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5

Vygotsky's uses of history

SYLVIA SCRIBNER

"History" is not a distinctive subject-matter to be inquired into. It is rather at once a trait of all subject-matters, something to be discovered and understood about each of them; and a distinctive way of inquiring into any subject-matter.

Randall, Jr. (1962, p. 28)

This chapter is a beginning exploration of the question "What is history?" in the psychological theory of L. S. Vygotsky.

Although the uses psychologists make of history is a topic worthy of analysis in its own right (White, 1976), the present inquiry addresses a special concern. Since the early 1970s social scientists have shown heightened interest in the relationship between culture and cognition. In spite of many advances in research methods and findings, however, conceptual difficulties continue to limit the enterprise. Principal among these difficulties is the problem of determining for any given domain of intellectual functioning (e.g., conservation, memory, logical reasoning) which aspects are universal in nature and which are specific to particular social environments. Theories of psychological development are of propaedeutic value here, and among them, Vygotsky's theory would seem to hold special promise for construction of an integrative account of cultural variations in thought. Some of us have attempted to develop this promise and use Vygotsky's framework as a guide to our work (Cole and Scribner, 1977; Scribner and Cole, 1981) but the implications of his theory for comparative studies of cognition have proved ambiguous. One source of ambiguity is that Vygotsky, like other developmental theorists, applies his concepts of development to the careers of both the child and the "primitive." These actors walk hand-in-hand through his pages in a relationship we find difficult to define yet impossible to ignore. Are we to infer from these passages that Vygotsky believed that in some cultures characterized as "primitive" adults are "childlike"? If not, are we forced to dismiss Vygotsky's child–primitive comparisons as an unfortunate aberration in an otherwise bril-

liant and useful approach to the social foundations of thought? More is at stake in these vexing questions than the accomplishment of a balanced appraisal of Vygotsky. Child–primitive comparisons continue to dominate many studies of cultural influences on thought [Hallpike (1979) is a recent anthropological effort using this framework] and continue to arouse controversy and debate (Cole and Scribner, 1977; Lave, 1981). In this context, clarification of Vygotsky's views seems essential; without it, his writings are subject to misuse; with it, we can hope for further constructive development of a sociohistorical theory of mind.

Clarifying Vygotsky's views of primitive thought, however, turns out to be no simple matter. If we want to go beyond a mere restatement of what Vygotsky said, we need to determine the function child–primitive comparisons played in his system as a whole. To conduct this analysis we are forced to shift our starting point. We need to begin, not with "child" or "primitive" but with more inclusive and fundamental categories in Vygotsky's theory. And this brings us to "history," the topic of this chapter. Vygotsky declares that historical analysis is the key to his system. The essence of a dialectical approach, he states, is to study something historically, to study "phenomena in movement"; "the historical research of behavior is not an additional or auxiliary aspect of theoretical study but forms the very basis of the latter" (DHF, p. 105; for sources and their designation, see note 1).

Accepting this view, we can examine how Vygotsky worked out his historical research of behavior, anticipating that this analysis might help us understand the significance of his methodology involving child and primitive thought. A complete analysis of Vygotsky's historical approach is, of course, a large undertaking and beyond the scope of this chapter. Here I will offer a series of preliminary observations, concentrating on the "sequences of moving phenomena" to which Vygotsky applied the term "history" and their functional role in his theory. Although certain of Vygotsky's concepts have been superceded or substantially modified by Soviet psychologists (see, for example, Leont'ev and Luria, 1968) I have chosen to conduct this analysis in Vygotsky's own terms. I am interested in following the logic of his method of theory construction rather than in evaluating the status of the theory.

Historical approach: Vygotsky's leading contribution

Of Vygotsky's many contributions to psychological theory, he has perhaps been most widely acclaimed for introducing the historical approach to the development of higher mental processes. Graham (1972) tells us that Soviet historians of science, who hold different assessments of Vygotsky's

work, agree in honoring him as the first to explicate the historical formation of the mind. This approach is so central to evaluations of Vygotsky that it has been elevated over other constructs to serve, in various compound forms, as the *name* for the theory as a whole. Soviet psychologists refer to Vygotsky's theory as "cultural *historical* theory" (Davydov, and Radzikhovskii, Chapter 2, this volume) or "social *historical* theory" (Leont'ev and Luria, 1968); and U.S. psychologists often seem to have Vygotsky's position in mind when they speak of the "Soviet *sociohistorical* approach" to mental development (as for example, Wagner and Paris, 1981).

In using the compound term "*sociohistorical*" rather than the simple term "*historical*," commentators appear to be singling out for emphasis one of Vygotsky's uses of history – history as the chronology of events involving humanity as a whole. Vygotsky refers to this series of events as general history and we will follow his usage as we begin our analysis.

General history: the first level of history

Singling out general history as the foundation for the entire theoretical edifice seems consistent with Vygotsky's own view of his enterprise. He begins, "The Development of Higher Mental Functions" with a quotation from Engels: "The eternal laws of nature to an ever greater extent are changing into laws of history." Vygotsky invites us to read this work as the unravelling of the mechanisms by which this transformation from the natural to the historical takes place in the phenomena of mental life.

To follow his course, we need to begin with the central questions about mental phenomena that Vygotsky sought to address. As we know, he was absorbed with the problem of the higher forms of behavior or higher psychological functions (we will not concern ourselves with the distinction here). To understand the development of the child, he said, psychology must be able to account for such complex phenomena as acquisition of speech and development of planning and self-control, the outstanding accomplishments of early childhood. But such an account was exactly what the various schools of psychology were unable to construct. Vygotsky devotes more than a fourth of his manuscript to an intricate analysis of the limitations in psychological theory and method responsible for this failure. This critique is not easily epitomized, but it pivoted around two seemingly irreconcilable approaches within psychology to the study of higher behavior. Briefly stated as a reminder of Vygotsky's view of the state of psychology in his day: Empirical psychologists conceived of higher forms of behavior as simply more complicated varieties of elementary processes and, like them, products of biological evolution; accordingly, they tried to explain both classes of phenomena by the same laws (the naturalist or

natural science camp). Speculative philosopher–psychologists contended that higher functions are *sui generis;* they are not regulated by biological laws or deterministic laws of any kind; as expressions of "human nature," they are, by nature, inexplicable (the idealist or cultural psychology camp).

Vygotsky's diagnosis of the difficulty was a brilliant penetration beneath the surface of the argument. The limitations of both camps arose from a *common* source: Neither understood the true origin of higher mental processes. These are discontinuous with elementary processes because they do not originate in biological evolution and cannot be explained by "natural" laws (i.e., laws of nature). But they are not lawless. Rather, their roots are to be found on another level of explanation – the regularities of the laws of history. Vygotsky put it this way: "Neither the eternal laws of nature nor the eternal laws of the spirit" but "historical laws" are the key to discovering the development of higher forms of behavior (DHF, p. 20).

