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L. S. Vygotsky

THE GENESIS OF HIGHER MENTAL FUNCTIONS

Editor's Introduction

Here Vygotsky covers several of his major themes, including genetic explanation, the social origins of cognition, internalization, and the role of sign systems in mediating human thinking. As noted previously, these themes have come to play an important role in the theory of activity.

Vygotsky begins this paper with an analysis of the nature of genetic explanation. He takes into account both historical and ontogenetic forms of development and argues that an understanding of mental phenomena must be based on an understanding of their origins and evolution. He devotes several pages to analyzing the very notion of development, since he thought that many psychologists had false ideas about its nature. Specifically, he criticizes analytic approaches based on the preformism he saw underlying much of the thinking in developmental psychology. He also rejects the notion that the ontogenesis of higher mental functions consists simply of a steady process of quantitative increments in the child's knowledge; in contrast to this, he claims that sudden, qualitative, "revolutionary" shifts play an important role. He argues that rather than try to ignore these qualitative shifts in development — as if they were disruptions in the otherwise smooth progression that constitutes development — the investigator should give

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them a major place in genetic explanation.

The most important of these qualitative shifts in ontogenesis is concerned with the introduction of cultural means of mediation into what were formerly "natural" processes. The use of cultural sign systems plays an especially important role in this qualitative shift. The introduction of these sign systems into the child's functioning in areas such as memory and problem solving changes the nature of these processes in a fundamental way. There are a massive disruption and a restructuring of the child's mental processes at this point. There may even be a temporary decrease in the level of functioning; but after the psychological processes have been restructured as a result of acquiring sign systems, the process (e.g., memory) becomes much more powerful in the cultural milieu in which it will be called upon to operate.

In what we have covered so far there are two ways in which the ideas expressed in the present work are direct reflections of Marx's ideas. First, Vygotsky stressed that the explanation of a phenomenon in social and psychological realms must rest on an analysis of its origins and development. Just as Marx argued that an analysis of society must be based on a knowledge of the socioeconomic history of that society, Vygotsky claimed that an analysis of an individual's mental processes must be based on a knowledge of the earlier stages through which he/she has gone. Second, Marx emphasized that although a society may develop over long periods of time by making quantitative increments (e.g., from an earlier form of capitalism to a later one), fundamental qualitative shifts will occasionally take place and will restructure the entire society. These revolutions are a necessary and important aspect of history. In the present paper Vygotsky uses the notion of revolution in his argument against theories of child development that view ontogenesis as a steady stream of quantitative increments in mental functioning.

Perhaps the most interesting argument Vygotsky makes in this paper (and in the paper on voluntary attention) is concerned with the social foundations of cognition. As noted in the introduction to this volume, this is one of the key ideas in the theory

of activity. Vygotsky proposed that higher psychological processes carried out by individuals are direct reflections of social processes in which the individual participated at an earlier stage of ontogenesis. In the terms of the present paper, higher mental functions are first carried out on the "interpsychological" plane and only later on the "intrapsychological" plane. Of central concern are the social processes used by one party to control another in social interaction and how these regulative processes are taken over by the individual child, allowing him/her to function as an independent cognitive agent. As Vygotsky puts it, "... the very mechanism underlying higher mental functions is a copy from social interaction. All higher mental functions are internalized social relationships."

Vygotsky's interpretation here of higher mental functions in terms of control or regulation has much in common with what has recently been studied in the West under headings such as "executive routine," "metacognition," etc. However, Western investigators have usually limited their attention to the functioning of the individual once he/she has begun to operate as an independent cognitive agent. They have not examined the social origins (at the interpsychological level) of these cognitive processes. Thus, a major point that distinguishes Vygotsky's approach from many of those in the West is his emphasis on the notion that the structure of processes on the intrapsychological plane is a reflection of the way processes are carried out on the interpsychological plane.

An important point to note about Vygotsky's ideas on the social origins of cognition is that it is at this point that he uses the notion of internalization. He is not simply claiming that social interaction leads to the development of the child's abilities in problem solving, memory, etc.; rather, he is saying that the very means (especially speech) used in social interaction are taken over by the individual child and internalized. Thus, Vygotsky is making a very strong statement here about internalization and the social foundations of cognition.

In summary, in terms of the features of the theory of activity, we can see that among other things, Vygotsky is concerned in

this paper with how one must use a genetic analysis to understand how higher mental functions are the mediated, internalized result of social interaction.

J.V.W.

The third aspect of our investigation is most closely concerned with our historical way of viewing higher forms of behavior. The analysis of higher mental processes aids us in understanding fundamental problems of the child's cultural development. It allows us to analyze the genesis of higher behavioral forms, i.e., the mental forms that constitute the object of our study.

According to Hall, psychology produces a genetic explanation of a higher form of logic: it is concerned with the question of where a given phenomenon is going and from whence it came. It is also concerned with the results of future transformations.

For the developmental psychologist the historical form of explanation is the highest possible. In order to answer the question of what a form of behavior represents, he/she finds it necessary to discover its origin and the history of its development up to the present. In Blonsky's words, behavior can be understood only as the history of behavior.

But before turning to the genesis of higher forms of behavior, we must elucidate the very concept of development, as we have done in the chapters [of our book] on the analysis and structure of higher mental processes. The fact is that because of the crisis in psychology, all concepts have become meaningless and vague. They change depending on the investigator's point of view. In different systems of psychology based on different methodological principles, all the fundamental categories of research, including that of genesis, acquire different meanings.

A second consideration that compels us to look at the genetic problem is that contemporary psychologists have not yet come to appreciate the unique nature of the development of the higher forms of behavior that are the object of our research. The child's cultural development, as we have already tried to establish, represents a completely new level of development, which

not only is insufficiently studied but is usually not even distinguished in child psychology.

If we turn to the concept of development as it is used in modern psychology, we see that it still contains many problems that must be overcome. The first such problem, a regrettable vestige of prescientific thought in psychology, is latent, residual preformism in the theory of child development. Old ideas and mistaken theories that disappear from science leave traces and remnants in the habits of thought. In spite of the fact that we long ago rejected the view that children are distinguished from adults only by the proportions of their bodies — in scale and size — this idea continues to exist in subtle form in child psychology. No essay in this field can now openly repeat the long-rejected falsehood that the child is an adult in miniature, but this view is nevertheless retained to this day in hidden form in almost every psychological investigation.

It is sufficient to say that the most important aspects of child psychology, such as study of memory, attention, and thought, are, in our estimation, only beginning to escape from this dead end and to recognize the process of psychological development in all its real complexity. But in the vast majority of cases, scientific research latently continues to maintain a view that would explain the child's development in purely quantitative terms.

Such a view was once adhered to in embryology. A theory based on this view is called "preformism" or a "theory of preformation." Its essence consists of the doctrine that the embryo contains an organism that is completely finished and formed in advance. The only difference is that it is of a smaller size. For example, according to this theory, the entire oak tree with its roots, trunk, and branches is contained in the acorn, the only difference being that it is an oak in miniature. With regard to humans, it is assumed that the fully formed human organism, in a much smaller form, is contained in the human seed.

From this point of view, the whole developmental process can be represented very simply: it consists purely of a quantitative increase in the size of what exists from the very beginning in the embryo. The embryo gradually grows and in this manner is converted into a mature organism. This point of view was abandoned long ago in embryology, and is of only historical interest. Meanwhile, in psychology it continues to exist in practice despite the fact that in theory it was long ago abandoned in this discipline as well.

From a theoretical standpoint, psychology long ago gave up the idea that the child's development is a purely quantitative process. Everyone agrees that the process is much more complex, and is not confined to quantitative changes alone. But in practice psychology still has not discovered the complex process of development in all its real fullness and has not identified all the qualitative changes and conversions involved in the child's development.

Claparède is quite correct when he says in his preface to Piaget's research that the problem of the child's thought is usually posed in purely quantitative terms in psychology and that only new work will permit us to redefine it as a qualitative problem. He points out that former analyses of the child's intellectual development usually relied on several additions and subtractions, the growth of new experience, and liberation from some mistakes. Modern investigations reveal to us that the very nature of the child's intellect gradually changes.

If we wanted to characterize in one general principle the basic requirement the problem of development poses for modern research, we would say that this requirement is that one must study the positive aspects of the child's behavior. This notion is in need of some further clarification.

