of signs and tools in this process.*

At a later age children extend the boundaries of their understanding by integrating socially elaborated symbols (such as social values and beliefs, the cumulative knowledge of their culture, and the scientifically expanded concepts of reality) into their own consciousness.

## IN REGARD WITH LANGUAGE

◆ **In *thought and language* Vygotsky presents a sophisticated argument demonstrating that language, the very means by which reflection and elaboration of experience takes place, is a highly personal and at the same time a profoundly social human process.**

• *He sees the relation between the individuals and the society as a dialectical process which, like a river and its tributaries, combines and separates the different elements of human life. They are never frozen polarities to him.*

◆ **By far the most important sign-using behavior in children's development is human speech.**

• *From speech children free themselves of many of the immediate constraints of their environment. They prepare themselves for future activity; they plan, order, and control their own behavior as well as that of others.*

Speech is an also excellent example of sign usage which, once internalized, becomes a pervasive and profound part of the higher psychological processes; speech acts to organize, unify, and integrate many disparate aspects of children's behavior, such as perception, memory, and problem solving (chapter 4). He offers the contemporary readers a provocative avenue for dealing with a recurrent controversial issue, the relation between overt and covert processes.

◆ **Like words, tools and nonverbal signs provide learners with ways to become more efficient in their adaptive and problem-solving efforts.**

• *Vygotsky often illustrates the varied means of human adaptation with examples drawn from nonindustrialized societies:*



Counting fingers was once an important cultural triumph of mankind. It served as a bridge between immediate quantitative perception and counting. Thus the Papuas of New Guinea began to count with the pinky of their left hand, foreign, elbow, shoulder, right shoulder, and so on, finishing with the pinky of the right hand. When this was insufficient they often used another person's fingers, or their own toes, or sticks, shells, and other small portable objects. In early counting systems, we may observe in developed and active form the same process that is present in rudimentary form during the development of a child's arithmetical reasoning.

Similarly, the tying of knots as a reminder not to forget something is related to psychology of everyday life. A person must remember something, to fulfill some request, do this or that, pick up some object. Not trusting his memory and unwilling to go by it, he often ties his hanky into a knot or uses a similar device, such as sticking a little piece of paper under the cover of his pocket watch. Later on, the knot is supposed to remind him of what he was supposed to do. And, this device often successfully carries out that function.

Here, again, is an operation that is unthinkable and impossible in the case of animals. In the very fact of the introduction of an artificial, auxiliary means of memorizing, in the active creation and use of a stimulus as a tool for memory, we see a principally new and specifically human feature of behavior.

## **HIDDEN AND MANIFESTED PROCESSES (SIGNS AND TOOLS)**

**◆ The use of tools and signs share some important properties, both involve mediated activity. But they also diverge from each other: signs are internally oriented, according to Vygotski, a means of psychological influence aimed at mastering oneself; tools, on the other hand, are externally oriented, aimed at mastering and triumphing over nature.**

The distinction between signs and tools is a good example of Vygotsky's analytical capacity to interweave diverse and similar aspects of human experience. Some other examples are thought and language, immediate and mediated memory, and, on a broader scale, the biological and the cultural, the individual and the social.

## **PROCESS OF INTERNALIZATION**

**◆ The actual relations between human individuals underlie all the higher functions.**

In a concise passage in which he describes a two-stage psychological transformation that captures the way in which the child internalizes her social

experience, Vygotsky also depicts a dynamic that he believes is present throughout the entire span of a human life: “Every function in the child’s cultural development appears twice, on two levels. First, on the social, and later on the psychological level; first, *between people as an interpsychological category*, and then inside the child, as an *intrapsychological category*. This applies equally to voluntary attention, to logical memory and to the formation of concepts. The actual relations between human individuals underlie all the higher functions” (chapter 4). In the buzzing confusion that surrounds the infant during the first few months of her life, parents assist her by pointing and carrying the child close to objects and places of adaptive significance (toys, refrigerator, cupboard, playpen), thus helping the child to ignore other irrelevant features of the environment (such adult objects as books, tools, and so on). This socially mediated attention develops into the child’s more independent and voluntary attention, which she will come to use to classify her surroundings.

In contrast with the well-known formulation by J. B. Watson, who wrote of thought as “subvocal language,” Vygotsky, in *Thought and Language*, describes how the growing child internalizes social language and makes it personal and how these two aspects of cognition, first independent of each other, are later joined: “Up to a certain point in time the two follow different lines, independently of each other . . . . At a certain point these lines meet, whereupon thought becomes verbal and speech rational” (p.44). In this way Vygotsky demonstrates the effectiveness of conceptualizing related functions not as an identity but as the unity of two diverse processes.

We believe this conception of human growth in its many varied manifestations is of value to contemporary psychological investigations. Though Vygotsky focused much of his research energies on the study of children, to view this great Russian psychologist as primarily a student of child development would be an error; he emphasized the study of development because he believed it to be the primary theoretical and methodological means necessary to unravel complex human processes, a view of human psychology that distinguishes him from his and our contemporaries. There was, for him, no real distinction between developmental psychology and basic psychological inquiry. Moreover, he recognized that an abstract theory is insufficient to capture the critical moments of change; and he demonstrated that the researcher must be an astute observer of children’s play, their efforts at learning, their responses to teaching. The ingenuity of Vygotsky’s experiments was a product of his skill and interest as both observer and experimenter.