What are these historical laws? In his discussion of the current state of psychology, Vygotsky presents and dismisses historical approaches offered by several schools, most notably psychoanalysis and "understanding psychology" (represented by the works of E. Spranger). Vygotsky called these metaphysical, unscientific positions: "It is not enough to formally bring psychology and history closer to one another; it is necessary to ask: what psychology and what history are we dealing with?" (DHF, p. 32).

As we know from his many citations, Vygotsky was, in the first place, dealing with the materialist history of Marx and Engels. One of their kernel ideas was that the human species differs from all others because, through its manipulation of nature, it frees itself from biological determinism and begins to fashion its own nature. Productive activities (generically "labor") change in the course of history as new resources and new forms of society come into being. This history is material because it establishes the material activities of people and their intercourse with one another as the source of ideas and mental life (Marx and Engels, 1846).

In adopting this outlook, Vygotsky committed himself to two propositions that it entails: (1) Because socially organized activities change in history, the human nature they produce is not a fixed category that can be described once and for all; it is a changing category. Questions about what human nature is, or more appropriately to Vygotsky's enterprise, what human mental life (the "psyche") is, cannot be separated from questions about how human mental life becomes what it is. Questions of genesis thus move to the forefront of the scientific enterprise; psychological study of human nature (thought and behavior) must concern itself with the processes of formation of human nature. (2) Changes in social activities that occur in history have a directionality: hand-powered tools precede machines; number systems come into use before algebra. This movement

is expressed in the concept of historic *development* in contrast to the generic concept of historic *change,* and its reflection in human mental life is expressed as mental *development.*

Here is a passage in the opening chapter of *"The Development of Higher Mental Functions"* in which Vygotsky introduces some of these concepts. He has been laying out the deficiencies in the two camps of psychology and he summarizes them in this manner:

The higher forms of behaviour originated by mankind's *higher development,* are either placed alongside the physiological, organic processes. . .or are totally set apart from all that is material and begin a new and this time eternal life in the realm of ideas. . .Either one or the other. Physiology or mathematics of the spirit, but under no circumstances the *history of human behavior* as a part of *mankind's general history.* (DHF, p. 20; emphasis added)

Vygotsky expresses his main conclusion – the need to search for specifically human behavior in history rather than biology – in this way:

Human behavior differs from animal behavior in the same qualitative manner as the entire type of adaptability and historical development of man differs from the adaptability and development of animals, because the process of man's *mental development* is part of the *general historic development of mankind.* (DHF, pp. 95, 96; emphasis added)

Many years later, Leont'ev and Luria (1968), in a retrospective assessment, credited Vygotsky's theory of "the sociohistorical formation of higher mental processes" as the key to his solution of the crisis in psychology (p. 341). One might say that Vygotsky used the category of "general history" to achieve a synthesis in psychology between "nature" and "culture" (see Toulmin, 1978).

All aspects of the historical progress of humankind were not of equal importance to Vygotsky. He was concerned with those forms of social life that have the most profound consequences for mental life. As we know, he thought these to lie primarily in the symbolic–communicative spheres of activity in which humans collectively produce new means for regulating their behavior. Vygotsky called these means "cultural" and the new forms of behavior "specifically cultural forms" (DHF, p. 46). Historical laws of development, as they apply to human mental life, are therefore laws of development of cultural forms of behavior, and the other way around: Cultural forms appear slowly, each new stage building on a preceding one, so that everything cultural is "in its very nature, an historic phenomenon" (DHF, p. 21). Thus, we find Vygotsky introducing the term "cultural development" in his discussion of the origins of higher psychological functions and in some contexts using it interchangeably with "historical development."[2]

By situating the origin and motor force of the higher mental processes in

human cultural history, Vygotsky at the same time redefined the nature of psychological explanation. Insofar as its object of inquiry is regulated by historical rather than biological processes, psychology's search for laws of development (formation of human nature) must be conducted on the sociocultural level of reality, and it must devise a methodology appropriate to this enterprise.

For Vygotsky, then, the transformation of phylogeny (biological evolution) into general history (historical development) is more than a backdrop for a Marxist psychology; it is a first building block in the construction of this science, setting before it the task of explaining the genesis and development of cultural forms of behavior and developing a method for this purpose.

Ontogeny: the second level of history

The second level of history that enters into Vygotsky's system is the "subject's individual history" (T&S, p. 27) or the "history of the child" (T&S, p. 63). Although Vygotsky's concern with the course of human history distinguishes him from other developmental psychologists, his attention to individual growth and change seems to require no theoretical prolegomenon. Individual history appears to many U.S. psychologists to be the natural subject of Vygotsky's psychology or, more conservatively, the domain in which Vygotsky's psychology coincides with the field of developmental psychology as it is customarily defined.

Vygotsky's analysis of child history centers on the same topic as his analysis of general history: the characterization of "uniquely human aspects of behavior" (Vygotsky, 1978; p. 19). Just as Vygotsky rejected the notion that biological laws can explain the emergence of higher forms of behavior in general history, he rejected their explanatory value for these behaviors in child history as well. He claimed that on the individual level of organization, as well as on the species level, two lines of development must be distinguished – the biological (sometimes referred to as natural; see note 2) and the cultural. Natural processes regulate the growth of elementary psychological functions in the child – forms of memory, perception, and practical tool-using intelligence, for example, that are continuous with the mental life of apes and other species. Social and cultural processes regulate the child's acquisition of speech and other sign systems, and the development of "special higher psychological functions" such as voluntary attention and logical memory (DHF, p. 35). These acquisition processes constitute the cultural development of the child, or what Vygotsky claims is the same statement (we will return to this equivalency later), the cultural

development of behavior (DHF, p. 17). The cultural line of development is closely linked to the child's "social history," the particular societal and cultural medium in which he or she grows up (T&S, p. 27). It proceeds by the child's mastery of the means and forms of behavior "elaborated in the course of the historical development of human society" (El'konin, 1967, p. 35).

Although most of Vygotsky's work is a sustained argument for psychology's recognition of a separate cultural line of development in the child, he tends to retain the biologically derived term "ontogeny" as a generic term to refer to *all* processes of child development (see note 2). Vygotsky makes a crucial distinction between ontogeny and phylogeny, however. In contrast to phylogenesis, in which the line of historical–cultural development *displaces* the biological, in ontogenesis both lines of development co-occur and are fused. As children grow in size and gain control over locomotion (biological development), they are also acquiring use of tools and speech (cultural development).

We now have two series of changes, each of which involves a line of cultural development, one taking place on the level of general world history and the other on the level of individual history. On both levels specifically human aspects of human nature are in the process of formation.

