

Vygotsky, L. S. - Thinking and Speech

THE COLLECTED WORKS OF VYGOTSKY

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PREFACE

Through an analysis of available information on phylogenesis and ontogenesis, we must attempt to identify the most useful point of departure for the resolution of the problem; we must attempt to develop a general theory of the genetic roots of thinking and speech. Second, to develop preliminary working hypotheses and contrast our own theoretical perspectives with those of others, we must conduct a critical analysis of the best contemporary theories of thinking and speech. In our view, current theories are in need of serious reassessment and improvement.

We have also compared our own data on concept formation with current educational theory on the development of concepts. In general, we found it most useful to address these problems in theoretical terms, without attempting a detailed analysis of empirical data. Thus, in describing our studies on the development of scientific concepts, we have presented a working hypothesis on the relationship of instruction and development. This hypothesis was developed in a separate work and is based on empirical data that we do not review in detail here. We also relied on a theoretical mode of analysis in our attempt to construct a theoretical perspective that would incorporate all our experimental data.

This is followed by a critical analysis of the two most powerful and complete contemporary theories of the development of speech and thinking, those advanced by Jean Piaget and William Stern. The purpose of this analysis was to contrast our statement of the problem and our research methods with more traditional perspectives and methodologies.

... we can summarize the contributions of our research effort in the following way: (1) we have provided experimental evidence indicating that word meaning develops in childhood and identified the basic stages of this process; (2) we have identified the process involved in the development of scientific concepts and demonstrated how this process differs from the development of spontaneous concepts; (3) we have clarified the psychological nature of written speech as a distinct speech function and explored its relationship to thinking; and (4) we have made a contribution to the experimental study of inner speech and the relationship between inner speech and thinking.

Chapter 1 THE PROBLEM AND THE METHOD OF INVESTIGATION

In contrast, the problem of thinking and speech is as old as psychology itself. However, the issue of the relationship of thought to word remains the most confused and least developed aspect of the problem. The atomistic and functional forms of analysis that dominated psychology during past decades led to the analysis of the mental functions in isolation from one another. Psychological methods and research strategies have developed and matured in accordance with this tendency to study separate, isolated, abstracted processes. The problem of the connections among the various mental functions – the problem of their organization in the integrated structure of consciousness – has not been included within the scope of the research.

This assumption (one that was never clearly formulated and is entirely false) is that the links or connections among the mental functions are constant and unvarying, that the relationships between perception and attention, memory and perception, and thought and memory are unchanging. This assumption implies that the relationships among functions can be treated as constants and that these constants do not have to be considered in studies that focus on the functions themselves.

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If we begin with the claim made in antiquity that thought is "speech minus sound," we can trace the development of the first tendency – the tendency to identify thinking and speech – through to the contemporary American psychologist or the reflexologist. These psychologists view thought as a reflex in which the motor component has been inhibited. Not only the resolution of the problem of the relationship of thought to word but the very statement of the issue itself is impossible within these perspectives.

If thought and word coincide, if they are one and the same thing, there can be no investigation of the relationship between them. One cannot study the relationship of a thing to itself. From the outset, then, the problem is irresolvable. The basic issue is simply avoided.

Perspectives that represent the other extreme, perspectives that begin with the concept that thinking and speech are independent of one another, are obviously in a better position to resolve the problem. Representatives of the Wurzburg school², for example, attempt to free thought from all sensory factors, including the word. The link between thought and word is seen as a purely external relationship. Speech is represented as the external expression of thought, as its vestment. Within this framework, it is indeed possible to pose the question of the relationship between thought and word and to attempt a resolution.

The investigation of any mental formation presupposes analysis, but this analysis can take either of two fundamentally different forms. All the failures that researchers have experienced in their attempts to resolve the problem of thinking and speech can be attributed to their reliance on the first of these two forms of analysis. In our view, the second represents the only means available for moving toward a true resolution of this problem.

The first of these forms of analysis begins with the decomposition of the complex mental whole into its elements. This mode of analysis can be compared with a chemical analysis of water in which water is decomposed into hydrogen and oxygen. The essential feature of this form of analysis is that its products are of a different nature than the whole from which they were derived. The elements lack the characteristics inherent in the whole and they possess properties that it did not possess. When one approaches the problem of thinking and speech by decomposing it into its elements, one adopts the strategy of the man who resorts to the decomposition of water into hydrogen and oxygen in his search for a scientific explanation of the characteristics of water, its capacity to extinguish fire or its conformity to Archimedes law for example. This man will discover, to his chagrin, that hydrogen burns and oxygen sustains combustion. He will never succeed in explaining the characteristics of the whole by analyzing the characteristics of its elements. Similarly, a psychology that decomposes verbal thinking into its elements in an attempt to explain its characteristics will search in vain for the unity that is characteristic of the whole. These characteristics are inherent in the phenomenon only as a unified whole. When the whole is analyzed into its elements, these characteristics evaporate. In his attempt to reconstruct these characteristics, the investigator is left with no alternative but to search for external, mechanical forms of interaction between the elements.

The methods we intend to apply in our investigation of the relationship between thinking and speech permit a synthetic analysis of the complex whole. The significance of this approach is illustrated by yet another aspect of the problem, one that has remained in the background in previous research. Specifically, the initial and the primary function of speech is communicative. *Speech is a means of social interaction*, a means of expression and understanding. The mode of analysis that decomposes the whole into its elements divorces the communicative function of speech from its intellectual function. Of course, it is generally accepted that speech combines the function of social interaction and the function of thinking, but these functions have been conceptualized as existing in isolation from one another, they have been conceptualized as operating in parallel with no mutual interdependence. It has always been understood that both functions are somehow combined in speech. But traditional psychology left entirely unexplored issues such as the relationship between these functions, the reason that both are present in speech, the nature of their development, and the nature of their structural relationship. This is largely true of contemporary psychology as well.

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It turns out that just as social interaction is impossible without signs, it is also impossible without meaning. To communicate an experience or some other content of consciousness to another person, it must be related to a class or group of phenomena. As we have pointed out, this requires *generalization*. *Social interaction presupposes generalization and the development of verbal meaning*; generalization becomes possible only with the development of social interaction.

Children who do not possess the appropriate generalization are often unable to communicate their experience. The problem is not the lack of the appropriate words or sounds, but the absence of the appropriate concept or generalization. Without the latter, understanding is impossible. As Tolstoy points out, it is generally not the word itself that the child fails to understand but the concept that the word expresses (1903, p.143). The word is almost always ready when the concept is. Therefore, it may be appropriate to view word meaning not only as a *unity of thinking and speech* but as a *unity of generalization and social interaction, a unity of thinking and communication*.

This statement of the problem has tremendous significance for all issues related to the genesis of thinking and speech. First, it reveals the true potential for a *causal-genetic analysis of thinking and speech*. Only when we learn to see the unity of generalization and social interaction do we begin to understand the actual connection that exists between the child's cognitive and social development.