### ► Educational Implications

Throughout this volume Vygotsky explores the various temporal dimension of human life.

## **THE HISTORICAL DEVELOPMENT OF HUMANKIND VS THE INDIVIDUAL GROWTH**

He never equates the historical development of humankind to the stages of individual growth, since he is opposed to the biogenetic theory of recapitulation. Rather, his concern is with the consequences of human activity as it transforms both nature and society. Although the labor of men and women to improve their world is rooted in the material conditions of this era, it is also affected by their capacity to learn from the past, to imagine, and to plan for the future. These specifically human abilities are absent in newborns, but by the age of three young children may already experience the tension between desires that can be fulfilled only in the future and demands for immediate gratification. Through play this contradiction is explored and temporarily resolved. And so Vygotsky places the beginnings of human imagination at the age of three: "Imagination is a new formation which is not present in the consciousness of the very young child, is totally absent in animals, and represents a specifically human form of conscious activity. The old adage that child's play is imagination in action can be reversed: we can say that imagination in adolescents and school children is play without action" (chapter 7).

### **PLAY AND DEVELOPMENT**

#### **◆ Play leads development.**

In their play children project themselves into the adult activities of their culture and rehearse their future roles and values. Thus, play is in advance of development, for in this manner children begin to acquire the motivation, skills, and attitudes necessary for their social participation, which can be fully achieved only with the assistance of their peers and elders.

During preschool and school years the conceptual abilities of children are stretched through play and the use of their imagination. In the course of their varied games they acquire and invent rules, or as Vygotsky describes it, "In play a child is always above his average age, above his daily behavior, in play it is as though he were a head taller than himself" (chapter 7). While imitating their elders in culturally patterned activities, children generate opportunities for intellectual development. Initially, their games are recollections and reenactments of real situations; but through the dynamics of their imagination and the recognition of implicit rules governing the activities they have reproduced in their games, children achieved an elementary mastery of abstract thought. In this sense, Vygotsky argued, play leads development.

### **A PARALLEL BETWEEN PLAY AND SCHOOL INSTRUCTION**

#### **◆ Similarly, school instruction and learning is in advance of children's cognitive development.**

Vygotsky proposes a parallel between play and school instruction: both create a "zone of proximal development" (chapters 6 and 7), and in both contexts

children elaborate socially available skills and knowledge that they will come to internalize. While in play all aspects of children's lives become themes in their games, in school both the content of what is being taught as well as the role of the specially trained adult who teaches them is carefully planned and more narrowly focused.

## **SOME OF THE SPECIFIC FEATURES OF CLASSROOM EDUCATION**

In an essay on the psychological ideas of L. S. Vygotsky, Leontiev and Luria summarize some of the specific features of classroom education:

**◆ School educating is qualitatively different from education in the broad sense. At school the child is faced with a particular task: to grasp the bases of scientific studies, i.e., a system of scientific conceptions.**

*• In the process of school education the child starts off from what have become his own complex generalizations and significances; but he does not so much proceed from them, as proceed onto a new path together with them, onto the path of intellectual analysis, comparison, unification, and establishment of logical relations. He reasons, following the explanations given to him and then reproducing new, for him, logical operations of transition from one generalization to other generalizations.*

The early concepts that have been built in the child in the process of living and which were assisted by rapport with his social environment (Vygotsky called them "everyday" or "spontaneous" concepts, spontaneous in the sense that they are formed aside from any process specially aimed at mastering them) are now switched to a new process, to a new specially cognitive relationship to the world, and so in this process the child's concepts are transformed and their structure changes. In the development of a child's consciousness the grasping of the bases of a science-system of concepts now takes the lead.

In Vygotsky's lifetime he and Luria initiated studies aimed at examining the cognitive consequences of rapid social change and the specific impact of schooling. In addition to his interest in cognitive development among nonliterate peoples, his concern encompassed other aspect of the social and educational transformations brought about by the October Revolution. These concerns occupy many contemporary educators in countries undergoing rapid modernization and urbanization. Even in the United States, where the concept of public education is two centuries old, similar issues arise because large groups of people have not yet been integrated into or benefited from mass education. Some of the issues of concern to Vygotsky that are still alive today are the length and scope of public education, the use of standardized tests to assess the educational potential of children, and effective models of teaching and curriculum.

## ◆ Telescoping of Vygotsky's cognitive theory: the zone of proximal development

Through the concept of the zone of proximal development as advanced by Vygotsky during intense educational debates in the 1930s, he telescopes, from the point of view of instruction, central tenets of his cognitive theory: the transformation of an interpersonal (social) process to an intrapersonal one; the stages of internalization; and the role of experienced learners. The zone of proximal development, and the role of experienced learners. The zone of proximal development, he wrote, is "the distance between the [child's] 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" (chapter 6).