How do these two series of cultural development relate to each other? Before we try to work out the answer to this question, it seems necessary to justify why it should be raised in the first place. We might take Vygotsky's discussion of the historical development of human nature as an independent topic in its own right. It clearly served the theoretical function of carrying the critique against dualist positions in psychology and establishing the main directions for a new science of behavior. Having served these functions, the concept of general history might silently leave the scene. Adoption of this position would imply that the sociohistorical aspect of Vygotsky's theory plays no significant functional role in his systematic study of higher mental processes in child development.

Vygotsky's writings, however, do not readily lend themselves to such an interpretation. He not only engages in general theoretical discussion on cultural development, but he laces his texts with detailed descriptive material on human behavior in early history and primitive cultures – material culled from the writings of ethnologists, the French sociological school and the field of "ethnic psychology." (Levy Brühl and Wundt are two well-quoted sources in the latter fields.) This material always involves "primitive man," a term variously referring to the prehistoric species at the threshold of humanity, to *Homo sapiens* in the earliest historical epochs, or

to "the most primitive man of the now living tribes" (Vygotsky, 1966, p. 18). Vygotsky insists that the data of ethnic psychology need to be taken into account in child psychology if effective approaches are to be worked out for the study of higher processes. And to emphasize the point, as it were, he follows a practice of interweaving material from both these fields in discussions of substantive topics and he does so within an avowedly comparative framework. Thus, Vygotsky seems to be saying that it is not merely history in the abstract but some actual stuff of history that is critically important to theory and research on child development. Let us consider the kind of information he uses from history and anthropology and the contexts in which he considers such material relevant.

Child and primitive

I have selected illustrative material dealing with the two classes of phenomena Vygotsky defined as branches of the development of higher functions— organization of functional systems and acquisition of sign systems. (Unless otherwise indicated, all emphasis in quotations is mine.)

Example 1: Memory. In the essays in "Tool and Symbol," Vygotsky undertakes an analysis of sign operations in the child, focusing on their role in integrating elementary processes into higher systems. He elects to begin with the "history of child memory" since memory is an "exceptionally advantageous subject" for a "comparison of elementary and higher functions" (p. 83). But he immediately introduces material from general history. "The *phylogenetic* investigation of human memory shows that, even at the most primitive stages of psychological development, we can clearly see two, principally different types of memory functions" (p. 85). When he completes the description of stages of memory in early history, Vygotsky presents a series of studies he and his colleagues conducted on the development of memory operations in *children.*

Example 2: Counting. In "Development of Higher Mental Functions," Vygotsky includes an important theoretical section analyzing the first forms of sign-mediated activities. He describes as one such activity finger-counting systems among the Papuans of New Guinea: "Counting fingers was once an important cultural triumph of mankind. It served as a bridge over which man passed from natural arithmetic to cultural. . . . Finger counting underlies many scales of notation. It is widely represented to this very day *among primitive tribes*" (p. 28). "Studying these primitive 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 arithmetic reasoning,* and, in certain cases in the behavior of grown-ups" (p. 129).

Example 3: Prehistory of writing. This discussion (Vygotsky, 1978) presents a clear revelation of the movement of Vygotsky's thought from child to human history to the history of writing to the writing of a traditional people and back to the child. (The passage is continuous but several sentences are omitted for condensation purposes.)

The gesture is the initial visual sign which contains the *child's* future *writing* as an acorn contains a future oak.

. . . Wurth pointed out the link between pictorial or pictographic writing and gesture in discussing the *development of writing in human history.* He showed that figurative gestures often simply denote the reproduction of a graphic sign; on the other hand, signs are often the fixation of gestures. For example, the *pictorial writing of Indians* represents a line connecting points by one that indicates motion of the hand or index finger.

. . .Now we will point out two other domains in which gestures are linked to the *origin of written signs.* The first concerns *children's scribbles."* [And the second, Vygotsky goes on to say, concerns children's play]. (Vygotsky, 1978, p. 107).

Does ontogeny recapitulate general history?

Reading these passages, we hear echoes of many other comparisons between primitive and child mentality in the history of psychology. Developmental psychology, in particular, has rarely escaped such comparisons. Implicitly or explicitly they are present in the major theories and were certainly a prominent feature of the genetic psychology movement of Vygotsky's day. Most of these comparisons take the form of parallelism, a framework developed in biology that proposes that stages of ontogeny correspond to sequences of life forms in phylogeny. The most conspicuous version of parallelism attempted to account for these correspondences through a biological law of repetition (the biogenetic law) whose workings are inscribed in memory in the famous aphorism that "ontogeny recapitulates phylogeny."

One particular feature of recapitulation theory is of special interest to our present inquiry. Whereas all species have always consisted of both immature and mature members, evolutionary history has been conventionally depicted as a sequence of successive adult stages; and whereas ontogeny is, properly speaking, the entire life history of an individual, conventionally it has been studied with respect to stages of development up to the point of maturity or adulthood (Gould, 1977, p. 484). Accordingly,

most ontogeny–phylogeny comparisons take the form of finding resemblances between immature members of higher species and mature members of lower species. When Hall and other genetic psychologists at the turn of the century extended recapitulation theory from anatomy to behavior, they left this form of comparison intact; they proposed that the biogenetic law reproduces forms of thought and behavior in ontogeny that correspond to various stages of cultural evolution. According to the theory, the white Western child passes through all earlier and lower stages to arrive at "civilization"; individuals in traditional societies, however, retrace only part of this ancestral cultural history and remain arrested at one of the lower levels. In this scheme, the term "primitive" applied to early humans of all ages, adults in contemporary traditional societies, and children in industrial societies. [See Grinder (1967) for readings of genetic psychology and Hallowell (1967) and Gould (1977) for critiques.]

As Gould (1977) documents, recapitulation theory supported racist ideology and practices and persisted in psychology long after its repudiation in biology as scientifically worthless.

With this historical background, it is understandable that questions have arisen on the meaning of child–primitive comparisons in Vygotsky's work. Vygotsky's view of higher mental functions as having social–historical, rather than biological, origins sets his theory apart from others and certainly distinguishes it from the thinking of the genetic psychology movement. Still, without diminishing the significance of his theoretical break with biologically oriented psychologies, we need to consider the following possibility: In displacing the biological concept of phylogeny with the social concept of history, did Vygotsky nonetheless leave the structure of the older theories intact? Does ontogeny recapitulate history? Or, in the weaker version, does the child parallel stages of culture on its way to mature intellectual functioning?