The first issue that emerges when we consider the relationship of thinking and Speech to the other aspects of the life of consciousness concerns the connection between *intellect and affect*. Among the most basic defects of traditional approaches to the study of psychology has been the isolation of the intellectual from the volitional and affective aspects of consciousness. The inevitable consequence of the isolation of these functions has been the transformation of thinking into an autonomous stream. Thinking itself became the thinker of thoughts. Thinking was divorced from the full vitality of life, from the motives, interests, and inclinations of the thinking individual. Thinking was transformed either into a useless epiphenomenon, a process that can change nothing in the individual's life and behavior, or into an independent and autonomous primeval force that influences the life of consciousness and the life of the personality through its intervention.

There exists a dynamic meaningful system that constitutes a unity of affective and intellectual processes. Every idea contains some remnant of the individual's affective relationship to that aspect of reality which it represents. In this way, analysis into units makes it possible to see the relationship between the individual's needs or inclinations and his thinking. It also allows us to see the opposite relationship, the relationship that links his thought to the dynamics of behavior, to the concrete activity of the personality.

Chapter 2 THE PROBLEM OF SPEECH AND THINKING IN PIAGET'S THEORY

Comparing Piaget's perspectives on the child's thinking to those that had previously dominated psychological research, it becomes clear that his statement of the problem in qualitative rather than quantitative terms resulted in a more positive characterization of the child's mind. Traditional psychology tended to characterize the child's thinking in negative terms. Research involved the enumeration of the flaws, inadequacies, and limitations that differentiate the child's thinking from the adult's. The primary focus was on *what the child does not have*. The child's thinking was characterized in terms of his incapacity for abstract thinking, concept formation, connected judgement, and deduction. In contrast, Piaget attempted to identify what is qualitatively unique in the child's thinking; he attempted to characterize the child's thinking in positive terms. With Piaget, the focus was shifted to the question of *what the child is*, to the question of the distinctive features and characteristics of his thinking.

What was new and remarkable in Piaget's work is in essence simple and commonplace. However, many great things can be expressed or characterized in terms of Rousseau's old and banal position that the child is not a small adult, that the child's mind is not a small adult mind. Piaget clarified this idea and provided an empirical foundation for it. Yet for Piaget, another simple idea lies behind this truth, the idea of development. The varied and fascinating pages of his work greatly illuminate this simple idea.

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This crisis, which signifies the transformation of psychology into a true science, stems from the sharp contradiction that exists between the empirical data that have been accumulated through psychological research and the methodological foundations of our science.

The crisis in psychology is primarily a methodological crisis. It is firmly rooted in history, with the struggle between the materialist and idealist traditions lying at its core. The conflict between these traditions currently seems to be much stronger and sharper in psychology than in other fields.

In Brentano's words, the historical condition of our science is such that there exist many psychologies, but no unified psychology. One could argue, indeed, that the development of this multitude of psychologies is a direct function of the absence of a general, unified psychology. The absence of a unified scientific system that incorporates the whole of contemporary psychological knowledge has produced a situation in which each discovery of significant empirical data *requires* the creation of a new theory; a new system for explaining and understanding newly acquired *data* and or newly identified *relationships*. New data require the creation of a new psychology, a psychology that is one among many.

This is how Freud, Levi-Bruhl, and Blondel created their psychologies. The contradiction between the empirical foundations of their theories and the theoretical constructs raised on these foundations, the idealistic character of these systems (expressed differently in each), and the metaphysical flavor of many of their theoretical constructs, are all the inevitable and fatal reflection of the dualism which we earlier identified as the stamp of the current crisis in psychology. This dualism reflects the fact that when psychology takes a step forward in the accumulation of empirical data it consistently takes two steps back in its theoretical interpretation of this material. At almost every step, contemporary psychology demonstrates most pathetically how new and important discoveries — the ultimate achievement and pride of a science — can become bemired in prescientific concepts which shroud them in *ad hoc*, semi-metaphysical systems and theories.

Piaget strives to avoid this fatal dualism by isolating himself in the narrow domain of empirical data. He wants to know of nothing but the facts. He consciously avoids generalizations, and is even more concerned about moving beyond the problems of psychology to those of related fields such as logic, epistemology, and the history of philosophy. In his view, the best foundation is pure empiricism. In his preface to *The Thought and Language of the Child* (Piaget, 1932), Piaget writes that "this means that the essays before us are first and foremost a collection of facts and documents, and that the bond between the various chapters is not that of systematic exposition, but of unity of method applied to a diversity of material (1932, p. xiii)."

What then is this central link that allows us to see the various characteristics of the child's thinking in a unified manner? Within Piaget's theoretical framework, it is the egocentric nature of the child's thinking. This is the cornerstone of the entire structure. Piaget writes that "we have sought to trace most of the characteristics of child logic to egocentrism (1928, p. 201)." These characteristics form a complex that determines the child's logic. Underlying this complex is the egocentric character of the child's thinking and activity. All characteristics of the child's thinking flow from it. Whether the remaining threads — threads that allow us to use this theoretical generalization to interpret, understand, and connect the various features of the child's logic in a unified whole — are strengthened or broken, depends on our initial acceptance or rejection of this central concept. For example, the author claims that syncretism (a central characteristic of the child's thinking) is the direct result of the child's egocentrism.

Our first task, then, is to consider the egocentric character of the child's thinking and its link with the other aspects of the qualitatively unique nature of the child's thought. Piaget defines egocentric thought as a transitional or intermediate form of thinking, a form that in genetic, functional, and structural terms lies between autistic thought and directed rational thought. In the history of the development of thinking, egocentric thought is a transitional stage, a genetic link.

Piaget's distinction between undirected thought (what Bleuler called autistic thought) and rational or directed thought is borrowed from psychoanalytic theory.

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Rational or directed thinking is social. As it develops, it is increasingly subordinated to the laws of experience and pure logic. Autistic thought, as its name implies, is individual and is subordinated to a set of special laws that need not be precisely defined here.

Between these two extreme forms of thought,

"there are many degrees, varying with their capacity for being communicated. These intermediate varieties must therefore be subject to a special logic, intermediate between the logic of autism and that of intelligence. The chief of those intermediate forms, i.e., the type of thought which like that exhibited by our children seeks to adapt itself to reality, but does not communicate itself as such, we propose to call egocentric thought" (1932, p. 45).

Piaget formulates this position on the intermediate character of the child's egocentric thought still more clearly, saying, "all egocentrism is designed by its structure to stand half-way between autistic thought which is 'undirected,' i.e., which as in day-dreaming hovers about at the mercy of every whim, and 'directed' intelligence (1932, p. 238)." It is not only the structure but the function of this form of thinking that locates it between autistic thinking and real thinking in a genetic series. As noted above, the function of this thinking is not so much in the individual's adaptation to reality as in the satisfaction of his needs.

In Piaget's view, it is clear that:

"From the genetic point of view, we must start from the child's activity if we want to explain his thought. Now, this activity is unquestionably egocentric and egotistical. The social instinct is late in developing. The first critical stage occurs at the age of 7-8 (1928, p. 209)."

It is to this age that Piaget relates the first period of logical reflection as well as the child's first efforts to escape the consequences of egocentrism.

In essence, this attempt to derive egocentrism from the later development of the social instinct and the biological egoism of the child's nature is inherent in Piaget's definition of egocentric thought. Egocentric thought is represented as individual rather than socialized thought, and for Piaget, socialized thought means rational or realistic thought.

