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Volume 5
Child Psychology

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Prologue

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This volume of Vygotsky's Collected Works contains important writings on the development of human psychology from early childhood to adolescence. The volume is divided into two sections. The first contains about one-half of the chapters of Vygotsky's book, *Pedology of the Adolescent*. This book was published during Vygotsky's lifetime in a limited number of copies. The second section consists of separate articles which were published after Vygotsky died.

The works in this volume reveal some important extensions of Vygotsky's fundamental concepts. In particular, one finds extensive discussions about the transition from elementary psychobiological processes to conscious psychological phenomena. Vygotsky delineates the social and cognitive determinants of this qualitative change. Other concepts which are developed in this volume include the integration of psychological phenomena in consciousness, the relation between structure (or form) and content of psychological phenomena, and the relation between biological processes and psychological functions. Finally, Vygotsky makes a number of methodological points concerning the nature of psychological inquiry. The following prologue will introduce the reader to these concepts.

Higher and Lower Processes

The fundamental principle which drives Vygotsky's developmental psychology is the transition from "lower" psychobiological processes to "higher" conscious psychological functions. The former include reflexes, temperamental traits, and spontaneous, rudimentary conscious processes. The latter include developed, voluntary, mental functions and associated personality characteristics. In Vygotsky's words, psychological development consists in "the transition from direct, innate, natural forms and methods of behavior to mediated, artificial mental functions that develop in the process of cultural development" (p. 168, this volume).

Vygotsky argued that higher and lower functions are fundamentally different from each other in terms of origins, biological mechanisms, and mental features (cf. Ratner, 1991, Chap. 4; Ratner, forthcoming for a discussion of these differences). Consequently, mature psychological functions comprise a novel system which is not derived from lower processes. Elementary psychobiological functions are not the basis of mature, complex, mental psychological phenomena. Nor do the

lower processes remain intact and interact with higher processes. Instead, Vygotsky proposed a radical dichotomy between the two which grants real autonomy to higher psychological functions. They develop according to different pathways from lower functions and have their own characteristics. Rather than lower and higher processes forming a continuous gradation in which early processes engender later ones, comprise their components, and affect their character, psychological development requires the introduction of new mechanisms which generate novel, autonomous higher functions.

Vygotsky states this position quite clearly in the present volume. He says, "The circumstance that higher mental functions are not simply a continuation of elementary functions and are not their mechanical combination, but a qualitatively new mental formation that develops according to completely special laws and is subject to completely different patterns, has still not been assimilated by child psychology" (p. 34).

Lower and higher functions rest upon different biological, cognitive, and social foundations. Lower functions are determined by biological mechanisms and they are minimally cognitive. For instance, infantile attention is a simple, involuntary "orientation reflex" that is biologically programmed. Temperamental traits of infants are similarly biologically programmed, involuntary, spontaneous, simple reactions to events. Vygotsky maintains that early, or natural, memory is likewise a spontaneous recollection that is prompted by a direct similarity between a current and prior sensation (p. 98, this volume).

In contrast, higher, mature, complex psychological phenomena are stimulated and organized by social experience and they are mediated by, or depend upon, conceptual thinking. Vygotsky explains this difference in a succinct statement about lower and higher forms of attention:

the importance of the organic process, which lies at the foundation of the development of attention, decreases as new, qualitatively distinct processes of attentional development emerge. Specifically, we have in mind the processes of *the cultural development of attention*. When we speak of the cultural development of attention, we mean *evolution and change in the means for directing and carrying out attentional processes the mastery of these processes, and their subordination to human control . . .* Voluntary attention emerges owing to the fact that the people who surround the child begin to use various stimuli and means to direct the child's attention and subordinate it to their control . . . and of itself, the organic, or natural, development of attention never could, and never will, lead to the emergence of voluntary attention (Vygotsky, 1981, pp. 193-194).

Qualitative Change

Vygotsky reiterates the notion of qualitative change throughout this volume. He says that mature psychological functions which are culturally stimulated and organized, and rest upon conceptual thinking, are qualitatively different from biologically based, non-cognitive elementary functions. Another use of the notion of qualitative change is his discussion of the unique character of cognitive concepts. He said that "A concept is not just an enriched and internally interconnected associative group. It is a qualitatively new formation that cannot be reduced to more elementary processes that characterize the development of the intellect at earlier stages (p. 40).