These questions are not idle: A biological orientation to intellectual development is not logically necessary to a recapitulationist or parallelist view. And several surface features of Vygotsky's comparative remarks resemble those of classic parallelist theories. For one thing, Vygotsky frequently compares characteristics of the modern child to those of the primitive adult; or, to put it the other way around – for it is in this version that the "shoe pinches" – he compares the primitive adult to the modern child. A second resemblance, as we have pointed out, is that Vygotsky adopts the tradition of using the term "primitive" to refer not only to ancient forebears but to living men and women in contemporary societies whose technological means are primitive.

As an example of the interpretive problems Vygotsky's comparisons

pose, consider Luria's (1976) cross-cultural research and the controversy it aroused. In the early 1930s, Luria undertook to test the sociohistorical aspects of Vygotsky's theory in a remote area of the Soviet Union that was undergoing rapid changes in modes of production and social life. In a series of studies among adults, he found conceptual and reasoning differences between nonliterate peasants and others who had participated in agricultural collectives or in literacy and training experiences. These differences were similar to age-related changes psychologists had identified in ontogeny, and Luria tended to interpret them within a development perspective. For example, he considered the grouping of objects by perceptual–functional attributes (common among his nonliterate respondents and young children in other studies) developmentally lower than grouping by taxonomic class membership (the preferred mode of literate, schooled respondents and other children). Luria presented these findings as confirmation of Vygotsky's thesis that the higher psychological processes change as a function of sociohistorical changes. But did this work and its interpretation imply that the "unchanged" Uzbekistanian peasants were childlike? Some critics apparently thought so. Cole (1976, p. xiv) points out that Luria's research received a mixed reception when it was first reported; some believed it insulting to ethnic minorities in the Soviet Union; other commentators faulted not merely this piece of research, but the general theory for its imputation that certain classes and sections of the population who were carrying out Soviet policy were not capable of abstract thought (cited in Cole and Griffin, 1980).[3]

Disagreements as to the implications of Vygotsky's sociohistorical views are not confined to the Soviet Union or the past (see Cole and Griffin, 1980). As I hope my presentation has shown, Vygotsky's writings in the context of the history of developmental psychology provide grist for controversy.

If ambiguities are present in Vygotsky's work; it is not the function of interpretation to "get rid" of them. What I want to show is that some, if not all, of the sources of controversy disappear when we go beneath the surface and examine the functional role of ontogeny–history comparisons in Vygotsky's theory. Before doing that, however, I think it useful to draw attention briefly to material that refutes a recapitulationist position and cautions against an assimilation of Vygotsky's views to classical parallelist positions as well [for descriptions of these theories, see Gould (1977)].

I will confine my remarks to four points.

1. First, Vygotsky vigorously denies that his is either a recapitulationist or a parallelist position. He was quite aware of the possibility that his citation of ethnopsychological material might be interpreted as supporting such

positions and he was concerned to set the record right. One passage (others might be cited, viz. T&S, p. 129) illustrates the tone of his argument:

> In the child's development, we find represented (but not repeated) both types of psychological development which we find in phylogenesis in isolated form: the biological and the historic. In ontogenesis both processes have their analogies (not parallels). This is a fundamental and central fact. . . . By this we certainly do not wish to say that ontogenesis in any form or degree repeats or reproduces phylogenesis or runs parallel to it. (DHF, p. 47)

2. A recapitulationist position requires that the same processes operate on both the individual and species level; in biological theories this requirement was met by postulating a biogenetic law of repetition. Vygotsky, however, repeatedly points out that the child's acquisition of tool and sign use does not follow that of primitive man (e.g., DHF, p. 49). He judged Spranger's cultural psychology deficient, in part, because it tried to equate "such different life processes as the historical development of mankind and the child's psychological development" (DHF, p. 32). Equation of these life processes is precluded by the distinctive characteristics of child and general history: The child is an assimilator of sign systems and develops higher functions through processes of internalization. Adults in the course of history are the inventors and elaborators of sign systems, as well as users. Assimilative and creative processes are not psychologically the same. The contrast is well illustrated in Vygotsky's discussion of the development of cultural forms of memory. Children of a certain age learn to use external aids for remembering. In the history of society we also find a stage in which adults rely on external memory aids (notched sticks, knotted ropes). Vygotsky recalls an anecdote related by Levy-Brühl: A missionary observed a man in a preliterate culture carving figures in a piece of wood to help him remember a sermon that impressed him. Vygotsky says that Levy-Bruhl saw this as an example of the way primitive man relies on memory instead of thought, but "we are prone to see the contrary in this example, how man's intellect leads to the formation of new forms of memory. . . how much thought must have been necessary to inscribe a speech by carving figures on a piece of wood" (DHF, p. 125). What is memory to a child (use of an aid to remember) is thought for the adult (preparation of an aid to remember).

3. Turning to parallelism: Classical positions set up correspondences in the *content* of child behavior and the *content* of adult behavior in earlier epochs. In the genetic psychology movement, fears, ideas, and beliefs about the world were the material proof of the affinity of child and cultural developments. [See Gould (1977) for some startling examples. Grinder (167) reports that Hall, a founder of genetic psychology in the United

States, launched his work with a volume on *The Content of Children's Minds.*] Vygotsky makes no claim for phenotypic similarities and severely criticizes psychologists who do. "It goes without saying," he points out, that "to base oneself on ethnopsychological data does not mean to transpose them directly to the doctrine of ontogenesis" (DHF, p. 38) nor does it mean there is a correspondence between actual phenomena of cultural development in the child and in history. Vygotsky's refusal to assume likenesses in mental content across time and place is consistent with his view of sociohistorical shaping of mind: Ontogentic development is influenced by its particular sociocultural milieu; not only are modern children unlike primitive adults in "real life" but they are unlike children in other times and places. In an obvious reference to Piaget's early work, Vygotsky protests that, in certain psychological research

> the world outlook and causal concept of the contemporary European child of intellectual background and the same outlook and concept of a child coming from some primitive tribe, the outlook of a child from the Stone Age, that of the Middle Ages, and that of the XX century – these are all conceived as being basically identical; one and the same in principle, always equal one to the other. (DHF, p. 22, 23)

4. Finally Vygotsky's position lacks a principal feature of classical parallelist theories – a "stage theory" of culture that can be brought into correspondence with stages in ontogeny. I find no evidence that Vygotsky incorporated a Spencerian (1888) or other doctrine of cultural stages in his theory. According to Spencer, societies develop over history, becoming increasingly complex and more highly organized, each marked by more advanced forms of thought. According to Vygotsky, the decisive moment in history is marked by the *advent* of culture – more exactly, the invention of cultural means for regulating behavior. The transition from nature to culture is the lever for movement from lower to higher forms of thought. In a generic sense, all cultures exhibit some higher forms of behavior and thought; indeed these define the human species. For what makes an individual a primitive human rather than an animal is the fact that he or she uses tools and signs to mediate interactions with nature and with others. All humans participate in the most powerful, most basic of all sign systems, speech. Because every language incorporates a system of socially created significances, all human adults who have mastered this system will have a human, that is, semantic, consciousness. And because all human societies known to us engage in processes of dialogue and communication, we must make the assumption that in childhood, speech has gone inward and has reorganized some forms of psychological functioning in at least some domains. Vygotsky says just that "should it be exposed enthnologically, we would witness an all-encompassing stage of culture which has been

reached during different epochs and in differing forms by all nations" (DHF, p. 108). Such a framework – holding that adults in all cultures have higher sign-mediated systems of some kind – imposes a substantial constraint on developmental interpretations of cognitive differences among adult populations. Over and beyond the "all-encompassing stage of culture," differences will be located in the particular characteristics of higher systems and the functions they serve, not in the absence or presence of "higher thought." Because cultural means have developed over history, and will continue to develop, we expect to find continual changes in the structure and form of higher systems.