Up to the present, all the psychological methods applied to the investigation of the normal and abnormal child's behavior, despite all the great variation and differences that exist among them, have one feature in common: negative characterization of the child. All of these methods tell us about what the child does not have or what is lacking in the child compared with the adult. In the abnormal child these deficiencies are specified in terms of the normal child. We are always confronted with a negative picture of the child. This does not tell us anything

about the positive features that distinguish the child from the adult and the abnormal from the normal child.

Psychology is now confronted with the problem of how to capture these features in the child's behavior in all their richness and how to give a positive picture of the young individual. But this positive picture becomes possible only if we change our idea of child development in a fundamental way and if we take into consideration the fact that it represents a complex, dialectical process characterized by a multifaceted, periodic timetable, by disproportion in the development of various functions, by metamorphoses or qualitative conversion of one set of forms into others, by complex combinations of the processes of evolution and involution, by complex mixing of external and internal factors, and by the process of adaptation and surmounting difficulties.

The second feature that must be overcome in order to clear the way for modern genetic research is latent evolutionism, which even now continues to rule in child psychology. Evolution, or the development by means of gradual and slow accumulation of various changes, continues to be considered the only form of child development to account for all the known processes that enter into the composition of this general concept. In discussions of child development there is a latent analogue with processes of plant growth.

Child psychology does not want to know about the sudden, violent, and revolutionary changes that appear throughout ontogenesis and that are so often encountered in the history of cultural development. To naïve observers, revolution and evolution do not appear to coincide. Historical development seems to proceed along a straight path. When a revolution, the rupture of the historical fabric, or a leap occurs, naïve observers see nothing but catastrophe, gaps, and precipices. For them, historical progression stops at this point until it alights anew on a straight and smooth path.

Scientific observers, on the other hand, consider revolution and evolution as two mutually connected forms of development that presuppose one another. They see the sharp changes in

the child's development that occur simultaneously with other, similar changes as the determining point in the whole line of development.

This position has special significance for the child's cultural development. As we shall see later, cultural development to a large degree results from such critical and uneven changes that arise in the child's development. The very essence of cultural development is in the collision of mature cultural forms of behavior with the primitive forms that characterize the child's behavior.

The immediate outcome of this is a change in the usual point of view about children's mental development and a change in the idea of the nature of its structure and flow. Usually, all the processes of child development are represented as smoothly flowing processes. In this sense embryological development is considered to be the standard form or model with which all other forms are compared. This type of development depends heavily on the external environment. The word development in its literal sense can be related most correctly to this, i.e., the unfolding of the possibilities contained in the undeveloped embryo. But, embryological development cannot be considered the model of any process of development, in the strict sense of the word: it could more readily be presented as its result or sum. It is already a settled, finished process that proceeds more or less smoothly.

One needs only to compare, as Darwin did, the evolution or emergence of animal species with embryological development to see the fundamental distinction between one type of development and another. Species have emerged and have become extinct; they have undergone modification and have developed in the struggle for existence during the process of adapting to the surrounding environment. If we wanted to draw an analogy between the process of child development and some other process of development, we would be more likely to choose the evolution of animal species than embryological development. Child development is least of all like a smooth process sheltered from external influences. The child develops and changes in his/her

active adaptation to the external world.

New forms emerge in this process, which does not simply involve a stereotyped reproduction of chains formed in advance. Any new stage in the development of the embryo, which is already contained in potential form in the preceding stage, arises as the unfolding of these inner potentialities. This is not so much the process of development as a process of growth and maturation. This type of process is also represented in the child's mental development. But in the history of cultural development, a second type of process occupies a much larger place. This process consists of having a new stage arise not from the unfolding of potentials contained in the preceding stage, but from actual collision of the organism and the environment and from active adaptation to the environment.

In modern child psychology we have two basic points of view on the process of child development. One of these goes back to Lamarck; the other, to Darwin. Bühler correctly says that one must view Koffka's book on the psychology of child development as an attempt to give Lamarck's idea modern psychological expression. The essence of this point of view is that in explaining lower forms of behavior we should use a principle that we usually use to explain higher forms of behavior, whereas, until now, psychologists have relied on principles used to explain primitive behavior to analyze a higher level. But the author states that this method has nothing in common with anthropomorphism. One of the important methodological achievements of modern psychology is the establishment of the extremely important difference between naïve and critical anthropomorphism.

While the naïve theory equates the functions at various levels of development, critical anthropomorphism begins with higher forms we know about in humans and traces the same psychological structure and its development further down the ladder of psychological development. The works of Köhler and Koffka are examples of this latter approach. These important exceptions notwithstanding, present theories simply transfer the explanatory principle found in the investigation of higher forms of behavior to the study of lower ones.

In contrast to this, Bühler looks on his work in child psychology as an attempt to continue Darwin's idea. Although Darwin knew only one area of development, Bühler points out two new areas that, in his opinion, corroborate Darwin's principle of selection. True, Bühler tries to combine Darwin's point of view with Lamarck's, using Hering's words: "From two theories — Lamarck's and Darwin's — developed with ingenious unilaterality, one general picture of the history of the development of all living things emerged for me. What happened with me was what happens when looking through a stereoscope. At first, one receives two impressions, which cross and contend with one another. Initially, they do not suddenly unite into one clear figure in three dimensions."

Continuing this simile, Bühler says: "Neo-Darwinism without Lamarck is too blind and immobile; but without Darwin, Lamarck does not arrive at the diversified richness of living forms. The theory of development will make a genuine step forward when it becomes more evident than it has up to now in child psychology how these two investigators are connected with one another."

Thus, we see that there is no unified concept of child psychology in the minds of various investigators. In Bühler's study it seems to us that his idea of different areas of development is extremely fruitful. Darwin himself said that he knew essentially only one area, but Bühler pointed out three distinct areas. In Bühler's opinion, the development of behavior goes through three basic stages and consists of the fact that there is "a change in the place of selection." Darwinian adaptation is accomplished by the elimination of less favorably organized individuals. Here we are talking about life and death. Adaptation by training is completely internal to the individual. It sorts out old modes of behavior and creates new ones. Its field of action is the area of bodily activity; and its cost is no longer life, but surplus body movements that are dissipated by the same means as in nature.

Bühler points out the further possibility of development. If bodily movements are still too costly or for some reason in-

sufficient, the field of action selection must be transferred to the area of representation and thoughts.

Bühler writes, "It is necessary to reduce both higher forms of human invention and discovery and the most primitive ones with which we are acquainted in the child and the chimpanzee to one common denominator and to understand their equivalence." Hence, the concept of internal probing or probes in thought, which are equivalent to a probe of an object itself, allows Bühler to extend Darwin's formula for selection to the whole field of human psychology. The emergence of the principle of selection, which is useful in three different spheres (instinct, training, and intellect) or fields of action, is explained by starting from one principle. This idea, in my opinion, is a consistent extension of the modern theory of development in the Darwinian tradition.

I should like to dwell in a bit more detail on this theory of three stages in the development of behavior. It really includes all of the most important forms of behavior, distributing them in accordance with three stages on the evolutionary ladder. Instinct, or the innate, inherited fund of behavioral modes, forms the first stage. The second stage consists of what Bühler called the stage of training or the stage of habits or conditioned reflexes, i.e., conditioned reflexes mastered and acquired in personal experience. Finally, and still higher, we have the third stage, the stage of intellect or intellectual responses that fulfill the function of adaptation to new conditions. In Thorndike's words, these constitute the organizing hierarchy of habits used for solving new problems.

The third step in this scheme has up to now remained debatable. It is the most complex and the least studied. Many authors try to limit the whole scheme of development to two stages, arguing that intellectual responses can be considered as especially complex forms of habits and therefore should not be isolated as a special class. It seems to me that contemporary experimental research provides solid foundations for considering this argument settled in favor of recognizing a third class. The intellectual response, characterized by several

essential features in origin and functioning, even in the area of animal behavior, as Köhler's research showed, cannot be put in the same class as the mechanical formation of habits resulting from trial and error.

True, we must not forget that the stage of intellectual responses is very closely connected with the second stage in the development of behavior and relies on it. But this is a general phenomenon that applies equally to the second stage in the development of behavior.

In my opinion, one of the most fruitful theoretical ideas genetic psychology has adopted is that the structure of behavioral development to some degree resembles the geological structure of the earth's core. Research has established the presence of genetically differentiated layers in human behavior. In this sense the geology of human behavior is undoubtedly a reflection of "geological" descent and brain development.