Vygotsky frequently criticized psychologists who recognize only quantitative changes in psychological functioning. One statement expresses this clearly: "if one holds the point of view [that] the process of intellectual changes that occur at adolescence can be reduced to a simple quantitative accumulation of characteristics

already laid down in the thinking of a three-year old . . . the word *development* does not apply” (p. 29). Vygotsky was especially critical of Thorndike for whom “higher forms of thinking differ from elementary functions only quantitatively according to the number of associative connections that enter into their composition” (p. 40).

Conceptual Underpinnings of Psychological Phenomena

Mature, complex psychological functions rest upon conceptual thinking. They are “historically based forms of intellectual activity” (this volume, p. 35). Vygotsky expresses this rationalist philosophy forcefully and unmistakably on page 81:

Development of thinking has a central, key, decisive significance for all the other functions and processes. We cannot express more clearly or tersely the leading role of intellectual development in relation to the whole personality of the adolescent and to all of his mental functions other than to say that acquiring the function of forming concepts is the principal and central link in all the changes that occur in the psychology of the adolescent.

Vygotsky describes how memory changes from a lower to a higher function through the intercession of cognition: “in the child, intellect is a function of memory; in the adolescent, memory is a function of intellect” (p. 96). “We have seen that the child’s thinking depends specifically on concrete images, on visual representations. When the adolescent makes the transition to thinking in concepts, his remembering what he perceived and logically comprehended must disclose completely different laws than those that characterized remembering during primary school age” (p. 97).¹

Perception is another function which is transformed by conceptual thinking:

Isolated objects of perception become connected because of thinking; they become ordered and acquired sense—a past and a future. Thus, speech leads to thinking about perception, to analysis of reality, to the formation of a higher function in place of an elementary function.

If we turn to the perception of an adult, we will see that it represents not only a complex synthesis of present impressions and images in memory, but its basis is a complex synthesis of processes of thinking and processes of perception. That which we perceive and that which we know, that which we perceive and that which we think merges into one . . .

Ordered and comprehended perception, connected with thinking in words, is the complex product of a new synthesis in which visual impressions and processes of thinking are merged in a single alloy that can justifiably be called visual thinking. In contrast to the developed thinking of an adult, a child’s thinking unites, orders, and comprehends what is perceived entirely differently. For this reason, the hypothesis of E. Claparède, who says that the child sees differently than the adult, and the statement of K. Koffka that the child lives in another world than we adults do are true in a certain respect. The developed perception of an adult places a net of ordering, logical categories over reality. His is always a comprehended perception (p. 88, this volume; cf. Ratner, 1991, pp. 38–41, 70–76).

Vygotsky says that imagination and fantasy are also intellectualized during adolescence and consequently fulfill a completely new function in the new structure of the adolescent’s personality:

If we correctly defined the higher development of the thinking of the adolescent as a transition from rational to judicious thinking and if we determined correctly the

¹Vygotsky’s emphasis on conceptual thinking led him to minimize the importance of non-cognitive factors in determining psychological development. Thus, he criticized psychologists who regard development as due to emotional or sexual changes in adolescence (pp. 30–31, 38, 153–154, this volume).

intellectualization of such functions as memory, attention, visual perception, and willful action, then in the same logical sequence we must reach the same conclusion with respect to fantasy. Thus, fantasy is not a primary, independent and leading function in the mental development of the adolescent; its development is the result of the function of forming concepts, the result which completes and crowns all the complex processes of changes that all of the intellectual life of the adolescent undergoes (p. 154).²

Contrary to popular opinion, the intellectualizing of fantasy and imagination enrich them in comparison with their impoverished existence in early childhood. Fantasy and imagination in childhood are bound to real objects and therefore have limited freedom. "The imagination of the adolescent is different from the play of the child in that it breaks the connection with real objects" (p. 161). Utilizing abstract concepts, the adolescent's imagination is more varied than the child's (p. 161; cf. Ratner, 1991, pp. 180–182).

The Integration of Psychological Phenomena

We have just seen how each psychological phenomenon is integrated with conceptual thinking. Their common integration into conceptual thinking also unifies the various phenomena together. Vygotsky expressed this as follows:

Various functions (attention, memory, perception, will, thinking) do not develop side by side like a bundle of branches placed into a single vessel; they even do not develop like various branches of a single tree that are connected by a main trunk. In the process of development, all of these functions form a complex hierarchic system where the central or leading function is the development of thinking, the function of forming concepts. All the other functions enter into a complex synthesis with this new formation; they are intellectualized and restructured on the basis of thinking in concepts (pp. 84–85).