It would be possible, of course, to order higher systems in a progression according to their different characteristics, assigning one level to a certain historical period and another more advanced level to a nearer point in time. But just as Vygotsky does not offer a "progression of cultural stages," he does not offer a stagelike progression of higher forms of behavior. One reason, I believe, is that he does not represent higher systems as general modes of thought or as general structures of intelligence in a Piagetian sense. Vygotsky addressed the question of general processes of formation of particular functional systems, a project quite at variance from one aimed at delineating a particular sequence of general functional systems. In the passages quoted above, we note that Vygotsky's comparisons are always made with respect to some particular system of sign-mediated behavior – memory, counting, writing. As we will see, each of these systems has its own course of development; all of them ("higher" or "cultural" by definition) advance from rudimentary to more advanced forms. But there is no *necessity* in theory for all functional systems characterizing the behavior of an individual, or behaviors in a given social group, to be at the same level. Vygotsky's theory allows for the possibility, for example, that highly developed forms of memory or planned behavior will coincide with the use of primitive counting systems, or the other way around. Various combinations are theoretically conceivable. In actuality, because cultural means have a single line of historical development according to Vygotsky, all combinations are not likely to be realized: looking backward at early human societies, we find no examples of highly advanced mathematical systems in the absence of written notational systems. Thus Vygotsky sometimes refers globally to the "psychology of primitive man" (DHF, p. 41) and contrasts it, in dichotomous fashion, to the "higher psychology of modern man." His theoretical scheme, however, does not itself impose such global comparisons. Since his child–primitive comparisons are made with respect to particular functional systems, it is in Vygotsky's studies of the formation of these systems that we expect to locate their functional significance.

Higher psychological functions: a third line of history

Higher psychological functions have their own genesis and stages of development, – in the broadest sense, a history. This history, is, of course, embedded in the history of real people and is therefore realized on the two planes of phenomena we have already examined – general history and child history: "These functions, which from the point of view of phylogenesis are [products of] the historical development of the human personality possess also from the point of view of ontogenesis, their own particular history of development" (T&S, p. 64).

As compared to the history of humanity or child history, the history of the development of the higher psychological functions (this is Vygotsky's terminology) is "an absolutely unexplored field of psychology" (DHF, p. 1). Yet, Vygotsky argues, to understand the cultural development of the child, we need to know the specific features of structure and function that characterize higher systems, their origin and development to "full maturity and death" (DHF, p. 6), and the laws to which they are subject. The title of Vygotsky's "Development of Higher Mental Functions" now becomes clear. He proposes to accomplish psychology's mission – achieving an understanding of the formation of human nature (see the discussion under the heading "General history. . .") through studies of the origin and development of higher psychological functions *as such*. This is a radical development of higher psychological functions *as such*. This is a radical enterprise for it amounts to nothing less than constructing a new object of scientific investigation. In the essays collected in "Tool and Symbol," Vygotsky set his exposition in the framework of approaches to child psychology and made it clear that his topic was human ontogeny. But in the later work, he equally clearly distinguishes his inquiry from the study of the child as a whole (DHF, p. 3). For purposes of theory construction, he takes as his conceptual object "higher psychological systems" and separates it from the natural object, the "child." [Glick (1983) makes this distinction between conceptual and natural objects in a penetrating analysis of Piaget's theory of development.]

Since Vygotsky took a new object for investigation, he needed a new method for this task: "The study of any new field must always begin by a search for and elaboration of method. . .the object and the method of study emerge as closely linked to each other" (DHF, p. 68).

How to begin? The psychologies of Vygotsky's day offered few leads. Cultural psychology was concerned with the products, not the processes, of cultural development. Traditional approaches in child psychology, including experimental psychology, did not recognize the separate status of cultural forms of behavior and offered neither concepts for thinking about them nor techniques for their investigation. It seemed necessary to

begin at the beginning, with information about actual forms of cultural behavior. Where could one turn to find such material? Because the history of higher functions appears twice, once in child history and once in general history, it might appear that information derived from either of these two sources would serve as a suitable point of departure. Not so, says Vygotsky. We cannot follow the obvious path of sifting through the thousands of accumulated facts on child behavior, because this behavior is the product of two lines of development, the natural and the cultural, fused into a "common although complex process" (DHF, pp. 37). The two can be disentangled through a process of abstraction, but such a process empties child development of the concrete content the theory builder needs. The way out of the difficulty is to turn to facts of behavior that are the product of the cultural line of development exclusively; these are to be found in the data of ethnic psychology, where higher psychological functions appear before our eyes in clear outline (DHF, p. 44). In phylogenesis,

> both these processes – that of the biological and cultural development of behavior – are represented as independent and self-sufficient lines of development.
> . . .Therefore we must turn to phylogenesis which shows no such unification and fusing of both lines so as to untie the complicated knot inherent in child psychology (DHF, p. 36, 37).

As this passage reveals, it was not only to demonstrate the validity of a historical materialist approach that Vygotsky ventured into folk psychology. His excursion was obligatory for methodological reasons: "For the clarification of the basic concepts. . .must by necessity, considering the present level of our knowledge of this issue, base itself on an analysis of how man's psyche developed during consecutive stages of historical development" (DHF, pp. 37, 38).

We now have an additional answer to the question that motivated this exploration of Vygotsky's approach: Why does Vygotsky place such emphasis on the facts of primitive life as the ethnopsychology of his day revealed them? They were the only available source of evidence about changing human behavior that could be used for a psychological analysis of the cultural development of behavior, or, what to Vygotsky was the same thing, the development of cultural forms of behavior. Ethnopsychological material was the only available source because Vygotsky's ideas about two lines of development in ontogeny precluded his use of facts of child behavior for this purpose until they were refracted through the evidence of general history.