If we turn to the history of brain development, we see what Kretschmer calls the law of stratification in the history of development. In the development of higher centers, "older, lower centers do not simply fall by the wayside. Rather, they work further in the general union as subordinated centers under the direction of higher ones so that, in the undamaged nervous system, it is usually impossible to define them separately."

The second pattern in brain development is what can be called the transition of functions from below upward. "The subordinated centers do not fully retain their original type of functioning. Rather, they relinquish an essential part of their former functions to the new centers above them." Only when the higher centers are damaged or their functioning is weakened does the "subordinated structure become independent and show us elements of its former type of functioning that have been retained."

Thus, we see that the lower centers are retained as subordinated structures in the development of higher ones and that brain development proceeds in accordance with the laws of stratification or construction of new levels on old ones. The old level does not die when a new one emerges, but is copied by the new

one and dialectically negated by being transformed into it and existing in it. Instinct is not destroyed, but "copied" in conditioned reflexes as a function of the ancient brain, which is now to be found in the new one. Similarly, the conditioned reflex is "copied" in intellectual action, simultaneously existing and not existing in it. Two equally important problems confront science: it must be able to distinguish the lower stages in the higher, but it must also be able to reveal how the higher stages mature out of lower ones.

Werner has recently proposed that the behavior of the modern, cultural, adult human can be understood only "geologically," since various genetic layers, which reflect all the stages through which humans have traveled in their psychological development, are preserved in it. He says that psychological structure is characterized by not one, but several layers deposited on one another. Therefore, in a genetic examination even the individual displays certain phases in behavioral development that have already been completed genetically. Only a psychology based on elementary units sees human behavior as a united, closed sphere. Contrary to this, modern psychology is establishing that humans display various genetic states in their behavior. Werner sees the disclosure of this genetic, multilayered behavior as the main problem for modern research.

Blonsky's entire book Psychological essays is based on such a genetic analysis of human behavior. The new idea included in it is that everyday human behavior can be understood only by disclosing the presence of four general fundamental genetic stages through which behavioral development passes. Blonsky distinguishes sleeping life as the primitive state of life, primitive awakening life, life of incomplete awakening, and fully awakened life. This unified genetic scheme embraces both everyday human behavior and the history of its development, which spans many thousands of years. It would be more accurate to say that it considers everyday human behavior from the point of view of this long history. In this regard it provides a splendid picture of it since the historical point of view can be

applied to general psychology, to the analysis of the behavior of modern humans.

The history of signs, however, brings us to a much more general law governing the development of behavior. Janet calls it the fundamental law of psychology. The essence of this law is that in the process of development, children begin to use the same forms of behavior in relation to themselves that others initially used in relation to them. Children master the social forms of behavior and transfer these forms to themselves. With regard to our area of interest, we could say that the validity of this law is nowhere more obvious than in the use of the sign. A sign is always originally a means used for social purposes, a means of influencing others, and only later becomes a means of influencing oneself. Many factual connections and dependencies formed in this way have been found in psychology. For example, we could point out what Baldwin discussed in his time and what Piaget has developed more recently in his research. This research has shown that there definitely is a genetic tie between a child's argumentation and his/her reflections. The child's logic corroborates this tie. Logical argumentation first appears among children and only later is united within the individual and internalized. Child logic develops only along with the growth of the child's social speech and whole experience. In connection with this it is interesting to note that in the child's behavioral development, the genetic role of the collective changes. The higher functions of child thought at first appear in the collective life of children in the form of argumentation and only later develop into reflection for the individual child. Piaget established that it is the emerging transition from preschool to school age that results in the change in the forms of collective activity, and that on this basis the very thought of the child is altered. He writes, "Reflection can be viewed as internal argumentation. One needs only to remember speech, which initially is a means of social interaction and only later a means of thought (in the form of inner speech), in order for the applicability of this law to the history

of the child's cultural development to become quite clear."

Nevertheless, we would have said very little about the significance of this law if we were unable to show the concrete forms in which it is manifested in cultural development. Here let us link the action of this law with the four stages in behavioral development mentioned earlier. If we take this law into consideration, it becomes quite clear why everything that is internal to higher mental functions was at one time external. If it is correct that the sign initially is a means of social interaction and only later becomes a means of behavior for the individual, it is quite clear that cultural development is based on the use of signs and their inclusion in a general system of behavior that initially was external and social. In general, we could say that the relations among higher mental functions were at some earlier time actual relations among people. I shall relate to myself as people relate to me. Just as verbal thought is the transferal of speech to an internal level, and just as reflection is the transferal of argumentation to an internal level, the mental function of the word,* as Janet demonstrated, cannot be explained except through a system extending beyond individual humans. The word's first function is its social function; and if we want to trace how it functions in the behavior of an individual, we must consider how it used to function in social behavior.

*Throughout this section Vygotsky consistently uses the term word [slovo] where it may appear to many readers that speech [rech'] would be more appropriate. Since Vygotsky's emphasis here is on how signs mediate social and individual activity rather than on the process of speech activity, it would seem that his use of word rather than speech is significant. Therefore, I have maintained this distinction in my translation. It should be noted, however, that one should not take the term word too literally. Since it is used in connection with Vygotsky's general concern with sign mediation, it does not refer solely to morphological units; rather, phrases, sentences, and entire texts fall under this category as well. — J.V.W.

I shall not evaluate the validity of the main body of Janet's theory of speech. I want only to say that the research method he proposes is indisputably correct from the point of view of the history of the child's development. According to Janet, the word initially was a command to others and then underwent a complex history consisting of imitations, changes of functions, etc. Only gradually was it separated from action. According to Janet, it is always a command, and that is why it is the basic means of mastering behavior. Therefore, if we want to clarify genetically the origins of the voluntary function of the word and why the word overrides motor responses, we must inevitably arrive at the real function of commanding in both ontogenesis and phylogenesis. Janet says that behind the word's power over mental functions lies the real power of the supervisor over a subordinate. Relations among mental functions genetically must be linked to the real relations among people. Regulation of others' behavior by means of the word gradually leads to the development of verbalized behavior of the people themselves.

Speech plays a central role in the individual's social ties and cultural behavior. Therefore, the individual's history is especially instructive, and the transition from the social to the individual function emerges with particular clarity. It is no coincidence that Watson sees the essential distinction between inner and external speech as being that inner speech is for individual rather than social forms of adaptation.

If we turn our attention to types of social connection, we discover that even relations among people are of two types. It is possible to have direct and mediated relations among people. Direct relations are those based on instinctive forms of expressive movement and action. When Köhler describes how apes wishing to get other apes to go with them somewhere look the other ones in the eyes, push them, and start the very action toward which they want to persuade their friends, we have a classic case of a direct social bond. It may be noted that all descriptions of chimpanzees' social behavior abound

in examples of this type. One animal influences another either by means of actions or by means of instinctive, automatic, expressive movements. Contact is established through touching, cries, or gazes. The entire history of early forms of social contact in the child is full of examples of this type. We see contact here established by means of a cry, seizing with the hands, and gazes.

At a higher level of development, however, mediated relations among people emerge. The essential feature of these relations is the sign, which aids in establishing this social interaction. It goes without saying that the higher form of social interaction, mediated by the sign, grows from natural forms of direct social interaction, yet is distinguished from it in an essential way.

Thus, the imitation and division of functions among people are a basic mechanism for the modification and transformation of the individual's functions. If we examine the initial forms of labor activity, we see that the function of execution of orders and the function of giving directions are separate. A major step in the evolution of labor is that the work of the supervisor and that of the slave are united in one person. As we shall see below, this is the fundamental mechanism of voluntary attention and labor.

In this sense, the child's entire cultural development goes through three basic stages, which, using the breakdown introduced by Hegel, we can describe as follows.

As an example, let us consider the history of the development of the indicatory gesture. We shall see later that it plays an extremely important role in the development of the child's speech and in general is largely the historic basis of all higher forms of behavior. In investigating its history we notice that at first the indicatory gesture is simply an unsuccessful grasping movement directed at an object and designating a forthcoming action. The child tries to grasp an object that is too far away. His/her hands, reaching toward the object, stop and hover in midair. The fingers make grasping

movements. This is the initial situation for all further development; it is the first point where we see movements we have a right to call indicatory gestures. Here we have a child's movements that do nothing more than objectively indicate an object.