The fact that psychological phenomena are internally related to each other enables them to modulate and modify one another. Vygotsky emphasized how phenomena change as they become interrelated with new factors. For example, the playing with dolls or tools by a two year old and a four year old seem externally to be very similar; however, they may have completely different foundations and meanings due to the different configuration of factors which permeate them (p. 8).

The same habits, the same psychophysiological mechanisms of behavior that, from the formal aspect, frequently show no substantial difference at different age levels or at different stages of childhood are included in a completely different *system of tendencies and inclinations* in a completely different force field of direction, and from this arises the deep *uniqueness of their structure, their activity*, and their changes at a *given* definite phase of childhood (p. 4, this volume).

Vygotsky pointed out that qualitative change in psychological characteristics is only recognizable if they are acknowledged to be imbued with new qualities from their internal relationships with other phenomena. Regarding phenomena as discrete atoms (rather than dialectically interrelated) promotes the view that they are autonomous and therefore immune to qualitative change from related phenomena (cf. Ratner, 1997, pp. 15–26 for discussion of this point). Vygotsky repudiated static, atomistic thinking which only notices superficial, overt appearance. He endorsed dialectical thinking which discerns the modulations and transformations of phenom-

²Donald (1991, p. 212) argues that speech produced distinctive psychological phenomena over the course of human phylogenetic development: "Simultaneously with the appearance of speech there appeared a whole constellation of thought skills that are associated with language . . . Semiotic cultures triggered completely new forms of information processing and storage: semantic memory, propositional memory, discourse comprehension, analytic thought, induction, and verification, among others."

ena that result from their interdependence and interpenetration (p. 196): “the transition from research based on external manifestations, on phenotypic similarity, to a deeper study of the genetic [i.e., changing], functional, and structural nature of thinking at different ages leads us inevitably to rejecting the established traditional view that is inclined to identify the thinking of the adolescent with the thinking of the three year old” (p. 36; cf. Ratner, 1997, Chaps. 2, 4, 5 for application of this concept to psychological research).

The method which

describes characteristics of behavior according to age was usually reduced to a static characterization, to enumerating a number of features, traits, different characteristics of thinking for a given stage of development. In this case, a static characterization usually substituted for a dynamic consideration of age. Development was lost from sight and the form, characteristic only for a given age, was assumed to be stable, immovable, always equal in itself. Thinking and behavior at each state was considered a thing and not as a process, something at rest and not moving (p. 40).

A given psychological phenomenon changes its nature as it is related to different phenomena across the life span. It does not retain a constant quality, significance, or function. Therefore no single trait, like sexuality, emotionality, aggressiveness, or security can be used to assess (compare) the psychological development of an individual at all ages. The reason is that the trait which is the standardized measure changes. As Vygotsky said, “The importance and significance of any trait change continuously with the transition from age level to age level. This excludes the possibility of dividing childhood into separate periods according to a single criterion for all ages” (p. 188).

Vygotsky believed that all aspects of psychological functioning change through new interrelationships over the life span. Not only do particular phenomena such as thinking, feeling, attention, memory, personality, etc. acquire new characteristics, but even “the driving forces of our behavior change at each age level” (p. 3). Therefore, no one mechanism consistently explains psychological functioning at all age levels. We have seen that intellectual/cognitive processes organize the psychological processes of adolescents and adults, but not infantile or childhood processes. Which mechanisms are central depends upon biological, mental, and social factors. Different constellations (Gestalts) of these factors alter the driving forces of behavior (cf. Asch, 1946, 1952 for brilliant demonstrations of this dialectical standpoint). In Vygotsky’s words, “The age levels represent the integral, dynamic formation, the structure, which determines the role and relative significance of each partial line of development” (p. 196). “Processes that are central lines of development at one age become peripheral lines of development at the following age and conversely, peripheral lines of development of one age are brought to the forefront and become central lines since their meaning and relative significance in the total structure of development changes . . .” (p. 197).