This seemingly casual formulation brings us directly to the hidden philosophy of the whole of Piaget's research. It brings us to the problem of the social and the biological in the child's mental development, to the question of the nature of the child's development.

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Autistic thinking is not, however, the first stage in the mental development of either the human species or the child. It is not a primitive function, not the point of departure for the whole of development. It is not the basic or initial form from which all others take their beginning.

Not even for biological evolution or the biological analysis of infant behavior does autistic thinking warrant the status suggested by Freud and accepted by Piaget. As we have seen, both Freud and Piaget maintain that autism is the first and basic stage in the development of thinking, a stage that provides the framework on which all subsequent stages are constructed. In Piaget's words, this earliest stage in the development of thinking is a kind of illusory imagination. The pleasure principle, which directs autistic thinking, precedes the reality principle, which directs logical or rational thinking. It is of particular interest that biologically oriented theories, in particular that of Bleuler who developed the theory of autistic thinking, have reached this same conclusion.

Recently, Bleuler has pointed out that the phrase "autistic thinking" has led to several misunderstandings. Specifically, he cites the tendency to merge the concept of autistic thinking with the concepts of schizophrenic autism and egoistic thinking. He therefore proposes that autistic thinking should be called "unrealistic thinking" in order to contrast it directly with realistic or rational thinking. However, this change in the designation of autistic thinking, though perhaps necessary, masks an important change in the content of the concept itself.

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Bleuler (1927) clearly expressed the nature of this change in a study that focused on autistic thinking. He gives precise expression to the issue of the genetic relationship between autistic and rational thinking, noting that autistic thinking is usually placed at a genetically earlier stage than rational thinking.

"Realistic thinking, thinking that satisfies the complex needs of reality (i.e., "the reality function"), is much more easily crippled under the influence of illness than is autistic thinking. In fact, autistic thinking advances to the forefront as a consequence of the disease process. As a result, French psychologists, Janet in particular, suggest that the reality function is the higher and more complex of the two forms of thinking. However, only Freud takes a clear position on this issue, stating that the mechanism of pleasure is primary in the developmental process. Freud accepts the notion that the human egg that is separated from the external world by its shell, live autistic lives. In Freud's view, the child "hallucinates" about the satisfaction of his inner needs and shows his dissatisfaction by expressing his intensifying irritation or through motor reactions such as cries and movement, subsequently experiencing an hallucinatory form of satisfaction (ibid, p. 55-56)."

In this way, Bleuler formulates the basic position of the psychoanalytic theory of child development on which Piaget relied. He defines egocentric child thinking as a transitional stage between this initial, primary autism (which in another work on infant psychology Piaget justifiably refers to as egocentrism) – which taken to its logical limit is solipsism – and rational thinking.

In opposition to this perspective, Bleuler develops what seems to us, in developmental terms, an invincible argument.

"I cannot agree with this. I do not see any hallucinatory satisfaction in the infant. I see satisfaction only after the infant has actually received food; and I must say the chick in the egg breaks out not with the aid of representations, but with the benefit of physically and chemically perceivable food. In my observations of the older child, I also fail to see his preference for an imaginary apple over a real one. And the imbecile as well as the savage are both real politicians. The latter, in precisely the same manner as we who stand at the pinnacle of the development of the capacity for thought, demonstrates his autistic stupidity only in situations where his reason and experience turn out to be insufficient, that is, in his concepts of the cosmos and natural phenomena, in his understanding of disease and other misfortunes, and in the measures he takes to protect himself from the latter. In the imbecile, it is not only realistic thinking but autistic thinking as well that is simplified. I have not been able to find a being capable of life, however limited its development, that does not react to reality before all else. I cannot, indeed, imagine such a being. Moreover, I cannot imagine an autistic function that could exist below a given level of organization, since the autistic function requires extremely complex capacities of memory. Thus, except for a few observations of the more highly developed animals, comparative psychology knows only the reality function.

The apparent contradiction is easily resolved: the autistic function is not primitive as the more simple forms of the reality function. It is, however, more primitive in several respects than the higher forms of the reality function as it has developed in man. The lower animals possess only the reality function. No being thinks exclusively in an autistic manner. At a certain stage of development, however, the autistic function is combined with the reality function. From this point on it develops together with it (ibid, pp. 57-58)."

One need only consider the development of thinking within the general framework of biological evolution to be convinced that the first form of intellectual activity is active, practical thinking. This is thinking that is directed toward reality. It is a basic form of adapting to new or changing conditions in the external environment.

From a biological perspective, it is nonsense to assume that the fantasy function the logic of the dream is biologically or evolutionarily primary; to assume that thinking emerged and developed from lower to higher animal forms and from the higher animal forms to man as a function of self-satisfaction (i.e., in subordination to the pleasure principle). In biological terms, the assumption of the primacy of the pleasure principle in the development of thought precludes any explanation of the origin of the mental function that we call intellect or thinking.

Bleuler poses the question of how autistic thinking, a function that in phylogenetic terms is so recent can be so widely distributed and so powerful that it directs the greater part of the mental life of many children after the age of two (e.g., in fantasy, daydreams, and play).

Bleuler's answer to this question is that: (1) the development of speech creates favorable conditions for autistic thinking, and (2) autism provides a receptive field for the exercise of the child's developing intellectual capacities. In the child's fantasies, his capacities to combine concepts increase in parallel with his physical dexterity in active play. "The child playing soldier or mother exercises a necessary complex of representations and emotions much like the kitten preparing itself for the hunt (ibid, p. 76)."

While this new understanding of the phenomenon clarifies the function, structure, and genesis of the autistic function, it suggests that we need to reconsider its nature. In our view the unconscious nature of autistic thinking is the central problem. "Autistic thought is unconscious." Freud and Piaget both begin with this definition.

Even egocentric thought, argues Piaget, is still not fully conscious. In this respect, it occupies an position intermediate between the conscious reasoning of the adult and the unconscious activity of dreaming.

The notion that autistic and egocentric thought are unconscious is indeed fundamental to Piaget's general conception of the phenomenon. His basic definition of egocentric thought is that it is thought which is not conscious of its task and its goal, that it is thought which satisfies an unconscious urge. But even the concept of the unconscious nature of autistic thinking is shaken by Bleuler's arguments. Bleuler writes that "with Freud autistic thinking is so closely related to unconscious thinking that an inexperienced man might easily fuse the two concepts (1927, p. 43)." It is Bleuler's conclusion, however, that these concepts must be strictly distinguished. Bleuler argues that "autistic thinking can, in principle, be conscious as well as unconscious" and provides several concrete examples of how autistic thinking takes both forms (ibid).

The notion that autistic and egocentric thinking are not directed toward reality is also attacked in Bleuler's studies.

"In accordance with the field on which autistic thinking is expressed, we find two forms that differ primarily in the degree to which they depart from reality. These two forms are not sharply distinct from one another, but in their prototypical forms significant differences do emerge (ibid, p. 26-27)." One form differs from the other in the extent to which it approximates reality. "The autism of the normal man in a waking state is closely linked with reality and operates almost exclusively with normal representations and firmly established concepts (ibid, p. 27)."