When the mother comes to the aid of the child and comprehends his/her movement as an indicator, the situation changes in an essential way. The indicatory gesture becomes a gesture for others. In response to the child's unsuccessful grasping movement, a response emerges not on the part of the object, but on the part of another human. Thus, other people introduce the primary sense into this unsuccessful grasping movement. And only afterward, owing to the fact they have already connected the unsuccessful grasping movement with the whole objective situation, do children themselves begin to use the movement as an indication. The functions of the movement itself have undergone a change here: from a movement directed toward an object it has become a movement directed toward another human being. The grasping is converted into an indication. Thanks to this, the movement is reduced and abbreviated, and the form of the indicatory gesture is elaborated. We can now say that it is a gesture for oneself. However, this movement does not become a gesture for oneself except by first being an indication, i.e., functioning objectively as an indication and gesture for others, being comprehended and understood by surrounding people as an indicator. Thus, the child is the last to become conscious of his/her gesture. Its significance and functions first are created by the objective situation and then by the people surrounding the child. The indicatory gesture initially relies on a movement to point to what others understand and only later becomes an indicator for the child.

We could therefore say that it is through others that we develop into ourselves and that this is true not only with regard to the individual but with regard to the history of every function. The essence of the process of cultural development also consists of this: This cultural development is expressed in a

purely logical form. The individual develops into what he/she is through what he/she produces for others. This is the process of the formation of the individual. For the first time in psychology, we are facing the extremely important problem of the relationship of external and internal mental functions. As has already been said, it becomes clear here why it is necessary that everything internal in higher forms was external, i.e., for others it was what it now is for oneself. Any higher mental function necessarily goes through an external stage in its development because it is initially a social function. This is the center of the whole problem of internal and external behavior. It is true that many authors long ago pointed out the problem of internalization or the transferal of behavior to an internal level. Kretschmer viewed the law of nervous activity in terms of this process. Bühler reduces the whole evolution of behavior to the fact that the selection of useful actions is internalized.

But this is not what we have in mind when we speak of the external stage in the child's cultural development. When we speak of a process, "external" means "social." Any higher mental function was external because it was social at some point before becoming an internal, truly mental function. It was first a social relation between two people. The means of influencing oneself were originally means of influencing others or others' means of influencing an individual.

In the child we may follow the steps in the changes of these three basic forms of development in speech functions. First, a word must have sense, i.e., a relation to an object. There must be an objective bond between the word and what it signifies. If this does not exist, further development of the word is impossible. Moreover, this objective bond between the word and the object must be used functionally by the adult as a means of social interaction with the child; only then does the word acquire significance for the child. Hence, a word's meaning first exists objectively for others and only subsequently begins to exist for the child. All the basic forms of

the adult's verbal social interaction with the child later become mental functions.*

We could formulate the general genetic law of cultural development as follows: Any function in the child's cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition. We may consider this position as a law in the full sense of the word, but it goes without saying that internalization transforms the process itself and changes its structure and functions. Social relations or relations among people genetically underlie all higher functions and their relationships. Hence, one of the basic principles of volition is that of the division of functions among people, the new division into two parts of what is now combined into one. It is the development of a higher mental process in the drama that takes place among people. Therefore, the sociogenesis of higher forms of behav-

*In order to be consistent with the translation practices first adopted in Vygotsky's book Thought and language, I have used the words sense [smysl] and meaning [znachenie] here. It seems that in this paragraph, however, Vygotsky is using the term sense to deal with a problem of reference. In general, the reader should note that in the translations of Vygotsky's writings, these terms are not used in the way they are generally used in contemporary linguistics and language philosophy in the West. Since the translation of Frege's writings into English, the term sense has been used in the West to signify what Vygotsky termed meaning [znachenie]. The potential confusion is compounded by the fact that some writings in English use the term meaning to signify what Vygotsky meant by sense [smysl]. Vygotsky's final and most authoritative analysis of sense and meaning may be found in the last chapter of Thought and language. — J.V.W.

ior is the basic goal toward which the child's cultural development leads us.

The word social when applied to our subject has great significance. Above all, in the widest sense of the word, it means that everything that is cultural is social. Culture is the product of social life and human social activity. That is why just by raising the question of cultural development of behavior we are directly introducing the social plane of development. Further, one could point to the fact that the sign, like the tool, is separate from the individual and is in essence a social organ or a social means. We may even go further and say that all higher functions are not developed in biology and not in the history of pure phylogenesis. Rather, the very mechanism underlying higher mental functions is a copy from social interaction; all higher mental functions are internalized social relationships. These higher mental functions are the basis of the individual's social structure. Their composition, genetic structure, and means of action — in a word, their whole nature — is social. Even when we turn to mental processes, their nature remains quasi-social. In their own private sphere, human beings retain the functions of social interaction.

To paraphrase a well-known position of Marx's, we could say that humans' psychological nature represents the aggregate of internalized social relations that have become functions for the individual and forms of his/her structure. We do not want to say that this is the meaning of Marx's position, but we see in this position the fullest expression of that toward which the history of cultural development leads us.

In the ideas developed here we have tried to convey in summary form the basic pattern we have observed in the history of cultural development. They are directly connected with the problem of the child collective. On their basis we have seen that higher mental functions, such as the function of the word, are first divided and distributed among people, and then become functions of the individual. If we analyzed only the individual's behavior, it would be impossible to expect anything like this. Formerly, psychologists tried to derive social behavior from

individual behavior. They investigated individual responses observed in the laboratory and then studied them in the collective. They studied how the individual's responses change in the collective setting. Posing the problem in such a way is, of course, quite legitimate; but genetically speaking, it deals with the second level in behavioral development. The first problem is to show how the individual response emerges from the forms of collective life. In contrast to Piaget, we hypothesize that development does not proceed toward socialization, but toward the conversion of social relations into mental functions. Therefore, the psychology of the collective in child development emerges in an entirely new light. Usually, the question has been asked, How does one or another child behave in the collective? We ask how the collective creates higher mental functions in the child. It has been suggested that a function is in the individual's head in a semiprepared or rudimentary form and that it matures in the collective, is made more complex, is raised to a higher level and enriched or, conversely, is impeded, neutralized, etc. We now have grounds for thinking that with regard to higher mental functions, just the opposite is true. Functions are first formed in the collective as relations among children and then become mental functions for the individual. In particular, it was formerly thought that each child was able to reflect on, give reasons for, construct proofs for, and search for the foundations of any position. An argument was spawned out of the clash of such reflections. But, in fact, matters stand otherwise. Research shows that reflection is spawned from argument. The study of all the other mental functions leads us to the same conclusion.

In discussing how we pose our problem and develop our research method, we have an opportunity to clarify the great significance that the comparative method of the study of the normal and abnormal child holds for the history of cultural development. This is a basic method of research that is widely used in modern genetic psychology. It allows us to compare the convergence of the natural and the cultural lines in the development of the normal child with the divergence of these two lines

in the development of the abnormal child. I should like to dwell in more detail on the significance of all our basic positions concerning the analysis, structure, and genesis of cultural forms of behavior for the psychology of the abnormal child.

We shall start with the basic postulate established in our analysis of higher mental functions. This postulate is that one must recognize a natural basis for cultural forms of behavior. Culture creates nothing; it simply modifies the natural environment to conform to human goals. Therefore, it is quite natural that the cultural development of the abnormal child will be thoroughly permeated with the influences of his/her basic defect or deficiency. Natural processes — the elementary processes upon which higher cultural modes of behavior must be constructed — are inadequate; and that is why it is impossible for higher forms to emerge and develop sufficiently in such cases. This is because of the poverty of the material that is at the foundation of cultural forms of behavior. This feature is noticeable in children with a general delay in development, i.e., mentally retarded children. We recall that cultural forms of behavior are based on well-known indirect paths that are formed from the simplest elementary connections. This purely associative substratum of the higher forms of development, the foundation upon which they emerge, turns out to be weakened in the mentally retarded child.

But the second postulate in our analysis introduces an essential addition to what we have just been saying. It shows that in the process of cultural development, one set of functions in the child replaces another, and new, indirect paths emerge. This creates completely new possibilities in the abnormal child's development. If the child cannot accomplish something by using a direct route, the development of indirect paths becomes the basis for his/her compensation. The child begins to use indirect paths to accomplish what he/she cannot accomplish directly. This substitution of functions is the foundation of all the cultural development in the abnormal child. Remedial education is full of examples of such indirect paths and compensatory substitution in connection with cultural development.