### ◆ In the zone of proximal development, teaching represents the means which through development is advanced.

Many educators, recognizing that the rate of learning may vary from child to child, isolate particularly "slow learners" from their teachers as well as their peers through their use of programmed and frequently mechanized instruction. In contrast, Vygotsky, because he views learning as a profoundly social process, emphasizes dialogue and the varied roles that language plays in instruction and in mediated cognitive growth. The mere exposure of students to new materials through oral lectures neither allows for adult guidance nor for collaboration with peers. To implement the concept of the zone of proximal development in instruction, psychologists and educators must collaborate in the analysis of the internal ("subterranean") development processes which are stimulated by teaching and which are needed for subsequent learning. In this theory, then, teaching represents the means which through development is advanced; that is, the socially elaborated contents of human knowledge and the cognitive strategies necessary for their internalization are evoked in the learners according to their "actual developmental levels." Vygotsky criticizes educational intervention that lags behind developed psychological processes instead of focusing upon emerging functions and capabilities. A particularly imaginative application of these principles are Paulo's Freire's literacy campaigns in Third World countries. Because he adapted his educational methods to the specific historical and cultural setting in which his students lived, they were able to combine their "spontaneous" concepts (those based on social practice) with those introduced by teachers in instructional setting.

## ▶ Vygotsky's Historical-Cultural Approach

◆ Perhaps the most distinguishing theme of Vygotsky's writings is his emphasis on the unique qualities of our species, how as human beings we actively realize and change ourselves in the varied contexts of culture and history.

• *Repeatedly in his volume Vygotsky differentiates the adapted capabilities of animals from those of humans.*

The critical factor on which this distinction is based is the historically created and culturally elaborated dimensions of human life that are absent from the social

organization of animals. In the development of higher functions—that is, in the internalization of the processes of knowing—the particulars of human social existence are reflected in human cognition: an individual has the capacity to externalize and share with other members of her social group her understanding of their shared experience.

◆ **The relative immaturity of the human infant, in contrast with other species, necessitates a lengthy reliance on caretaking adults, a circumstance that creates a basic psychological contradiction for the infant:**

- *on the one hand he is totally dependent on organisms vastly more experienced than himself, and on the other hand he reaps the benefits of a socially developed and optimal setting for learning.*
- *Although children are dependent on lengthy nurturance and caretaking, they are active participants in their own learning within the supportive contexts of family and community. As Edward E. Berg pointed out:*

Just as the tools of labor change historically, so the tools of thinking change historically. And just as new tools of labor give rise to new social structures, new tools of thinking give rise to new mental structures.

Traditionally, it was thought that such things as the family and the state always existed in more or less their present form. Likewise, one also tends to view the structure of the mind as something universal and eternal. To Vygotsky, however, both social structures and mental structures turn out to have very definite historical roots, and are quite specific products of certain levels of tool development.

◆ **Vygotsky's study of human development was deeply influenced by Friedrich Engels, who stressed the critical role of labor and tools in transforming the relation between human beings and their environment.**

- *The role of tools in human development was described by Engels as follows: "The tool specifically symbolizes human activity, man's transformation of nature: production."*

Such an approach requires an understanding of the active role of history in human psychological development. In *The Dialectics of Nature* Engels presented some key concepts that were elaborated by Vygotsky. They both criticized psychologists and philosophers who held the view "that only nature affects man and only natural conditions determine man's historic development," and emphasized that in the course of history man, too, "affects nature, changes it, creates for himself new natural conditions of existence." Furthermore, Vygotsky argued that the effect of tool use upon humans is fundamental not only because it has helped them relate more effectively to their external environment but also because tool use has had

important effects upon internal and functional relationships within the human brain.

Although Engels and Vygotsky based their theories on the limited archaeological findings available to them during the years in which they wrote, contemporary archaeologist and physical anthropologists such as the Leakeys and Sherwood Washburn have interpreted more recent findings in a manner consistent with Engel's and Vygotsky's point of view. Washburn states, "It was the success of the simplest tools that started the whole trend of human evolution and led to the civilization of today." Most likely Vygotsky would have agreed with Washburn, who views the evolution of human life from our primate ancestors as resulting in "intelligent, exploratory, playful, and vigorous primates . . . and that tools, hunting, fire, complex social speech, the human way and the brain evolved together to produced ancient man." These archaeological discoveries support Vygotsky's concepts of what it is to be human.

**◆ The impact of Vygotsky's work —as that of great theoreticians everywhere— is both general and specific.**

Cognitive psychologists as well as educators are interested in exploring the present—day implications of his notions, whether they refer to play, to the genesis of scientific concepts, or to the relation of language and thought. The men and women who were his students forty years ago still debate his ideas with the intensity and vigor due a contemporary—and we who worked as his editors found many possible, sometimes contradictory, interpretations of his work. But there is a powerful thread drawing together Vygotsky's diverse and stimulating writings: it is the way in which his mind worked.

His legacy in an increasingly destructive and alienating world is to offer through his theoretical formulations a powerful tool for restructuring human life with an aim toward survival.