Whether our concern is genetic, functional, or structural, then, autistic thinking is neither the first stage of all subsequent forms of thinking nor their foundation. This implies that we must reconsider the notion that the child's egocentrism is an intermediate or transitional stage between autistic thinking and other higher forms of thought.

3

Our first step will be to clarify Piaget's own ideas, to define as precisely as possible what it is that he sees as the empirical foundation for his theory. This foundation appears in his research on the functions of the child's speech. Piaget classifies all the child's conversation as either egocentric or social speech. When he speaks of egocentric speech, Piaget is concerned with a speech form that is distinguished primarily by its function. Piaget writes that "this talk is egocentric partly because the child speaks only about himself, but chiefly because he does not attempt to place himself at the point of view of his hearer (1932, p. 9)." The child is not interested in whether anyone partner or to inform him of something. This is monologue, reminiscent of monologue in drama. Its essence can be expressed in a single formula: "The child talks to himself as though he were thinking aloud. He does not address anyone (1932, p. 9). When he is occupied with something, the child accompanies his action with a variety of utterances. It is this verbal accompaniment of activity that Piaget designates with the term egocentric speech." The child's socialized speech has an entirely different function. In this speech, the child actually exchanges thoughts with others; he requests, orders, threatens, informs, criticises, or asks questions.

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In the simplest terms, Piaget contends that while the adult tends to think in a socialized manner even when he is alone, the child of under 7 years of age thinks and speaks egocentrically even when he is in a social context. If we also remember that along with the thoughts the child expresses in speech he has a large quantity of egocentric thoughts that remain unexpressed, it is clear that the coefficient of egocentric thinking exceeds the coefficient of egocentric speech by a substantial margin.

He continues: "There is, as we have said, no real social life between children of less than 7 or 8 years (1932, p. 40)."

Piaget's observations of social life in a children's home in Geneva indicate that only between 7 and 8 years of age do children manifest the need to work together.

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Leaving issues of fact aside for the moment, the basic outline of Piaget's theory of egocentric speech is sufficiently clear. It is his contention that the majority of the young child's speech is egocentric. It is not a means of social interaction. It does not have a communicative function. It provides a rhythm for the child's activity and experience, accompanying it in the sense that an accompaniment is provided for a basic melody in music. Egocentric speech contributes nothing essential to the child's activity or experience, any more than the course or structure of a basic melody is influenced by its accompaniment. There is agreement but no internal connection.

For Piaget the child's egocentric speech is an accessory of the activity, a reflection of the egocentric nature of the child's thinking. The highest law for the child is play. His thinking is primarily an illusory imagination, a form of imagination expressed in egocentric speech.

First, in contrast to Piaget, our studies indicate that egocentric speech begins to play a unique and important role in the child's activity at a very early age. Our experiments were similar to those conducted by Piaget. In them, we attempted to identify what it is that elicits egocentric speech in the child, to clarify what gives rise to it. With this in mind, we organized the behavior of the child in a manner nearly identical to that characteristic of Piaget's studies. The essential difference was that we introduced several factors that tended to increase the difficulty of the child's task. For example, in a unrestricted drawing task, we introduced an impediment or obstacle to the child's activity. The task was arranged such that the child did not have the colored pencil, paper, or paint that he needed. In short, we introduced some form of disturbance or difficulty into the child's activity.

These studies demonstrated that the coefficient of egocentric speech nearly doubled when some difficulty or impediment was included in the task. This was true whether we compared these finding with the coefficients of egocentric speech identified by Piaget or with coefficients derived from the performance of the children in our own studies in situations with no experimentally induced difficulties or impediments.

When the child encountered a problem, he attempted to assess the situation: "Where is the pencil? I need a blue pencil now. Nothing. Instead of that I will color it red and put water on it – that will make it darker and more like blue." The child conducted this entire discourse with himself.

The reader of Piaget's works will see that these data can be fruitfully considered in connection with two thoughts or theoretical positions frequently developed by Piaget in his work. The first is the law of conscious reflection, initially formulated by Claparede. This law states that difficulties or impediments encountered in automatic activity lead to conscious reflection on that activity. The second is the claim that the appearance of speech signifies this process of conscious reflection. We see something like this happening in the behavior of the children in our studies. Egocentric speech is the attempt to make sense of the situation in words, to find a solution to a problem or plan the next action. It emerges in response to the more complex situation.

Older children acted somewhat differently. They looked over the situation, thought (as evidenced by long pauses), and then found the solution. When asked what they had thought about, these older children gave answers that indicated a similarity between their covert behavior and the overt verbal thinking of the preschooler. Our assumption, then, is that the same operations that the preschooler carries out in overt speech are carried out by the school-age child in soundless, inner speech. We will return to this issue later.

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Piaget, of course, does not provide us with a foundation for this concept. He does not indicate that egocentric speech should be considered a transitional stage of this kind. On the contrary, it is Piaget's view that the fate of egocentric speech is to atrophy. In Piaget's work, the question of the development of the child's inner speech remains the least clarified of all issues concerning the child's speech. In fact, one gets the impression that inner speech – understood as speech that is psychologically inner and that functions in a manner analogous to external egocentric speech — precedes external or socialized speech.

Though from a genetic perspective this position may be ludicrous, Piaget must reach precisely this kind of conclusion if he consistently develops his thesis that socialized speech arises after egocentric speech, that socialized speech asserts itself only after egocentric speech has atrophied.

It is not difficult to demonstrate the similarity between these structural changes and those that are basic to inner speech. The tendency for abbreviation, in particular, is fundamental to both. This suggests that the rapid disappearance of egocentric speech that Piaget observed in school-age children reflects not the atrophy of egocentric speech but its transformation into inner speech, its movement to the inner sphere.

The phenomenon of egocentric speech, as we conceptualize it, cannot provide support for an argument concerning levels of egocentric thought. The intellectual function of egocentric speech, which appears to be directly linked with the development of inner speech and its functional characteristics, is not a direct reflection of egocentrism in the child's thought. On the contrary, it demonstrates that under appropriate conditions egocentric speech can be utilized as a means of realistic thinking at a very early age.

To repeat, then, it may be that the child's egocentric speech is not the expression of egocentric thinking. Egocentric speech may, in fact, function as a component of realistic thinking. Egocentric speech may be fused not with the logic of dream or fantasy but with the logic of rational, goal-directed action and thinking.

5

In Piaget's view, the development of the child's thinking moves from autism to socialized speech, from illusory imagination to logical relations. As Piaget would express it, he strives to observe the process through which the psychological substance of the child assimilates (i.e., deforms) the social influences originating in the speech and thinking of the adults who interact with him. For Piaget, the history of the child's thought is a history of a gradual socialization of the profoundly intimate, inner, personal, and autistic characteristics that define the child's mind. Social [thought] lies at the end of the developmental process. Even social speech is said to emerge later than the end of the developmental process. Even social speech is said to emerge later than egocentric forms of speech. Our hypothesis suggests that the development of the child's thinking has a fundamentally different organization. As we have said, it is our view that Piaget's perspective presents the most important genetic relationships in this developmental process. He presents them in distorted form however.