The third postulate outlined above says that mediated activity or the use of external signs as a means for the further development of behavior is the foundation for the structure of cultural forms of behavior. Thus, the isolation of functions and the use of signs have special significance in all cultural development. Observations of abnormal children indicate that when these functions are preserved in undamaged form, we actually have a more or less satisfactory compensatory development; but when they turn out to be delayed or disrupted, we have cases of the child's cultural development having suffered. On the basis of his experiments Eliasberg proposed a general thesis concerning the fact that the use of auxiliary means can serve as a reliable criterion for diagnosis. This criterion allows one to distinguish any form of weakness, underdevelopment, disruption, or delay in the intellectual activity of the retarded child. Thus, the ability to use signs as auxiliary means of behavior apparently disappears only with the onset of retardation.

Finally, our fourth and final postulate reveals a new perspective on the abnormal child's cultural development. We have in mind what we earlier called the mastery of one's own behavior. With regard to the abnormal child, we could say that one must distinguish the developmental stages of any function and the developmental stages of the mastery of this function. Everyone knows what a great disproportion there is between higher and lower functions in the mentally retarded child. What is characteristic for a debility is not so much the general, uniform deterioration of all functions as the underdevelopment of the higher functions along with relatively satisfactory development of the elementary ones. Thus, we must not only investigate what kind of memory the mentally retarded child masters but also the degree to which he/she is able to use this memory. The underdevelopment of the mentally retarded child consists first of all in the underdevelopment of higher forms of behavior, in the inability to master his/her own processes of behavior and to use them.

To a significant degree, we are returning from another direction to the idea proposed by Séguin when he saw the essence of

idiocy as the underdevelopment of volition. If we understand volition in the sense of mastering oneself, we would be disposed to go along with this opinion and emphasize that the main source of all underdevelopment in the mentally retarded child is in a defect of the mastery of one's own behavior. Lindvorskii expressed this in a somewhat paradoxical form when he tried to reduce the basis of intellectual activity to the perception of relations and emphasized that in this sense the intellect as a function of the perception of relations is no less characteristic of the idiot than it was of Goethe and that the entire vast difference between one and the other consists not of this, but of other, higher, mental processes. Hence, we could arrive at the fundamental notion with which we conclude our remarks on the special features of the abnormal child's cultural development. We can say that the secondary complications of mental retardation are always: first, primitivism as general cultural underdevelopment based on organic brain underdevelopment, and second, some underdevelopment of voluntary control, a fixation at the infantile stage in the control over oneself and one's behavioral processes. Finally, only in the third and last place must we consider the basic growth in the complexity of mental retardation or the general underdevelopment of the child's whole personality.

Let us now turn to some concrete problems in the development of higher mental functions. By examining them we will be able to understand better the data from the psychology of education and the child.

In general, can we apply the concept of development to the changes that concern us? After all, when we speak of the idea of development, we have in mind a very complex process that is defined by a number of features. The first feature of this process is that with any change, the substratum at the basis of the developing phenomenon remains the same. The second feature is that, to a large extent, any change has an internal character. We should not label as development a change that was completely unconnected with an internal process in the organism and is a form of an activity. Thus, the second basic feature that characterizes the concept of development is the unity of the entire process of development, the internal connection between a past stage of development and the emerging change.

With this in mind, we must point out that for a very long time, investigators in child psychology refused to consider the child's cultural experience as an act of development. It was usually said with respect to this: what can be labeled development is what proceeds from the inside out. What goes from outside in is schooling, because we never find a child who would naturally develop arithmetic functions in nature; but as soon as the child attains, say, school age, or somewhat earlier, he/she grasps a number of arithmetic concepts and logical operations in their outer form from surrounding people. It would seem, therefore, that we cannot say that the eight-year-old's acquisition of addition and subtraction and the nine-year-old's acquisition of multiplication and division are natural results of the child's development. These are external changes coming from the environment and are not in any way a process of internal development.

However, deeper study of how the child's cultural experience is accumulated has shown that several of the most important features necessary for applying the concept of development are present in this case.

As research has demonstrated, the first feature is that any new form of cultural experience does not simply come from outside, independently of the state of the organism at a given point of development. The fact is that the organism that is mastering external influences masters a number of forms of behavior or assimilates these forms depending on its level of mental development. Something similar to what is called nourishment in the field of physical growth occurs — that is, the child masters certain external things. However, these external materials are reprocessed and assimilated in the organism.

For example, let us assume that a child who does not yet know the cultural forms of arithmetic enters school and begins

to learn the four arithmetic operations. The question arises: Can one demonstrate that this mastery of the four arithmetic operations occurs as a process of development, i.e., is determined by the presence of [a certain] knowledge of arithmetic with which the child entered school?

It turns out that such is indeed the case. This provides a foundation for knowing what to teach at different ages and at different levels of instruction and explains the fact that during the seventh to eighth year it becomes possible for the child to master these operations for the first time, because the development of knowledge about arithmetic has occurred in the child. If we examine children in grades one through three in elementary school,* we find that for two to three years the child still displays traces of the preschool, natural arithmetic with which he/she entered school. Likewise, it turns out that when the child is learning various operations in school in what would appear to be purely external form, in reality he/she is mastering any new operation as a result of the process of development.

I shall try to show this at the end of the paper, when I analyze the concepts of mastery, invention, and imitation, i.e., all the means with the help of which new forms of behavior are mastered. I shall attempt to show that even when it would seem that the behavioral form is mastered by pure imitation, one cannot exclude the possibility that it arose as a result of development, not simply by imitation.

In order to be persuaded of this, it is sufficient to demonstrate in an experiment that any new form of behavior, even one mastered from outside, has various features. It is natural that such a form is built on the preceding one and that it becomes possible only on the basis of the preceding one. If someone were to succeed in showing experimentally that it was possible to master some cultural operation directly in its most developed stage, it would have been demonstrated that we were

*In the Soviet Union children enter first grade at age seven. — J.V.W.

not dealing with development in this case, but rather with a superficial mastery, i.e., with some kind of change by virtue of purely superficial influences. However, studies have shown us that every external action is the result of an internal genetic pattern. On the basis of experiments we can say that the child — even the prodigy — can never master the last stage in the development of operations immediately or any earlier than by going through the first two stages. In other words, the inculcation of a new cultural operation is broken down into a series of links or stages that are internally connected with one another and follow one another. Once we realize this, we have the basis for applying the concept of development to the accumulation of internal experience. This is the second feature we spoke of earlier.

It is clear that this will be a completely different kind of development from the development studied in the emergence of the child's elementary functions. This is an essential distinction. We know that in the development of fundamental forms of human adaptation, in the human struggle with nature, the essential distinction between zoological and historical human development is that in the first case, anatomical changes occur in the organism and the biological development takes place in the living organism on the basis of the structure's organic changes. In the second type, extensive adaptation to nature occurred in human history without such organic changes.

Finally, one must point to the connection between the child's natural behavioral development based on organic maturation and the types of development we have dealt with. This connection has a revolutionary rather than an evolutionary character. Development does not take place by means of gradual alteration or change, by the accumulation of small increments, the sum of which finally provides some kind of essential change: from the very beginning we observe a revolutionary type of development. In other words, we see sharp and fundamental changes in the very type of development, in the motivating factors of this process. It is well known that this mix of revolutionary and evolutionary changes does not exclude the possibility of

applying the concept of development to this process.

Let us now turn our attention directly to examining the types of development. We know very well that in contemporary child psychology two theories of genesis are more or less generally accepted. One of these theories distinguishes two basic levels in the development of behavior; the other distinguishes three. The theory that distinguishes two levels is inclined to point out that all of behavior is developed in two basic stages. The first is the stage of instinctive behavior, or the stage of the unconditioned reflex — the inherited or innate function of behavior. The second stage — the stage of reflexes acquired in individual experience, or conditioned reflexes — in the case of animals is the stage of training.

The other theory splits up this second stage, the stage of reflexes acquired in individual experience, even further and identifies a stage of intellectual responses. What distinguishes this third stage from the second? Very briefly, we may say that the essential distinction is, on the one hand, the way a response emerges and, on the other, the nature of the function [that the response serves] , i.e., the biological purpose of the response as opposed to a habit that emerges only through trial and error or as a result of stimuli that always come from a source outside the organism. In the latter case — the case of intellectual responses — a well-known answer emerges: such responses are obtained, apparently, as the result of some kind of short circuit, i.e., some kind of complex, central, internal process that arises on the basis of exciting a number of neighboring centers, as a result of the creation of a certain new pathway.