Form and Content

According to Vygotsky, it is not only the content of psychological processes which changes over the course of ontogenetic development. The form of psychological operations—or the manner in which information is processed—also changes. This is a break with traditional psychological thinking which postulates certain fixed ways in which thinking, feeling, perceiving, and remembering process information while allowing for new contents to be poured into these unchanging operations. Vygotsky maintained that the very ways of thinking, feeling, perceiving, and remem-

bering change as they confront new contents. The content of thinking is not simply the external data that comprise the subject of thinking; the content that one confronts “moves inward” and becomes an organic component part of psychological operations. The task of mastering new content nudges the youngster along the path of developing psychological operations as well (pp. 32–35, 42 this volume; Ratner, 1991, Chap. 3, especially pp. 131–138 for extended discussion of this point).

Traditional psychology assumes that content is socially organized and variable while operations are biologically determined fixed structures.

We might say that the fateful break between form and content flows inevitably from the fact that the evolution of content of thinking is always considered as a process of cultural development, primarily facilitated historically socially, and development of the form of thinking is usually considered as a biological process due to organic maturation of the child and the parallel increase in brain weight (p. 37, this volume).

However, the truth of the matter is that operations, structures, and processes are sociocultural phenomena just as much as content is. This is why they change as much as content does. In a powerful statement, Vygotsky explains that only a sociocultural view of human psychology can appreciate the integration of form and content. He says,

Only with the introduction of the teaching on the higher forms of behavior that are the product of historical evolution, only with the introduction of the special line of historical development or the development of higher mental functions in the ontogenesis of behavior does it become possible to . . . approach the study of the dynamics of form and content of thinking in their dialectical unity (p. 37).

Higher Processes Control Lower Processes

After establishing that higher psychological functions are fundamentally different from lower ones, and that qualitative change is a fundamental law of human psychological development, Vygotsky explains what happens to the lower processes which have been superceded. They do not continue to function in the original state while being supplemented by higher processes. Thus, they do not interact with higher processes. Instead, the lower processes are restructured on a new base: “lower or elementary functions, being processes that are more primitive, earlier, simpler, and independent of concepts in genetic, functional, and structural relations, are reconstructed on a new basis when influenced by thinking in concepts . . .” (p. 81).

This dialectical subsuming, surpassing, or *aufhebung* of one level into another requires some explanation. Vygotsky explains how it occurs in psychological and biological phenomena:

One of the basic laws of development of the nervous system and behavior is that as higher centers or higher formations develop, lower centers or lower formations yield a substantial part of their former functions to the new formations, transferring these functions upward so that the tasks of adaptation that are done by lower centers or lower formations at lower stages of development begin to be done by higher functions at higher stages (p. 83).

In other words, lower centers and formations are controlled by the higher centers and formations and work as subordinate units. They do not maintain an independent existence and original powers. However, if the higher centers and formations should be struck by some disorder, the subordinate unit may resume elements of its old type of functioning and act as a safety valve to provide rudimentary survival activities (pp. 83, 218–220).

The Relative Autonomy of Psychology from Biology

If higher psychological functions are not derived from or continuous with lower psychobiological processes, and if biologically determined lower processes are sublated into, reorganized, and subordinated by socially organized higher processes, then the latter cannot be biologically determined. Of course, higher processes require a biological substratum; however, this substratum is non-determining, in contrast to the biological determination of lower processes. The biological substratum of higher psychological functions—which is primarily the neocortex of the brain—is extremely pliable in response to experience. Thus, the human brain enables, rather than directs or controls, socially organized psychological phenomena (cf. Ratner, 1991, Chaps. 4, 5; Ratner 1989a, b for documentation of these points).

Higher psychological functions actually stimulate neuronal growth in particular directions. They create their own biological mediations. They do not depend upon specialized biological mechanisms which pre-determine them. If they did so, they would not be socially organized and they would not be higher functions. Vygotsky expressed this point as follows: “There is every reason to assume that the historical development of behavior from primitive forms to the most complex and highest did not occur as a result of the appearance of new parts of the brain or the growth of parts already existing” (pp. 35–36, this volume; Donald, 1991, pp. 1–19).