Our hypothesis obligates us to represent the overall process of development in the following way. The initial function of speech is social, that of social interaction or social linkage. Speech effects those in the immediate environment and may be initiated by either the adult or the child. The first form of speech in the child, then, is purely social. The notion that speech is socialized is incorrect in that this implies that speech was originally non-social, that it becomes social only through development and change.

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The social speech of the child is a phenomenon with multiple functions, a phenomenon that develops in accordance with the law of functional differentiation. It is only after an initial stage where the child's speech is a purely social phenomenon, only in subsequent growth and development, that we begin to see a sharp differentiation of social speech into egocentric and communicative speech. We prefer the term "communicative" rather than "socialized" speech partly because of the considerations discussed above. In addition, our hypothesis indicates that egocentric and communicative speech are equally social; they simply have different functions. In accordance with this hypothesis, egocentric speech develops in a social process that involves the transmission of social forms of behavior to the child. Egocentric speech develops through a movement of social forms of collaboration into the sphere of individual mental functions.

Egocentric speech is a form critical to the transition from external to inner speech. This is why it is of such tremendous theoretical interest. Our entire scheme can be represented in the following way:
social speech – egocentric speech – inner speech

This scheme can be usefully contrasted with that assumed by the traditional theory of inner speech development and with that inherent in Piaget's proposals. Traditional theory assumed the following sequence:

external speech – whispered speech – inner speech

Piaget's scheme assumes a different sequence, one related to the development of logical verbal thinking:

inner autistic thinking

|
egocentric speech
and egocentric thinking

|
socialized speech and logical thinking

One and the same point in the development of the child's thinking, that is, the phenomenon of egocentric speech, is placed in entirely different developmental sequences by Piaget and ourselves. For Piaget, egocentric speech acts as a transitional stage in the development from autism to logic, in the development from the intimately individual to the social. For us, egocentric speech acts as a transitional form in the movement from external to inner speech, in the movement from social to individual speech. We would include autistic verbal thought as an aspect of the latter.

... a single basic question: What course does the development of the child's thinking take? Does it move from autism, illusory imagination, or the logic of the dream to socialized speech and logical thinking, passing through the stage of egocentric speech at a critical point in the process? Or does the process take the opposite course, beginning with the child's social speech and moving through egocentric speech to inner speech and thinking, with both autistic and logical forms of thinking included in the latter?

The actual movement in the development of the child's thinking occurs not from the individual to some state of socialization but from the social to the individual. This was the basic conclusion of our theoretical discussion. It is also the basic conclusion of our empirical work.

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Finally, we attempted to show that the child's egocentric speech is not a simple by-product of his activity, that it is not simply an external manifestation of an inner egocentrism which atrophies at seven or eight years of age. On the contrary, it appears that egocentric speech is a transitional stage in the developmental process through which speech moves from the external to the inner plane. Thus, the empirical foundation of Piaget's general conception is shaken and the conception as a whole falls with it.

Vygotsky - Thinking and Speech

At this point, we must attempt to state our findings in more general terms. Our first and basic position – the central idea of our entire critique – is that Piaget and the psychoanalysts have framed the problem incorrectly. We cannot place the satisfaction of needs and the process of adaptation to external reality in opposition to one another. We cannot ask: "What is the motive force of the child's thinking? Is it a striving to satisfy inner needs or a striving to adapt to objective reality?" Considered from the perspective of developmental theory, the very concept of needs includes the idea that these needs must be satisfied through some adaptation to reality. In our view, Bleuler has demonstrated that the infant's needs are satisfied not when he hallucinates about pleasure or satisfaction but when he actually receives food. In the same sense, the older child's preference for the real over the imaginary apple indicates that his thinking and activity are propelled by his needs, not that he has forgotten his needs for the sake of adaptation or accommodation to external reality.

The fact is that adaptation to objective reality simply for the sake of adaptation, adaptation independent of the needs of the organism or personality, simply does not occur. All adaptation is directed by needs. This is a rather banal notion, even a truism, but it has somehow been overlooked in the development of the theoretical perspectives that we have considered here.

If the basic needs for food, warmth, and movement are the motive and directive forces that define the whole of the organism's adaptation to reality, the inherent meaninglessness of the practice of opposing one form of thinking which functions to satisfy inner needs with another which functions to adapt the organism to reality becomes apparent. Need and adaptation must be considered in their unity. In developed forms of autistic thinking, one can observe an isolation from reality that strives to obtain in imagination a satisfaction of needs which have not been satisfied in life. But this phenomenon is the product of a late development. The development of autistic thinking requires the development of realistic thinking, in particular, the development of the capacity to think in concepts. When Piaget borrows Freud's concept that the pleasure principle precedes the reality principle (Piaget, 1928, p. 202), he adopts the whole metaphysics associated with the concept of the pleasure principle. Here the principle is transformed from an auxiliary or biologically subordinant characteristic into a kind of independent vital force, into the prime mover of the whole process of mental development. Piaget writes that:

It is one of the merits of psychoanalysis to have shown that autism knows of no adaptation to reality, because pleasure is its only spring of action. Thus the sole function of autistic thought is to give immediate and unlimited satisfaction to desires and interests by deforming reality so as to adapt it to the ego (1928, p. 244),

Having divorced satisfaction and needs from the process of adaptation to reality, having given satisfaction and needs the status of an independent metaphysical beginning, Piaget is forced by logical necessity to represent realistic thinking as a phenomenon completely severed from the real needs, interests, and wishes of the organism, that is, as *pure thought*. But thought of this kind does not exist in nature. Needs do not exist independently of adaptation. That is why one cannot sever needs from the process of adaptation or oppose the organism's needs to this process. In the child, there exists no form of thinking that operates for the sake of pure truth, no form of thinking divorced from the earth, from needs, wishes, and interests.

In distinguishing autistic from realistic thought, Piaget writes that "it tends not to establish truths, but to satisfy desires (1932, p. 43)." But do wishes really exist that consistently exclude reality? Is there really a form of thought that is absolutely independent of practical needs, a form of thought that would strive toward the establishment of truth for the sake of truth itself? Remember, we are concerned here with the thought of the child. Only empty abstractions devoid of any real content, only logical functions or metaphysical hypostases can be differentiated in this manner. The actual, vital process of the child's thinking cannot.

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In comments on the Aristotelian critique of the Pythagorean theory of numbers and the Platonic theory of ideas existing in isolation from sensual things, Lenin said the following:

In essential idealism: the general (the concept or the idea) is a distinct entity. This seems a wild, foreign, or, more accurately, a childish absurdity. But isn't the contemporary idealism of Kant, Hegel, and the idea of god really entirely of the same type? Tables, chairs, and the idea of the table and the chair; the world and the idea of the world (god); the thing and "numen," the unknowable "thing in itself"; the connection of earth and sun, of nature in general and law, (Logos), god. The bifurcation of man's knowledge and the potential for idealism (=religion) is already given in the first, elementary abstraction ...

The approach of the mind (of man) to the isolated thing, the removal of a copy (=concept) from it, is not a simple, immediate, mirroring act. It is a complex, bifurcated, zigzagging process that includes in itself the potential for a flight of fantasy from life; it includes a potential for the transformation (and this a transformation unnoticed by man, unconscious) of the abstract concept the idea into a fantasy (in letzter Instanz = God). For even in the simplest abstraction, the most elementary general idea (the "table" in general) there is a certain element of fantasy (vol. 29, pp. 329-330).