Consequently, we are dealing with a response of an explosive type that is extremely complex in its emergence. Its mechanisms are as yet unknown, as our knowledge about brain processes is still at a very rudimentary stage of development. Meanwhile, if the function of an instinctive response is distinguished from the function of habits, then the function of habits is also distinguished from the intellectual function. After all, if the biological function of a habit is to adapt to individual conditions of existence that are more or less clear and simple, the function of intellectual behavior is to adapt to changing environmental conditions and to the changing circumstances of new conditions. There is an ongoing argument among psychologists on this point: those who refuse to consider the intellect as a special level in nature claim it is not a special level, but only a special subclass within the same class, the acquisition of habits. It seems to me that it would be scientifically dangerous to restrict ourselves to two classes of development of a child's behavior, inherited and acquired experience. Within the second — acquired experience — on the basis of our knowledge we must establish at least two, perhaps even more, stages.

Consequently, it would seem to us to be correct, given our present stage of knowledge, to take the point of view defended by the American psychologist Thorndike that distinguishes two levels, the hereditary and the individual, or the internal and the acquired, and to distinguish two behavioral stages or groups of responses. On the one hand, we have habits inherited for the adaptation to the more or less protracted conditions of individual existence. On the other, we have an entire hierarchy of habits directed at solving new problems as they confront the organism, in other words, the hierarchy of those responses about which we have been speaking.

The connections among the developmental stages that interest us in child psychology are dialectic. Each successive stage in the development of behavior is the negation of the preceding stage. It is a negation in the sense that the qualities peculiar to the first stage of development are copied, destroyed, and sometimes transformed into a higher stage. For example, if we take an unconditioned reflex and follow what takes place with regard to it when it is converted into a conditioned reflex, we see that several qualities connected with its inherited character (its stereotypic nature, etc.) are negated in the conditioned reflex because the conditioned reflex is a temporary, flexible formation that yields extremely easily to the influence of outside stimuli. In addition, the conditioned reflex is peculiar to only a particular individual not in accordance with nature or

heredity, but as the acquired conditions of experience.

Thus, any subsequent stage involves the change or negation of qualities of the preceding stage. On the other hand, however, the preceding stage exists within the following stage. The conditioned reflex, for example, shows this: it has the same qualities as the unconditioned reflex; it is the same instinct, but it appears and exists in a different form and takes a different expression.

Modern dynamic psychology attempts to study the source of energy behind various forms of behavior. For example, in several types of instinctive changes, "dynamic" psychologists point to language acquisition and its influence on behavior. Of course, this is of great interest to us in relation to the problem of volition, to which I shall return below. The fundamental question posed by psychologists is clear and can be illustrated as follows. Modern-day humans are guided to a restaurant to eat dinner whereas an animal is directed by the same instinct to gather the food necessary for its existence. The animal's behavior in nature is based entirely on instinctive response. Although the human being is also hungry, his/her mode of behavior is based on quite different conditioned reflexes. In the first case we have a natural reflex in which one response follows another. In the second case we have a number of conditioned changes. However, if we look closely into human cultural behavior, we see that the ultimate motivation for this behavior, its energy base, and its stimulus is, of course, the same instinct or material requirement for the organism. It sets the animal in motion in cases when instinct is not always needed in conditioned reflexes. In the second case this instinct exists in latent form, and the behavior is necessarily connected with the changing series of qualities of the instinct.

In the case of the conditioned reflex and intellectual response, we have just such a dialectical relationship, in which the preceding stage is negated while being preserved in latent form. In one of Thorndike's well-known examples connected with arithmetic problems we find that in solving a problem the child does not apply any responses other than those acquired as habits

or a combination of habits that have been used to solve new problems in the past. Thus, in this the intellectual response negates habits that are, as it were, latent responses directed at the solution of problems confronting the organism. In this manner several properties of the habits are obliterated by the intellectual response. At the same time, however, the intellectual response, as it turns out, is essentially reduced to nothing except a system of habits. This system or organization of habits is considered to be the proper matter of the intellect.

Turning our attention to the succession of stages in the natural development of behavior, we must say something similar with regard to our fourth stage in the development of behavior. Perhaps we should acknowledge that the higher behavioral processes about which we shall be speaking are also related to natural behavior and that every stage in natural behavior is related to former stages: to a certain extent it negates the stage of primitive behavior yet retains the same natural behavior in latent form.

As an example we shall take an operation such as memory aided by signs. We see here that, on the one hand, this type of memory operates unlike memory based on habits. Memory based on the intellectual response possesses some properties that are absent in the first case. At the same time, analysis has shown that if we separate the process of memory using signs into its composite parts, we can easily determine that this process contains the same responses that characterize natural memory, but in a new combination. It is this new combination that is the basic object of our research in child psychology.

Of what do these fundamental changes consist? They consist of the fact that at the higher developmental stages of nature, humans master their own behavior; they subordinate their own responses to their own control. Just as they subordinate the external forces of nature, they master personal behavioral processes on the basis of the natural laws of this behavior. Since the laws of stimulus–response connections are the basis of natural behavioral laws, it is impossible to control a response before controlling the stimulus. Consequently, the key

to the child's control of his/her behavior lies in mastering the system of stimuli. The child masters an arithmetic operation by mastering the system of arithmetic stimuli. In the same way, a child masters all other forms of behavior by mastering the stimuli. But a system of stimuli is a social force provided externally to the child.

In order to make all this clear, we must follow all the stages through which children pass in mastering their behavior. For this we shall introduce an experimental example we already used when dealing with selection. It would be appropriate here to outline how this response changes in the case of memory and why we define the properties of development in terms of these changes.

What does the development of a selection response consist of in a child? We know that in order to investigate this process we can select, say, five to eight stimulus cards and present each one to the child paired with a different response. For example, he/she is told to respond to blue by raising one finger, to red by raising another, and to yellow by raising a third. We have known for a long time that data from experimental psychology have indicated that this selection response is established when the child is about six years old. With adults as subjects, it has also been determined that a complex selection response is significantly more difficult to form and that with many stimuli, a special effort is required to establish the bond between stimuli and their respective selection responses.

For example, if we ask a subject to respond to a red card with the left hand and to a blue one with the right, the selection can be quickly established; the response will occur more easily than if we provide a choice of three to four or five to six colors. We have already noted that previous experiments have led psychologists to conclude that the selection response does not really require subjects to select; they have claimed that subjects display a different process, which can only superficially be called selection. In fact, this is not the case. Several [other] investigations have provided evidence for the notion that a very complex form of behavior underlies this selection

response, that we must distinguish random stimuli from organized stimuli, and that a chain of several conditioned connections occurs in these responses — or, in the terminology used earlier in psychology, we have evidence for the notion that an instruction has been consolidated. If we use a memory aid, something that characterizes the processing involved in remembering an instruction, we can establish a correct selection response more easily.

Let us consider the following case: we give six-, seven-, and eight-year-old children a long list of stimuli, say, a list of pictures, and request them to respond to each picture with a separate movement. These movements may be either pressing a corresponding key or making a movement with a finger. In this problem we allow the subjects to use certain external means in the solution of the internal operation; and we observe how the children behave under such conditions.

It is interesting that children always undertake this task: they never refuse to do it. They are so unfamiliar with their mental powers that this problem does not strike them as impossible. Conversely, when adults are asked to do this, they always refuse, saying, "No, I will not remember this and will not be able to do it." And, in reality, if these instructions are given to adults, they request them over and over, return to the previous color, and ask with which finger they must respond to a color. When children undertake the task, they listen to the instruction and immediately try to carry it out.

Usually the children run into difficulties immediately and make mistakes 90% of the time. But children who are slightly older and who have learned one or two responses spontaneously ask which finger must be used for each of the remaining stimuli.

The earliest stage in the child's development has been studied and described, and we can justifiably call it the stage of natural or primitive responses. We label it thus because it is a stage universal in all children. In the vast majority of cases, children at this stage behave with simple responses. It is a primitive stage because children's behavior in this case is determined by the resources of their immediate impression, by the

natural state of their brain apparatus. Indeed, if children try to master a complex selection response with ten stimuli, this is explained by the fact that they do not yet know what their capabilities are. They operate in a complex situation as they do in a simple one — in other words, they try to respond to a complex structure with primitive means.