This is a broad answer. But we can be more precise in Vygotsky's uses of historical data. He turned to ethnopsychology for discovery purposes and, if we follow his account, we can determine what discovery he made there.

What follows is my logical reconstruction of Vygotsky's steps in building a method for the study of formation of cultural behavior. (We have no way of knowing, of course, whether or not the logical order coincided with the chronological order in which he actually carried out the work and developed his ideas.)

Constructing a model: general history as the middle link

Beginning with Vygotsky's stated goal of achieving a complete dynamic analysis of higher psychological systems, encompassing their genesis, structure, and function, we can identify four moments in his theory-building procedure. The first concerns the discovery of the structure of higher psychological systems. Although Vygotsky tells us he must turn to ethnic psychology to untie the knot in child psychology, in fact he begins to untie the knot with observations about the behavior of *contemporary*, not primitive, adults! As Vygotsky presents it, his starting points were little noticed, but everyday cultural forms of behavior. Certain phenomena, trivial in themselves, are significant to the psychologist for revealing in pure form the defining properties of all higher systems of behavior. Vygotsky called these phenomena "rudimentary forms" – vestiges of behavior developed early in cultural history, now functioning as "living fossils" removed from the contexts that gave them social meaning but valuable as prototypes or blueprints for study. Vygotsky singled out three such rudimentary cultural forms for analysis: casting lots, tying knots, and counting fingers. Each reveals the tripartite structure of cultural forms of behavior consisting of environmental stimulus and response and a human-created symbolic stimulus mediating between the two. Casting lots represents a situation in which a person creates an artificial stimulus to determine her choices in a situation in which a response is blocked by two equipotent and opposing stimuli; tying knots exemplifies the invention of a stimulus to ensure retrieval of information when it is needed; finger counting is the adaptation of always-available objects to support intellectual procedures with a high potential for inaccuracy. Each form reveals the "key to higher behavior" (DHF, p. 129) – the transition point in which the species became human by creating symbolic means to master its own activity.

These rudimentary forms, however, have been superceded in modern societies by different forms of symbolic mediation. Although they are useful in helping the psychologist identify the structural components of higher systems and the primary instrumental function of signs, they cannot reveal their own future. To determine how rudimentary forms change to new

forms requires a shift away from observations of everyday contemporary behavior to another domain of behavior. It is at this point, the second moment of theory building concerned with the transformation of structures, that the stuff of general history plays a critical role. At least with respect to some psychological functions, sufficient information is on hand to permit reconstruction of the phases of transformation through which rudimentary forms pass on the way to becoming higher systems. Examining the evidence from ethnopsychology, Vygotsky found that the history of transformation appears similar for various systems of higher behavior. External means of regulation of behavior (e.g., knots) "go inward," passing through a series of stages until symbolic regulation has an entirely intrapsychological form. In this sequence of interiorization, Vygotsky believed he had found a model of the formation of higher psychological functions that might apply to the cultural line of development in ontogeny as well as history. Such a model, of course, was hypothetical, since it was derived by the interpretative mode from documentary evidence. To be established as a scientific scheme, it required testing and elaboration. Observation of child behavior was not the optimal method of test for the reasons that limited the usefulness of facts of child behavior as a method of discovery in the first place: The fusion of two lines of development in child behavior conceals the pure form of cultural development.

Vygotsky's genius now takes hold – the historical sequence can serve as a model for an aritificially evoked process of change in children, a process evoked through experimental means. If children of different ages are used as subjects and the experiment is appropriately set up [see chapter 5 in Vygotsky (1978)], the investigator will be able to follow the way in which children make the transition from rudimentary to higher psychological forms. The experiement will reveal in "pure and abstract form" (DHF, p. 130) how cultural development proceeds in ontogeny.[4] In the terms in which we have been laying out the logic of Vygotsky's procedure, the experimental–genetic method constitutes the third moment of theory building and the source, Vygotsky claimed, of the richest and most vital evidence. The experiment reveals the very essence of the genetic process. By its means, we can witness the drama of the formation of human nature unfolding according to its own laws of development.

Leont'ev's (1964) research on memory development is an especially clear example of the movement from ethnopsychological to experimental data that we have just described. His introduction to that research begins with a review of the phylogenetic history of human memory that traces the creation and elaboration of external signs as memory aids in history and their replacement by self-generated signs or behaviors that are solely internal. He presents this progression as conjectural. It serves only as a

"hypothesis" for experimental investigations, whose task is to reproduce artificially under laboratory conditions the process of development of memory (Leont'ev, 1964).

At this juncture, material on the behavior of primitive humans does not represent as great a leap from descriptions of child behavior as the passages quoted so far first suggested. From a systematic point of view, primitive history comes into play to supplement knowledge of certain forms of behavior among contemporary adults with information about adults in earlier times. Ethnopsychology is thus related to child psychology only indirectly through the scheme it presents of how rudimentary cultural forms develop into higher forms.

The rudimentary functions. . .furnish us with a fulcrum for the historical approach to the higher psychological functions and for establishing a link between the psychology of primitive man and that of man's higher psychology. At the same time they furnish the scale by which we may transpose the data of ethnic psychology to experimental psychological research. (DHF, p. 104)

In the present interpretation, the stuff of general history prepares the way for experimental modeling of higher psychological systems. What about the stuff of child history? Observations about the actual developmental progress of contemporary children constitute the fourth moment of theory building. Vygotsky believed that models emerging from experimental studies are, of necessity, schematic and simplified (DHF, p. 221). The experiment fails to inform us about how higher systems are actually realized by the child; an experimentally induced process never mirrors genetic development as it occurs in life (Vygotsky, 1962, p. 69). Nor do experiments capture the rich variety of child behavior in the many settings in which children grow up and acquire culturally elaborated means made available to them in their particular social milieus. Although the experiment models the process, concrete research is required to bring the observations made there into harmony with observations of naturally occurring behavior. Child history provides the material to corroborate or correct the model and reveal how higher processes are formed in everyday activities (DHF, p. 222). Thus Vygotsky begins with and returns to observations of behavior in daily life to devise and test models of the history of higher systems. Starting from behavioral observations of contemporary adults, he moves to observations of primitive adults documented in ethnopsychological records and then, by way of experiment, to behavioral observations of children in modern times.

Vygotsky's sociohistorical approach turns out on analysis to be not only the foundation of his theory of development but a crucial element in his methodology as well. With this in mind, we can understand his somewhat

scornful comment that only "sloth" (DHF, p. 48) would assimilate his
theory to recapitulationist or parallelist positions. A final verdict is not yet
in. But whatever ambiguities his works present, it is clear that he used
ethnopsychological material principally for heuristic purposes. Vygotsky
was advancing a complicated proposition for psychologists to consider:
Look to cultural history for hypotheses about the origin and transforma-
tion of higher functional systems. His work may be read as an attempt to
weave three strands of history – general history, child history, and the his-
tory of mental functions – into one explanatory account of the formation of
specifically human human aspects of human nature.