We saw that the child's egocentric speech is not divorced from reality, activity, or adaptation. It is not speech that is "hanging in air." We saw that this speech constitutes a necessary feature of the child's rational activity. It is intellectualized, occupying the mind in the first goal-directed actions. We saw that in the child's more complex activity it begins to serve as a means for forming intentions and plans. Activity and practice – these are the new concepts that have allowed us to consider the function of egocentric speech from a new perspective, to consider it in its completeness. They have enabled us to identify new factors in of the child's thinking, factors which – like the other side of the moon ~ have generally remained outside the observer's field of vision.

Piaget argues that things do not influence the mind of the child. But we have seen that where the child's egocentric speech is linked to his practical activity, where it is linked to his thinking, things really do operate on his mind and influence it. By the word "things," we mean reality. However, what we have in mind is not reality as it is passively reflected in perception or abstractly cognized. We mean reality as it is encountered in practice. This new concept, this problem of reality and practice and their role in the development of the child's thinking, fundamentally changes the whole picture.

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The movement of research toward philosophical problems permeates the whole of contemporary psychology. Attempts are made in empirical psychological research to address issues of direct and fundamental significance to philosophy. Correspondingly, this research has become dependent on philosophical perspectives for its approach to the statement and resolution of problems.

In Piaget's view, the greatest dangers are those of making premature generalizations of experimental results or finding oneself under the power of preconceived notions, under the power of prejudicial logical systems. As we have pointed out, Piaget therefore resists giving an excessively systematic account of his experiments and findings. Even more vigorously, he resists generalizations that would take him beyond the boundaries of the field of child psychology. His intention is to limit himself exclusively to the analysis of facts and to resist extending these facts into philosophical domains. However, Piaget must recognize that logic, the history of philosophy, and epistemological theory are fields with inherent links to the study of the development of logic in the child. Willingly or unwillingly, he touches on a whole series of problems from these complex fields. With surprising consistency, every time he approaches the boundaries of these philosophical fields, they tear at the very fabric of his thought.

Nonetheless, strange as it seems, Piaget himself consciously strives to keep his thought at the stage of pre-causality in this sense. He notes that there exists a parallel in this respect between the child and scientific tradition (1928, p. 197). Of course, Piaget views his rejection of causality as an indication of a supra-causal stage in the development of thought, as an expression of a form of scientific thinking that has passed the stage at which the concept of causality is utilized. The fact remains, however, that whatever his intentions, anyone who rejects the concept of causality has reverted to the pre-causal stage that Piaget has so well described in his analysis of the thinking of the child.

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What is it that Piaget offers as an alternative to the principle of causality? Piaget relies on genetic rather than causal analysis. The principle of causality is exchanged for the higher principle of development.

Fundamental to any analysis of this issue in Piaget's theory is a recognition of the gap he assumes to exist between the biological and the social. Piaget thinks of the biological as primal, initial, and self-contained within the child. He views the biological as forming the child's substance. In contrast, the social acts through compulsion or constraint as an external force which is foreign to the child himself. The social replaces the child's own characteristics, the modes of thinking that correspond to his own inner nature. The social implants schemes of thought that are foreign to the child and dictated from without. It is not surprising, therefore, that even in his newer perspective, Piaget unites the two extreme poles – egocentrism and cooperation – by a third component of force or compulsion. These words clearly express Piaget's actual conception of the mechanism through which the social environment directs the development of the child's thinking.

Piaget shares this conception with psychoanalytic theory. Here too, the environment is perceived as something external to the personality. The social environment exerts pressure on the personality, forcing it to restrict its own inclinations or impulses, to change them to pursue its needs indirectly. Compulsion and pressure – these two words are essential for expressing Piaget's view of the influence of the social environment on the child's development.

As we have seen, Piaget compares the processes through which social influences occur to the processes of assimilation. He studies how these influences are assimilated, that is, how they are deformed by the living being and instilled in its substance. But the child's own mental substance, the structure and mode of functioning that is characteristic of his thought, is qualitatively different from the thinking of the adult. It is defined by autism, by the biological characteristics of the child's nature. The child is not seen as a part of the social whole, as a subject of social relationships. He is not seen as a being who participates in the societal life of the social whole to which he belongs from the outset. The social is viewed as something standing outside the child, foreign force which exerts pressure and ultimately supplants his characteristic modes of thinking.

According to Piaget, then, the child's thinking is unique in that his mind is woven on two looms. The first, woven on a plane of subjectivity, wishes, and caprice, is the more important because it is a function of the child himself. Had Piaget and Claparede not cited Freud and his pleasure principle, there still would have been no doubt that we are dealing here with a purely biological conception of the child, a conception that attempts to derive the characteristics of the child's thinking from his biological nature. In his analysis of the child's development, Piaget in fact represents the biological and social as two forces entirely external to one another, two forces acting on one another externally and mechanically. This is clearly demonstrated in the conclusions to which his research leads.

The central conclusion of Piaget's subsequent two volumes of research is that the child lives in a bifurcated reality. One of these worlds is constructed on the foundation of his own thinking, on the foundation of the thinking that is characteristic of his own nature. The second is constructed on the basis of the logical thinking dictated to him by the people with whom he interacts.

In Piaget's view, the bifurcation of the child's thinking logically implies the child's development of a bifurcated perception of reality. Two different looms — two different fabrics. Two modes of thinking — two realities. This bifurcation will be reflected all the more sharply and strongly in each of the two planes on which the child's thought is woven. Each must have its own logic and, in the words of an authoritative witness, protest loudly when united with the logic of the other. Thus, it is the fate of the child's thought not only to dwell in a bifurcated, split reality, but to be constructed of two irreducible, absolutely heterogeneous, and fundamentally hostile fabrics. In Piaget's view, autistic thought creates an imaginary reality, a reality of dreams.

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With the same logical necessity, there arises the question of which of these two looms is the more important. To which of these two fabrics should primacy be given? The first part of this question, as we have seen, is answered clearly by Claparede. That which is produced on the lower plane is the more important in the first years of life. As we shall see, Piaget answers the second question no less categorically when he asserts that reality is much less real for the child than it is for us. Following the logic of this irresistible argument, we must recognize that the child's thought exists (in the words of the mystic poet) on the threshold of a dual existence; his soul dwells in two worlds.

Piaget suggests that it is unclear whether the child suffers from this bipolar reality. He raises the possibility that the child may have two or more realities which, in contrast to the hierarchically organized reality of the adult, are truly alternative realities.

In particular, in the first stage of the child's development (two to three years of age according to Piaget), the real is simply that which is wished: "Freud's 'pleasure principle' deforms and refashions the world to its liking. The second stage marks the appearance of two heterogeneous but equal realities — the world of play and the world of observation" (1928, p. 246). And further: "Childish play may therefore be said to constitute an autonomous reality, by which we mean that the 'true' reality to which it stands in contrast is far less true for the child than for us" (1928, p. 248).