We conducted another experiment as follows. When a child did not use some sort of mediational means in this task setting, we tried to introduce a certain modification into the experiment. We gave him/her a second series of stimuli. This is the basic method usually employed in studying children's cultural behavior. In addition to stimuli that must evoke a specific selection response, we gave the child several additional stimuli: several pictures affixed to various keys. Given this situation, we suggested that he/she associate a particular picture with a specific key. For example, the child was given a problem in which, on presentation of a picture of a horse, he/she was to press a key showing a sleigh. In this case when the child received the instructions, he/she already had seen that upon being presented with a picture of a horse, he/she must press the key with the sleigh on it, or given a picture of bread, the key displaying a knife. The child responds very well in this situation. With this type of response we have already gone beyond the primitive stage, because the child is required to respond on the basis of something more than primitive conditions. A rule emerges for the child for solving the problem. He/she makes the selection with the help of a generalized response, and the nature of the response changes. In this case it turns out that the law stating that increased training is necessary to process a larger number of stimuli no longer applies: the results are the same with four or eight, five or ten stimuli. The latency of the response does not change.

But it would be a mistake to think that the child has fully mastered a given form of behavior directly. One needs only to take the same pictures and present them in another way to see that there was no such direct connection. When we put the key with the knife in place of the key with the sleigh over the

picture of the horse, first telling the child that he/she must press the key with the knife for the picture of the horse, the child did not notice that the other auxiliary pictures were present. When we asked him/her whether or not he/she could remember them, the child confidently answered that he/she could. He/she listened to the instructions, but when we actually changed the position of the pictures, the child did not give the correct selection response. This stage was manifested in children in various ways; but what was common to the behavior of all the children was that they relied on these pictures while not yet understanding that the picture somehow played a role. They remembered that the picture of the horse somehow helped them find the key with a picture of a sleigh on it. The child considered this inner complex connection from a purely external, associative point of view. He/she believed that it was a fact that the picture must help him/her, although he/she was unable to explain the inner connection that was at its foundation.

An experiment carried out with a little girl can serve as a simple example of this stage in the development of the child's operations. The mother gave the little girl a command similar to the command in Binet's test: Go into the next room and carry out three simple operations. In one case the mother gave the command several times; in another, she gave it only once. The daughter noticed that when the mother gave the command several times, it was successfully executed. She remembered this and finally began to understand that it was necessary for the mother to repeat the order several times. When the mother gave a new command, the daughter said, "Repeat it again," and without listening, ran off. She noticed the connection that existed between repetition and success in fulfilling the task, but she did not understand that it was not the repetition itself that was responsible. She did not understand that one must listen to the repetition and assimilate it and that only then would it be easier to carry out the task. Hence, it is characteristic of this stage to have an external connection between the stimulus and response in place of an inner psychological connection between them.

It is interesting that phenomena similar to this observed in primitive humans are often labeled "magical thinking." Such thinking is possible because of insufficient knowledge of the laws of nature and because of the fact that primitive humans accept the connection between thoughts as a connection between things. One of the typical forms of magic is the following. In order to harm a person, primitive people practice witchcraft. They try to get a lock of hair or the portrait of a particular person and burn it, assuming that they will thereby inflict harm on the person. Here we have a case in which a mechanistic connection of thoughts is confused with a connection of objects. How do primitive people summon rain? They try to do this by using a magical ceremony. First they begin to blow through their fingers, imitating the wind. Then they organize a ceremony in which water falls into sand. If the sand gets wet, it means that this ceremony will summon rain. The mental connection is transformed into a material one.

The opposite phenomenon occurs in the child during the stage we are discussing. The connection between things is taken for the connection between thoughts. The connection between two pictures is taken as a psychological connection. In other words, the child is using an external association while not understanding the true nature of the rule involved. We can call this the stage of "naïve psychology." The very label "naïve psychology" is introduced together with the label "naïve physics" by Lipmann & Bogen and also by Köhler. It signifies that if there is naïve experience in the practical use of tools in animals, then humans have analogous naïve experience relative to their psychological operations. In both cases the experience is naïve because it is acquired through direct, naïve means. But since this naïve experience has limits, the naïve physics of the ape leads to a number of interesting phenomena. Inasmuch as apes have too little intelligence relative to the physical means of their bodies, they construct this naïve physics on the basis of visual experience, and something not unlike the well-known observation by Köhler is obtained: if apes have learned how to get fruit with the help of a stick, then when they do not have a stick in hand,

they run to a straw and try to use it to obtain the fruit. Why is such a mistake possible? Because visually a straw is similar to the stick, and apes do not know the physical qualities of the stick. They operate in exactly the same way with a boot, with the flaps of a straw hat, with a towel, or with any object.

What is even more interesting is that these shortcomings of naïve physics appear in apes when they want to place fruit in a high position. They try to put a box in the corner or at the edge of the cage and fly into a rage when the box falls. Another ape put the box against the wall at shoulder height and pressed it to the wall in the hope that the box would stay in such a position. All these operations of apes are easily explained by their natural life in the forest, where they acquire naïve physical experience. This naïve physical experience allows them to grasp twigs that all grow from the tree's trunk in the same direction. It also allows them to attach the box to the wall. All of these misguided operations are evoked in apes by their inadequate knowledge of the physical means of their own bodies and of other bodies.

When carried out with children, this experiment indicated that their use of tools was also a function of their naïve physics, i.e., of how much children who had already acquired some experience turned out to be capable of using objects as means and of understanding the functional role of these objects. Analogously, as a result of the practical use of signs, the child gains experience in their use that is still naïve psychological experience.

In order to understand that after repetition it is easier to remember, one must be experienced in memory tasks. It has been observed in experiments how this remembering takes place. It is understandable that children's memory grows stronger with repetition. Children who do not understand the connection between repetition and memory do not have adequate psychological experience and use this experience naïvely.

Is this naïve psychological experience acquired? Undoubtedly, like naïve physical experience, it is acquired by virtue of children's operating with objects, carrying out movements, mastering some qualities of the objects, and learning to approach

them. Similarly, in the process of their adaptation, children remember and use various instructions, i.e., they perform several psychological operations. In executing these operations children accumulate and master certain naïve psychological experience. They begin to understand how one must remember and what memory involves. When they understand this experience, they begin to use one or another sign properly. Thus, at this stage of the magical use of signs, children use them in a purely external manner. This stage does not last long, however. Children satisfy themselves that with the help of a certain arrangement of pictures, they remember the selection response, and with the aid of another arrangement, they do not. They therefore arrive at the revelation of the unique nature of their memory and soon begin to say, "No, put that picture here." When they are to press the key on which a picture of bread is drawn for the picture of a horse, they say, "No. I will take the key with the sleigh." Hence, children gradually begin to accumulate experience connected with memory.

In mastering naïvely what this memory operation consists of, children already move on to the next stage. If we give them pictures in random order, they arrange them in a certain order and establish a certain connection. They no longer operate superficially with signs; rather, they know that the presence of such signs helps them carry out the operation, i.e., helps them remember through use of the given signs.

Thus, by using an established connection based on past experience (horse–sleigh or bread–knife), children very soon begin to create signs themselves. At this stage children no longer have trouble creating and remembering such a sign — in other words, this stage is characterized by children's beginning to create a new sign by use of the connection provided for them. This stage may be labeled the stage of using external signs. It is marked by new connections' beginning to be formed independently through the use of signs in internal operations. This is the most important point we want to make: children organize stimuli in order to achieve their response.

At this stage we can clearly see the development of the fundamental genetic laws that organize children's behavior. This behavior is composed of the response children want to direct along a certain path. They organize external stimuli and use them to accomplish the objective confronting them. This stage lasts a short time, after which children go on to the next form of organizing their activity.

Having performed this same experiment several times, the investigator gradually begins to observe the following. The response time decreases more and more. If the response required to carry out the task took a half-second or more earlier, at a later stage it takes only 200 msec. This means that the speed of the response has increased 2.5 times. The most important change here consists of the children's using external means to carry out internal memory operations. Wishing to master their responses, they master stimuli. However, children then gradually begin to reject the external stimuli; they no longer pay attention to them. While making the selection response, they operate as they did earlier, but now they have discarded a number of stimuli. The difference here is that the children's external reactions have been internalized. The task involving several stimuli that earlier was impossible is now possible.

We can see what has happened: any external operation has, so to speak, its internal representation. What does this mean? We make a certain movement and rearrange certain stimuli in various contexts. All of this corresponds to some kind of inner brain process. As a result of several such experiences in the transition from an external operation to an internal one, all the intermediate stimuli turn out to be no longer necessary, and the operation begins to be carried out in the absence of mediating stimuli. In other words, what has transpired is what we shall conditionally term a process of "rooting." If the external operation has become internal, then a "rooting inward," or a transition from an external to an internal operation, has occurred.