Conclusions: extending the historical approach

Our analysis of Vygotsky's historical approach was motivated by current
concerns in research on cultural variations in thought. Sociocultural
changes are not a matter of past history but constitute a major condition of
life in our times. Whereas investigators of cultural influences on thought
have tended to concentrate their studies in traditional societies, new
cultural means are being elaborated at an accelerating rate in indus-
trialized nations as well. Hardly have we approached the problem of
understanding the intellectual impact of the printing press (Eisenstein,
1979) than we are urged to confront the psychological implications of com-
puterization (Tikhomirov, 1981). Technological and social changes occur-
ring in all societies create a need for comprehensive theories of learning
and development; at the same time they provide the context for fundamen-
tal research that can contribute to those theories and to more effective pro-
grams of education.

For these reasons, it would seem shortsighted to look upon Vygotsky's
sociohistorical approach as past achievement rather than as guide to the
present. In what ways might we enhance the usefulness of this framework
for contemporary cognitive science? One step is to arrive at a more balanced
interpretation of Vygotsky's views on cultural differences in thought and a
better appreciation of his methodology. Most of this chapter has been
directed to that end. However, our analysis also points to certain inade-
quacies in Vygotsky's historical approach that may limit its current ap-
plication. We might more accurately describe these as "incompletenesses."
Some of the theoretical ambiguities we have noted seem paradoxically to
result from Vygotsky's failure to use the historical approach to the fullest:
He did not encompass the full range of "phenomena in movement" on
the level of either general history or individual history.

Consider general history. In Vygotsky's theory, this history appears as a
single unidirectional course of sociocultural change. It is a world process

that informs us of the genesis of specifically human forms of behavior and
their changing structures and functions in the past. For Vygotsky's model-
building purposes, it might have been sufficient to look back at history and
view it in this way as one stream of development. But for purposes of con-
crete research, and for theory development in the present, such a view
seems inadequate. Societies and cultural groups participate in world his-
tory at different tempos and in different ways. Each has its own past history
influencing the nature of current change. Particular societies, for example,
may adopt the "same" cultural means (e.g., writing system) but, as a result
of their individual histories, its cognitive implications may differ widely
from one society to the other. Saxe (1982) provides a dramatic example in
his studies of the Oksapmin people of Papua New Guinea. Until recently,
this aboriginal group relied exclusively on a rudimentary number system
based on body parts to carry out simple quantitative operations needed in
daily life. Saxe documents how the organization of the system is changing
as a result of new occupational and trading activities. At the same time that
this ancient system is undergoing modifications, indications are that the
Oksapmin will soon be learning to use hand-held calculators to keep
accounts in the number of trade stores in the country (Edwards, 1981).
Americans are also learning to use hand-held calculators that are displac-
ing highly routinized paper-and-pencil calculations that have long dom-
inated arithmetic practice in school and personal life. In world history,
written arithmetic precedes electronic arithmetic, and there is only this one
course of cultural development. This sequence, however, is realized in
United States history but not in Oksapmin history. Would we expect psy-
chological implications of computer use to be equivalent in the two
societies? Could this question be appropriately addressed in empirical
research based on the world history model alone?

Many such discontinuities come to mind, but the import of this single
comparison is clear. Individual societal histories are not independent of
the world process, but neither are they reducible to it. To take account of
this plurality, the Vygotskyian framework needs to be expanded to incor-
porate a "fourth-level" of history – the history of individual societies. [For a
discussion on issues in integrating the history of human society in general
with the history of individual societies, see Semenov (1980).]

This expansion of the scheme would have the added advantage of firmly
anchoring all studies of social and psychological change in the present.
"The most primitive of now living tribes" is a member of a live culture and
not a past one. This means that hypotheses about psychological change
need to be informed by knowledge of conditions in cultures here and now,
and not derived solely from historical reconstructions.

Now let us turn to the level of individual history. In Vygotsky, as in other

classic developmental theories, ontogeny stops with the attainment of adolescence. Biological theories of parallelism, as we have pointed out, also work with this truncated ontogenetic sequence; perhaps there is some justification for this practice in biology inasmuch as maturational processes are most marked in early life stages. But what is the justification for a restricted individual biography in a psychological theory emphasizing the "cultural line of development"? Vygotsky himself said that it is not until adolescence that the "problems of cultural psychology" clearly emerge (DHF, p. 26). Whatever one's views about the nature of maturational processes in childhood, it is certain that in youth and adulthood normal psychological change is not attributable to these processes. Flavell (1970) described adulthood as a pure experiment in nature of the effect of experience, and Vygotsky acted on that concept when he resorted to observations of adult behavior to develop his experimental schemes. It is fascinating to consider why Vygotsky's group did not follow through on the logic of the method – why, with the exception of Luria's cross-cultural studies, adults dropped out of the research program. Whatever the reasons, opportunities are now present to fill in the missing link of adult cognitive change.

Basic theoretical questions are at issue. Do adults acquire new sign-systems and new sign-mediated functions in the same way as children? For example, is the learning-to-read process the same for adults with fully developed language competencies as for children? (Weber, 1977). Will Oksapmin adults and children assimilate calculators into their problem-solving routines differently? Does cognitive change in adults proceed in all cases, as with children, from the social interpsychological to the intrapsychological plane? Opportunities to investigate such questions are multiplying and, compatibly, so are the interests of developmental psychologists and educators in extending research to encompass the entire life span. It seems desirable, therefore, to enlarge Vygotsky's framework by replacing "child history" with "life history."