This thought is not unique to Piaget. All theories of child psychology that start from this set of fundamental assumptions are permeated with this idea. The child lives in two worlds. All that is social is foreign to the child, dictated to him from the outside. V. Eliasberg recently expressed the idea very clearly in a discussion of the child's autonomous speech. Speaking of the representation of the world that the child masters through speech, he concludes that it does not correspond with the nature of the child, that it is contradictory to that integral whole which we see in the child's play and drawings. With the adult's speech, he writes, the child masters the categorical forms, the division of the subjective and the objective, the I and the you, the here and the there, the now and the later — das Alles voellig unkindgemaess. Repeating Goethe's famous lines, he writes that two spirits dwell in the child. The first is fully connected with the child's spirit. The second arises under adult influence; this is the experience of the world in categories. Two spirits — two worlds — two realities. This conclusion is the inevitable consequence of the proposition that the social and the biological act as two forces entirely external to one another, as two fundamentally foreign beginnings.

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What, in Piaget's view, is the nature of the process through which the child's thought is socialized? We have seen that the process is perceived as external and foreign to the child himself. A second feature, however, is basic to this process. In Piaget's view, socialization is the only source of the development of logical thinking. What, however, is the actual content of the socialization process? It is a process of overcoming the child's egocentrism. Rather than thinking only for himself, the child begins to accommodate his thinking to the thought of others. Left to himself, the child would never attain logical thinking, because he acts exclusively in fantasy. In Piaget's view, "things are not sufficient in themselves to make the mind feel any need for verification, since things themselves have been made by the mind" (1928, p. 203).

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In concluding, we must pose the question of what is central and basic to Piaget's overall conception one last time. We would suggest that the absence of two factors is fundamental to Piaget's conception. One senses the absence of these factors with Piaget's first discussion of the narrow issue of egocentric speech. What is missing, then, in Piaget's perspective is reality and the child's relationship to that reality. What is missing is the child's practical activity. This is fundamental. Even the socialization of the child's thinking is analyzed by Piaget outside the context of practice. It is isolated from reality and treated as the pure interaction or communication of minds. It is this kind of socialization which in Piaget's view leads to the development of thought. The apprehension of truth, and the logical forms that make this knowledge possible, arise not in the practical mastery of reality but in the accommodation of the ideas of one individual to those of another.

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The child's behavior in the home environment differs even more markedly from what Piaget observed. Here, the process through which the child learns speech is social from start to finish. Stern has clearly established the primacy of the social function of speech in this context. The social function appears at the beginning of language mastery. The child has many practical and spiritual needs. He must frequently ask for things, inquire about things, listen carefully to something that he is striving to understand, or make attempts to be understood. Social speech begins to play a major role in the first years of the child's life (Stern & Stern, 1928, pp. 148-149). Stern provides substantial empirical support for this position in his books characterizing the development of the speech of the child in the early years.

In his preface to the Russian edition of his book, Piaget states forthrightly that:

"When one works, as I have been forced to work, within a single social environment such as that of the children in Geneva, it is impossible to establish with any precision the relative roles of the individual and the social in the development of the child's thinking. In order to make this distinction, we must study children in the most varied social environments (1932, p. 56)."

This leads Piaget to point to the potential for cooperative work with Soviet psychologists who have the opportunity to study children in a very different social environment. "Nothing could be more useful for science than this movement of Soviet psychologists toward the work done in other countries" (ibid).

We also assume that studying the development of the child's thinking in different social environments will lead to the establishment of extremely important laws. This may be particularly true in social environments where – in contrast to those studied by Piaget – children work. Such studies will create a potential for establishing laws relevant not only to the here and now but to the development of the child generally. This will require, however, that child psychology fundamentally transform its basic methodological traditions.

Chapter 3 STERN'S THEORY OF SPEECH DEVELOPMENT

Several experimental studies have demonstrated that the development of the use of signs, the transition to sign operations (i.e., to the signifying functions of speech), is not the product of a sudden discovery or invention by the child. This transition does not occur all at once or only once in the child's life as Stern suggests. The child does not at "one time on a single type of word discover the fundamental essence of the symbol" (ibid, p. 194). On the contrary, this is an extremely complex genetic process. There is a "natural history of signs." Signs have their natural roots and transitional forms in more primitive modes of behavior, in what is referred to as the illusory significance of objects in play and, still earlier, in the indicative gesture. Signs also have a "cultural history" that has its own phases and stages, its own quantitative, qualitative, and functional changes, its own advances and metamorphoses, its own dynamic and its own regularities.

Stern ignores the complex developmental process leading to the maturation of the signifying function. The process of speech development is infinitely oversimplified. This is the inevitable fate of any intellectualistic theory that substitutes a logicalized explanation for an account of the actual complex process of development. To the question of how the meaningful nature of the child's speech develops, this theory answers that "the child discovers that speech has meaning." This type of explanation is entirely appropriate for an intellectualistic theory. In this way, Stern's theory takes its place among theories such as the theory of the invention of language or the rationalistic theory of social contract. As we have seen, the greatest problem with these explanations is that they explain nothing.

Stern declares that the social environment is a major factor in the development of the child's speech (ibid, p. 291). In practice, however, he limits the role of this factor to a purely quantitative influence on the developmental process; he limits it to the acceleration or delay of that process.

The actual course of development is subordinated to internal laws, laws inherent to the organism. This leads Stern to a monumental overestimation of the importance of internal factors. We attempted to illustrate this phenomenon using the example of his explanation of the meaningful character of speech. This overestimation of the internal is a function of Stern's most basic assumption.

Chapter 4 THE GENETIC ROOTS OF THINKING AND SPEECH

Vygotsky - Thinking and Speech

Kohler's experiments demonstrate clearly that the rudiments of intellect or thinking appear in animals independent of the development of speech and are absolutely unconnected with the level of speech development. The "inventions" of the higher apes, their preparation and use of tools, and their use of indirect paths in the solution of problems, clearly constitute an initial *pre-speech* phase in the development of thinking.

Thus, a negative finding is frequently a function not of the phenomenon being studied, but of the researcher's understanding of it. That an animal falls to solve a given task under a specific set of conditions does not imply that it lacks the capacity to solve any such task under any conditions. Kohler correctly states that "research on mental endowment inherently tests not only the subject but the experimenter himself" (1921a, p. 191).

The child's rich and complex social contact leads to an early development of means of social connection. It has been clearly demonstrated that simple though unique reactions to the human voice are present in the third week of life (i.e., the presocial reactions) and that the first social reactions appear by the second month (C. Buhler 1927, p. 124). Laughter, babbling, pointing, and gesture emerge as means of social contact in the first months of the child's life. During the first year, then, we find in the human child both of the speech functions that we encountered in our discussion of speech in phylogenesis.

However, the most important event in the development of the child's thinking and speech occurs at approximately two years of age. It is at this point that the lines representing the development of thinking and speech, lines that up to this point have moved in isolation from one another, cross and begin to coincide. This provides the foundation for an entirely new form of behavior, one that is an essential characteristic of man.