Vygotsky's social explanation of psychological development led him to repudiate biological explanations. He rejected, for example, the notion that psychological development parallels biological maturation. “In comparing the data of onto- and phylogenesis, we did not for a moment take the point of view of biogenetic parallelism, intending to find in the history of the development of the child a repetition and recapitulation of those forms of thinking that prevailed at previous states of human history . . . We did not for a moment identify the process of concrete thinking of the child with the process of concrete thinking in the history of human development” (p. 41). The theory of recapitulation made no sense to Vygotsky because it confused mature, higher psychological processes of primitive adults with lower, elementary childish processes. Concrete thinking of primitive adults and modern children cannot be equivalent because the former is a higher process while the latter is a lower one. Vygotsky repudiated the temptation to compare psychological processes on the basis of superficial, external characteristics. Concrete thinking may appear to be superficially equivalent in primitives and children but a deeper understanding of their characteristics in terms of related biological, social, and cognitive factors reveals that they are really quite different. The sequence of certain kinds of thinking may be similar in ontogenetic and phylogenetic development—in both arenas external signs develop before internal mnemonic devices do (p. 168), and pre-linguistic functions are restructured by language—but the specific characteristics and functions of psychological phenomena are quite different in primitive adults and contemporary children.

Comprehending the Nature of Psychological Phenomena

Vygotsky believed that the way to understand the real (developing) character of psychological phenomena was to look beneath the surface of psychological characteristics: “Changes that occur in the thinking of the adolescent who has mastered concepts are to the utmost degree changes of an internal, intimate, structural nature often not apparent externally, not hitting the eye of the observer” (p. 38). Qualitative features are only recognizable to a dialectical standpoint which seeks out the

features and sections of a given stage as varied, or modulated, by each other (pp. 40–41). “The nature of things is disclosed not in direct contemplation of one single object or another, but in connections and relations that are manifested in movement and in development of the object, and these connect it to all the rest of reality” (p. 54).

Vygotsky expressed optimism that

psychology is moving from a purely descriptive, empirical, and phenomenological study of phenomena to disclosing their internal essence. Until recently, the main problem was the study of symptom complexes, that is, the aggregate of external traits that differentiate the various periods, stages, and phases of child development . . . But the real problem consists of studying what lies behind these traits and determines them . . . (p. 189).

Vygotsky says that the purely descriptive study of external features is fruitless with respect to explanation, prognosis, and practical applications. It can be compared to those medical diagnoses that doctors made at the time when symptomatic medicine prevailed. According to that approach,

The patient complains of a cough, the doctor makes a diagnosis: the illness is a cough. The patient complains of a headache, the doctor makes a diagnosis: the illness is a headache . . . The matter is precisely the same with respect to symptomatic diagnoses in psychology. If a child is brought in for consultation with complaints that he is developing poorly mentally, has a poor imagination and is forgetful, if after investigation, the psychologist makes the diagnosis: the child has low intelligence quotient and mental retardation, the psychologist explains nothing, predicts nothing, and cannot help in any practical way . . . (p. 205).

Vygotsky would obviously be appalled by the fact that precisely this kind of symptomatic, external assessment is the rule in contemporary psychological science, especially as exemplified by the *Diagnostic and Statistical Manual* for diagnosing psychological disorders (cf. Ratner, 1987; Ratner, 1997, Chap. 1 for additional examples).

Vygotsky argued that psychological phenomena are only truly understood if their internal relations and essential, underlying features are discerned. This, in turn, requires that phenomena be conceptualized in abstract concepts. Consistent with his rationalist philosophy, Vygotsky believed that conceptual thinking is an essential means for comprehending reality. He said, “those who consider abstract thinking as a removal from reality are wrong. On the contrary, abstract thinking primarily reflects the deepest and truest, the most complete and thorough disclosure of reality” (p. 47, this volume). “Recognizing concrete reality with the help of words, which are signs for concepts, man uncovers in the world he sees connections and patterns that are confined in it” (p. 48). “Without thinking in concepts there is no understanding of relations that underlie the phenomena. The whole world of deep connections that underlie external, outward appearances, the world of complex interdependencies and relations within every sphere of activity and among its separate spheres, can be disclosed only to one who approaches it with the key of the concept” (p. 42).

The Socialization of Psychological Phenomena

Vygotsky believed that higher psychological phenomena are stimulated and constituted by social relations. The infant is born into an existing social world and only through participating in this world develops higher mental functions. We have seen that social interactions do not simply elicit pre-formed functions, they literally

form the infant's psychology. Vygotsky provides three examples of this process (cf. Ratner, 1991, pp. 28–38 for additional examples).

One example is the manner in which logical thinking develops. Vygotsky, citing the research of James Baldwin, Pierre Janet, and Jean Piaget, states that logical thinking in the child recapitulates the form of social discussion and argumentation between people.