When we incorporate these revisions into Vygotsky's scheme, we have a historical framework consisting of four levels of "culture development" (depicted in Figure 1) in which to locate particular theoretical and research questions. It is customary for investigators concerned with culture and thought to single out for emphasis one or another level of change as seems suitable for the inquiry at hand. Psychologists, for example, tend to conceive of the individual as a dynamic system while assuming in their research designs that history on the societal level is static; anthropologists often make the reverse assumption. When Vygotsky turned his attention to specific topics of child development [e.g., play (Vygotsky, 1978)], he also followed the practice of assuming that only child history was in movement
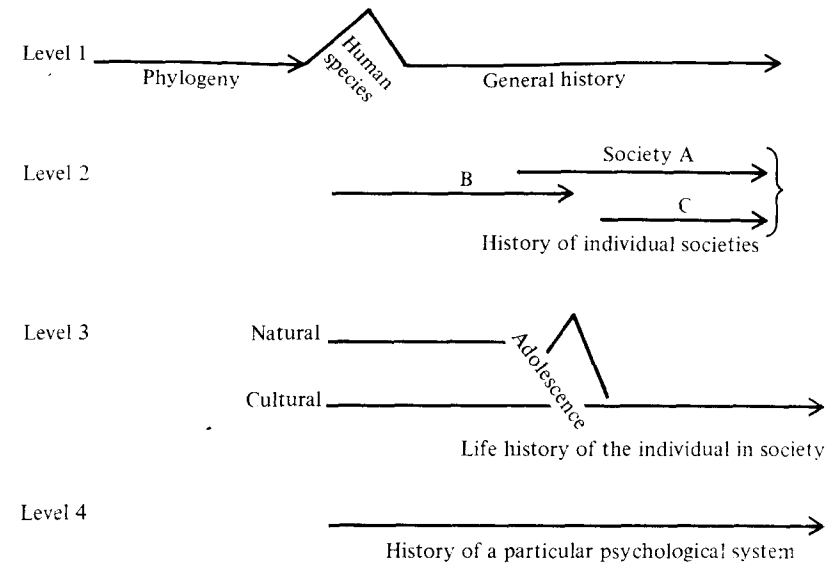
Figure 1. Vygotsky's levels of history – a modified scheme. (As explained in the text, we have modified the scheme to include level 2 and to extend level 3 to encompass adulthood.)

and other lines of cultural development remained constant. Extracting one process of change for study in this manner is a useful and often necessary technique. But Vygotsky's work in its totality makes clear the levels of cultural development are interrelated, that they are proceeding concurrently and mutually influencing each other. His framework is thus a useful guide for researchers who, increasingly today, confront the need to deal simultaneously with more than one level of change. Life-span developmental psychologists, for example, are challenging the dominant view that individual change can be studied independently of sociocultural change. Over a long period of time, the assumption of social stasis is untenable; an eighth-grade education may have been the national norm of half-century ago, but a high school education is the norm today. In this new field, investigators are devising and testing new techniques for studying concurrent changes in individual and social histories (see Schaie, Labouvie, and Buech, 1973).

Cross-cultural researchers are also discovering that presuppositions about the independence of individual and cultural change may need scrutiny. The typical paradigm for studying cognitive development cross-culturally assumes that in each society some stock of cultural means– language, number systems, and the like – is in place and has been mastered

by adults who then, informally or formally, help children achieve competency in these systems. As our earlier discussion of Oksapmin society indicated, such assumptions may be unwarranted. We reported that in this aboriginal culture, three arithmetic systems may be competing with one another in the near future – the indigenous body-parts number system (itself undergoing change), paper-and-pencil school arithmetic, and calculator arithmetic. Parents may be shifting over from one or another system or devising inventive combinations of several systems at the very time their children are acquiring their first number concepts. A simple transmission model with arrows running from adult to child seems insufficient here. Novel questions arise. One might ask how adult–child dyadic learning relationships are affected when both members of the dyad are novices and are acquiring new number facts and computation skills together. Or we might want to inquire into the development of "binumeracy" (drawing an analogy with biliteracy) among adults and children and investigate how uses of one or another number system are influenced by the characteristics of the particular arithmetic tasks that Oksapmin now encounter in their communities. We might be concerned to document whether social pressures are being generated for conversion to a modern number system at a faster rate than some adults are prepared to accept and what consequences such a situation might have for their children's learning progress.

These are among the intriguing questions posed by a consideration of Vygotsky's uses of history. Vygotsky presents us with a mode of theorybuilding that calls for the integration of all levels of history into one explanatory account of the sociohistorical formation of mind. Few may be ready to concern themselves with such a grand design, but whatever our disciplinary backgrounds, many of us will find it profitable to follow Vygotsky's invitation and explore new ways of bringing an historical perspective to the study of human nature.

NOTES

1 My major sources were English translations of unpublished manuscripts by Vygotsky. One is a collection of essays under the title "Tool and Symbol in the Development of the Child" (referred to as T&S), and the second is the booklength manuscript "The Development of Higher Mental Functions" (referred to as DHF). Most of "Tool and Symbol" and some sections of "The Development of Higher Mental Functions" are available in published form in Vygotsky (1978). An abridged version of "The Development of Higher Mental Functions" is included in Leont'ev, Luria, and Smirnov (1966); Wertsch (1981) has a complete text of Vygotsky's chapter 5. The views I have credited to Vygotsky

are all expressed in these published works, but I have followed the practice of citing the manuscripts because these contained his fullest discussion of methodological choices.

In preparing this chapter I found that Vygotsky's essays in *Thought and Language* [published in English as Vygotsky (1962)] could not easily be integrated with material in the other manuscripts. *Thought and Language* contains Vygotsky's writings on generalization and the semantic structure of consciousness; in these essays, he presents *word meaning* as a critical unit of analysis for the psychology of thought. In "Tool and Symbol" and "The Development of Higher Mental Functions," on the other hand, Vygotsky deals with the role of speech and other sign systems in intellectual operations and treats higher psychological systems as a unit of analysis for developmental psychology. Piaget's distinction between figurative and operative aspects of thought comes to mind, though I do not mean to imply that this classification is appropriate for Vygotsky's work. As additional writings become available, Vygotsky scholars may achieve a better integration of these approaches. For my purposes, I thought it best to confine my account to the two works on higher mental systems because it is in these that Vygotsky engages in the most extensive discussion of methodology.

Because of these limitations in source material, the interpretation I present here has to be considered incomplete.

2 Vygotsky's terminology presents a number of problems, some of which I have flagged in the text. He uses the terms "historical development" and "cultural development" interchangeably. On some occasions he uses the term "phylogeny" to refer to the biological evolution of species and distinguishes this sequence of development from general history. But, on other occasions, he uses "phylogeny" in a superordinate sense to encompass both biological and historical development. In discussing child development, Vygotsky sometimes contrasts the *biological* and cultural lines of change, and at other times draws the contrast between *natural* and cultural lines. Wertsch (pers. commu.) believes that Vygotsky was not consistent in his use of the term "natural": "Sometimes he equated it with biological phenomena, but sometimes it also seems to have included elements of what Piaget would later call sensorimotor intelligence."

3 Luria's studies appear to have been inspired principally by Vygotsky's work on concept formation and generalization, as reported in *Thought and Language*, rather than by the work on higher mental functions [see account in Luria (1971)]. Vygotsky's treatment of concept formation seems to imply a stronger developmental approach to sociohistorical changes in thought than do his other writings, but further analysis is needed.

4 The account given here of the methodological significance of Vygotsky's experimental–genetic studies is substantially the same as that presented by El'-konin (1967). He asserts that the aim of Vygotsky's research was modeling, rather than empirically studying, developmental processes. But he also observes that this interpretation has not been widely recognized.

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