On the basis of our experiments we can note three basic types of rooting, i.e., three types of movement from outside

inward. We shall outline these types and try to show to what degree these results are typical for the acculturated child in general and for development in the areas of arithmetic, speech, and memory in particular.

The first type of rooting or movement of external operations inward is what we call "rooting of the juncture type." We know how rooting of living tissue takes place: we take two ends of ruptured tissue and sew them together with thread. Because the two ends of tissue are united, a rooting of these tissues occurs. When this rooting has taken place, we can pull out the thread and, in place of an artificial connection, we have a rooting without a seam.

When children combine stimuli with a response, they combine a given stimulus with a response initially through a "seam." In order to remember that a picture on which a horse is drawn corresponds to a key on which a sleigh is drawn, they insert an intermediate link between the key and the picture. This intermediate link is the picture of the sleigh; it is the juncture that joins the given stimulus with the response. This juncture gradually dies away, and a direct link between the stimulus and the response is formed. If the juncture is discarded, then, of course, the speed of the response increases; the operation that required 500 msec requires only 150 msec, because the path from the stimulus to the response is shortened, and the operation is converted from a mediated to a direct one.

The second type of rooting is "undifferentiated rooting." Imagine children responding several times to one picture with the help of drawings of a set of things they understand. If children respond in this way 30 times, one can, of course, contend that they will remember that given a picture of a horse, they must press the key on which a sleigh is drawn. In other words, they internalize the undifferentiated set of external stimuli. This is the internalization of the series, and here the internalization of the operation consists of a smoothing out of the difference between external and internal stimuli.

Finally, the third and most important type of internalization of an operation consists of children's mastering the very structure of the process. They master the rules in accordance with which external signs must be used. Since they now have more internal stimuli and operate more easily with them than with external ones, children soon switch to using this structure according to the appropriate internal operation. In this situation, children say, "I no longer need the pictures. I will do it myself." And thus, they begin to use verbal stimuli.

In conclusion, let us follow up with an example of the development in the crucial area of children's knowledge of arithmetic. In the natural or primitive stage, children solve a problem by direct means. After solving the simplest problems, they proceed to the stage of using signs without consciously realizing how they work. Then comes the stage of using external signs, and finally comes the stage of inner signs.

Any development in children's arithmetic development must first go through a natural or primitive stage. Simply by looking at two groups of objects, can three-year-olds decide which group of objects — three or seven apples — is larger? They can. And in the case of a more complex differentiation — one group contains 16 and the other 19 apples — can children give the same answer? No, they cannot. In other words, first we have a natural stage, operating purely by natural laws, when children simply compare the necessary quantity by sight. However, we know that children very quickly and quite imperceptibly move from this stage to another. At this later stage, when they must ascertain where more objects are, most children in a cultural situation begin to count. Sometimes they do this even before they understand what counting is. They count, "One, two, three..." and so on despite the fact that they do not yet understand genuine counting. Shtern's observations verify that many children begin to count before understanding what they are doing. For example, if we ask such a child, "How many fingers are on your hand?" he/she counts the ordinal series and says, "Five." If we say to him/her, "How many do I have? Count again!" the child replies, "No. I can't." This means the child can apply this series only to his/her own

fingers, not to the fingers of others.

Another example from Shtern is that the child counts fingers: "One, two, three, four, five." When asked, "How many do you have in all?" he/she answers, "Six." The child is asked "Why six?" He/she answers, "Because this is the fifth, and in all there are six." The child has no clear concept of the sum. In other words, he/she masters this operation in a purely external, "magical" way, without yet knowing its inner relationships.

Finally, from this stage children move on to genuine counting. They begin to understand what it means to count their fingers; but nevertheless, they still count by means of external signs. At this stage children count mainly with their fingers. For example, when given the problem "Here are seven apples. If we take two away, how many remain?" children must switch from apples to fingers. In this case fingers play the role of signs: children put seven fingers up and then take two away, and five remain. In other words, they solve the problem with the help of external signs. It is interesting to observe what happens when children are prohibited from moving their hands. It turns out that they are unable to carry out the corresponding operations.

But we know quite well that children move very quickly from counting on their fingers to counting mentally. If older children need to subtract two from seven, they no longer count on their fingers, but mentally. In this case children display two basic types of rooting. On the one hand, counting in one's head is undifferentiated rooting. Children have rooted the undifferentiated external series (for example, counting to onself: one, two, three, etc.) internally. On the other hand, children display rooting of the juncture type. This takes place if they have practiced and then say, finally, that there is no need for an intermediate operation and come up with the result directly. This occurs with any calculation or figuring with "tables." In this instance, all mediating operations are dropped, and the stimulus produces the needed result directly.

Another example is in children's language development. At first children are at the natural, primitive, or, properly speaking, preverbal stage. They scream and utter identical sounds in different situations. This is purely external action. At this stage, when they need something they resort to natural means, using immediate or conditioned reflexes. Then a new stage emerges. It consists of children's discovering the basic external laws or outer structure of speech. They notice that every object has its word and that a given word is the conventional signification for a particular object. For a long time children consider this word to be one of the qualities of the given object. Research conducted with older children has shown that this relationship in which words are treated as inherent features of objects persists for a very long time.

There is an interesting philological anecdote that demonstrates the kind of relationship primitive people have to their language. Consider the story in Fedorchenko's book about how a soldier argued with a German about what language was the best and most correct. The Russian argues that Russian is the best and says in this connection: "For instance, let us take a knife [nozh]: it will be messer in German, couteau in French, and knife in English. But in fact, it is a nozh after all, and this means that our word is the most correct." In other words, it is assumed that a thing's name is the expression for its true essence.

Shtern's second example concerning the child who speaks two languages reflects the same situation. When the child is asked which language is correct, he/she says that German is correct because wasser is what can be drunk, not what is called l'eau in French. Thus, we see that children create a connection between a thing's name and the thing itself and consider an object's name one of its qualities along with other qualities. In other words, the external connection of stimuli or the connection of things is accepted as the psychological connection.

It is well known that such a magical relationship to words exists among primitive people. For example, among people who have grown up under the influence of religious prejudices, such a magical relationship toward words exists: there are

words that must not be spoken. If one must talk about something, say, about a deceased person, then the following words are added to this: "Don't talk about that in your home." It is forbidden to name the devil because if he is mentioned, he himself will appear. The same applies with regard to words that designate shameful things: they acquire tinges of these shameful things, and it becomes shameful to pronounce them. In other words, this is a remnant of the transference of the qualities of the object designated by signs to the conventional signs themselves.

From this stage in which the word is considered to be an inherent property of the object, children move very quickly to the conventional signification of the word, i.e., they use words as signs, especially in the stage of "egocentric" speech, about which we have already spoken — the stage at which children can use speech to plan the most complex operations they must accomplish. Finally, we know that from this stage children go on to the last stage; this is the stage of inner speech, in the proper sense of the word.

Thus, in children's speech development we have identified these stages: the natural stage or "magical" stage, in which they see the word as a property of the object; the external stage; and then inner speech. This last stage is thought itself.

One can speak separately about all these examples. However, in light of everything that has been said, we accept the notion that the basic stages in the formation of memory, volition, arithmetic, and speech are the same stages we have described and the stages through which children develop with respect to all higher mental functions.

L. S. Vygotsky

THE DEVELOPMENT OF HIGHER FORMS OF ATTENTION IN CHILDHOOD

Editor's Introduction

In this work Vygotsky touches on several of the defining features of activity; but his ideas about developmental explanation, the social origins of higher mental processes, and mediation are particularly in evidence.

The notion of a developmental or genetic explanation is apparent in Vygotsky's experimental methods and in his theoretical approach to the higher mental function of voluntary attention. For example, in analyzing early stages of the ontogenesis of attention, he argues that the speech used by adults to regulate children's attention serves two distinct functions: directing the listener's attention through indication, and abstracting the aspects of the environment involved in a concept. According to the notion of genetic explanation, it is the task of the investigator to identify and isolate the various aspects of an ability as they appear in a genetic sequence. This, and only this, is what allows us to understand the complex structure of a higher psychological function. The point of doing this is not simply to provide a timetable of how various mental abilities emerge; rather, it is to analyze an ability by understanding how it has

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