In the process of developing cooperation and particularly in connection with the appearance of a real argument, a real discussion, the child is first confronted by the need to form a basis, to prove, confirm, and verify his own idea and the idea of his partner in the discussion. Further, Piaget traced that the argument, the confrontation that arises in a children's group is not only a stimulus for logical thought, but is also the initial form in which thought appears . . . P. Janet showed that all deliberation is the result of an internal argument because it is as if a person were repeating to himself the forms and methods of behavior that he applied earlier to others.

Thus, we see that the child's logical deliberation is as if an argument transferred to within the personality and, in the process of the child's cultural development, *the group form of behavior becomes an internal form of behavior of the personality. the basic method of this thinking* (pp. 168–169, emphasis added).

A second example of the sociogenesis of higher psychological phenomena is the development of self-control and voluntary direction of one's own actions:

The child who learns to modify direct impulse and to subordinate his activity to one rule or another. . . does this initially as a member of a small group . . . Subordination to the rule, modification of direct impulses, coordination of personal and group actions initially, just like the argument, is a form of behavior that appears among children and only later becomes an individual form of behavior of the child himself (p. 169).

A third example of the sociogenesis of individual psychological phenomena is symbolic, or conceptual thinking:

speech, being initially the means of communication, the means of association, the means of organization of group behavior, later becomes the basic means of thinking and of all higher mental functions, the basic means of personality formation . . . Behind the psychological power of the word over other mental functions stands the former power of the commander and the subordinate (p. 169).

These examples all demonstrate that psychological functions are derived from social relations which exist externally to the individual. Vygotsky summarizes his position by saying that “the structures of higher mental functions represent a cast of collective social relations between people. These [mental] structures are nothing other than a transfer into the personality of an inward relation of a social order that constitutes the basis of the social structure of the human personality (pp. 169–170). Vygotsky goes so far as to call this “a law of the development and structure of higher mental functions.” This “law of transition of a function from outside inward” means that “all internal higher functions were of necessity external. However, in the process of development, every external function is internalized and becomes internal” (p. 170).³

³Psychological phenomena not only originate in social relations, they are best expressed and understood in social situations: “the social environment is the source for the appearance of all specific human properties of the personality” (p. 203, this volume). Vygotsky recommended that psychological assessment of higher functions be conducted in a social interaction between the subject and tester. In such an occasion, the tester can prompt the subject, demonstrate examples of what he is to do, and ask questions about the reasons for his action. Such social interaction may enable a child to meet higher performance standards than is possible through independent, individual test-taking. And the resulting improvement indicates that this child's psychological competence is different from a child's whose performance is not socially enhanced (pp. 202–203).

Of course, internalized, internal processes then mediate future encounters with the social environment. Encounters do not impinge upon a blank slate, but are refracted by accumulated experiences. As Vygotsky says, "My experience is affected by the extent to which all my properties and how they came about in the course of development participate here at a given moment" (p. 294). However, because psychological properties come about through socialization, as discussed above, we must say that the social environment shapes the experience which an individual has by shaping the psychological properties which comprise experience. In other words, the experience one has depends upon perceptions, emotions, ideals, and imagination which mediate an encounter with the physical or social world. Yet these mediations are all internalized from social relations. Social life is not experienced immediately—anew at each moment—but rather is mediated by psychological functions which have been socialized through previous social encounters. Social life works on us from the outside but also from the inside in the form of higher psychological phenomena. This is why Vygotsky concludes that the researcher must make "a penetrating internal analysis of the experiences of the child, that is, a study of the environment which is transferred to a significant degree to within the child himself and is not reduced to a study of the external circumstances of his life" (pp. 294–295; cf. Ratner, 1997, Introduction and Chap. 4).

The Logical Consistency of Vygotsky's Concepts

A great strength of Vygotsky's psychological system is its logical consistency. The distinction between higher and lower psychological functions, the relative autonomy of psychological functions from biological determinants, the subordination of lower processes to higher ones, the socialization of higher functions, their dependence on conceptual and semiotic symbols, the integration of psychological phenomena—including the unification of form and content, the qualitative changeability of psychological phenomena, and the requirement that they be studied by conceptualizations which penetrate beneath superficial external appearances and disclose essential internal relationships, all support one another. Logical consistency is a hallmark of all great scientific systems (cf. Ratner, 1997, Chap. 5). On this ground, along with the empirical validity of its concepts, Vygotsky's system qualifies as great science.

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