Stern provided the first and best description of this extraordinarily important event in the child's mental life. He demonstrated that a vague consciousness of the significance of language and the will to master it is awakened in the child. The child makes what is the most significant discovery of his life, the discovery that "each thing has its name" (1922, p. 92). This critical moment, the moment when speech becomes intellectual and thinking verbal, is marked by two clear and objective symptoms. These signs provide a foundation for reliable judgments concerning whether this turning point in speech development has occurred. In cases of abnormal or arrested development, they make it possible to determine the extent to which development has been delayed since these two symptoms are closely linked. First, the child who has attained this level of development begins to actively expand his vocabulary by asking the name of each new thing he encounters. Second, these efforts result in an extremely rapid increase in the child's vocabulary.

As is well known, animals can master the words of human speech and use them in appropriate situations. Before the child reaches this critical point in development, he also masters individual words that are for him nothing more than conditioned stimuli substitutes for objects, people, actions, states, or desires. At this point in his development, however, the child knows words only to the extent that they are given to him

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The methodological resolution of this problem requires that we find a middle link that unites the processes of external and inner speech, a link that is transitional between these two processes. As we have attempted to demonstrate, Watson's belief that this middle link is to be found in the whisper has no objective support. All that we know of the child's whisper contradicts the notion that it is the middle link in the transition between external and inner speech. However, the attempt to find this middle link – an attempt which is absent from most psychological investigations of this problem – is correct.

This leads us to an answer to another fundamental theoretical question, the question of why speech becomes inner. The answer would be that speech becomes inner because its function changes. The sequence underlying the development of speech would then be something different from that suggested by Watson. Rather than the stages of overt speech, the whisper, and soundless speech, we would have the stages of external speech, egocentric speech, and inner speech.

A basic, indisputable, and decisive fact emerges here: thinking depends on speech, on the means of thinking, and on the child's socio-cultural experience. The development of inner speech is defined from the outside. As Piaget's research has shown, the development of the child's logic is a direct function of his socialized speech. This position can be formulated in the following way: the development of the child's thinking depends on his mastery of the social means of thinking, that is, on his mastery of speech.

Here, we approach the formulation of the fundamental thesis of our work, a thesis of great methodological significance for the correct statement of the problem of thinking and speech. This thesis stems from our comparison of the development of inner speech and verbal thinking in man with the development of speech and intellect as it occurs in the animal world and the earliest stages of childhood. This comparison demonstrates that the former does not represent a simple continuation of the latter. The very type of development changes. It changes from a biological form of development to a socio-historical form of development.

As the preceding section clearly demonstrated, verbal thinking is not a natural but a socio-historical form of behavior. It is therefore characterized by a whole series of features and laws that do not apply to natural forms of thinking and speech.

Chapter 5 AN EXPERIMENTAL STUDY OF CONCEPT DEVELOPMENT

Rimat conducted a special and thorough investigation of the processes involved in the formation of concepts in adolescence. These studies were based on methods developed by Ach. Rimat found that concept formation begins to occur only when the child approaches the transitional age, that it is inaccessible to the child before this period. Ach writes that:

"We can firmly establish that only toward the end of the twelfth year of life do we see a sharp increase of the capacity for independent formation of general objective representations. In my view, it is extremely important to turn our attention to this fact. Thinking in concepts divorced from immediately perceivable features presents the child with demands that exceed his mental capacities before the age of twelve years" (Rimat, 1925, p. 112).

Thus, according to Ach's scheme, concepts are not constructed as associative chains, where one connection elicits another that is connected with it through processes of association. Rather, they are constructed through a goal-directed process composed of several operations that function as means for the solution of the basic task. In itself, learning words and their connections with objects does not lead to the formation of concepts. The subject must be faced with a task that can only be resolved through the formation of concepts.

In particular, Uznadze pointed out the importance of a functional factor which is advanced to the forefront by Ach's research, specifically, the factor of communication, of mutual understanding between people through speech.

"However, the word is a tool used for the attainment of mutual understanding. This plays a decisive role in the development of the concept. In the process of attaining mutual understanding, a complex of sounds acquires a definite meaning and is consequently transformed into a word or concept. If this functional aspect of mutual understanding did not exist, this complex of sounds could not be transformed into a carrier of meaning. Not a single concept would arise (Uznadze, 1966, p. 76).

Contact between the child and the adult world that surrounds him is established extremely early. From the outset, the child develops within the atmosphere provided by a speaking environment. He begins to use the mechanism of speech in the second year of life. "There is no question that what he uses are not complex meaningless sounds but true words. In time, they acquire increasingly differentiated meanings" (ibid, p. 77). Nonetheless, it seems to be relatively late that the child achieves the degree of socialization in his thinking necessary for the emergence of fully developed concepts.

Vygotsky - Thinking and Speech

As is indicated by the study that we will discuss here, all the higher mental functions are mediated processes. A central and basic aspect of their structure is the use of the sign as a means of directing and mastering mental processes.

In the problem of interest to us, the problem of concept formation, this sign is the word. The word functions as the means for the formation of the concept. Later, it becomes its symbol. Only the investigation of the functional use of the word and its development from one age to the next (a development where the various uses of the word are genetically linked with one another) provides the key to the formation of concepts.

Fogel has stated that concept formation cannot be reduced to a movement upwards through a conceptual paradigm, to a transition from the concrete to the increasingly abstract. This is the basic conclusion of Ach and Rimat's research. They have demonstrated the falsity of the associative perspective on concept formation. They have shown the productive, creative character of the concept and clarified the essential role of function in the concept's origin. They have emphasized that the concept is formed only with the emergence of a need that can be satisfied in the concept, only in the process of some meaningful goal-oriented activity directed on the attainment of a particular goal or the on resolution of a definite task.

These studies have done away with the mechanistic representation of concept formation once and for all.

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In genetic terms, the basic conclusion of our research can be formulated in the following way: *The development of the processes that eventually lead to the formation of concepts has its roots in the earliest stages of childhood. However, these processes mature only in the transitioned age. It is only at this point that the intellectual functions which form the mental basis for the process of concept formation are constituted and developed.*

Experimental research on concept formation has shown that necessary part of the process is the functional use of words or other signs as means of actively directing attention, partitioning and isolating attributes, abstracting these attributes, and synthesizing them.

This allows us to formulate the basic claim to which our research has led us. This research indicates that the proximal factor determining the formation of concepts (i.e. of this unique mode of thinking) is not association (as many authors suggest), attention (as G. Muller argues), the mutual cooperation of judgment and representation (as Buhler's theory of concept formation implies), or the determining tendency (as Ach proposes). All these processes participate in the formation of concepts. None of them, however, is the determining and essential factor. None of them is a factor which itself constitutes an adequate explanation of the emergence of this new form of thinking. This form of thinking is unique and irreducible to elementary intellectual operations.

The process of concept formation cannot be reduced to the processes of association, attention, representation, judgment, or determining tendencies, though all of these functions are indispensable for the complex synthetic process involved in concept formation.

Research indicates that what is central to this process is the functional use of the sign or word as the means through which the adolescent masters and subordinates his own mental operations and directs their activity in the resolution of the tasks which face him.

In the same way, the character of the task with which the adolescent is faced and that he resolves through the formation of concepts is without question among the functional features that must be considered in a complete scientific explanation of the process of concept formation. It is precisely this emerging task, need, or goal that is posed for the adolescent by the surrounding social environment that impels and forces him to make this decisive step in the development of his thinking.

Vygotsky - Thinking and Speech

In contrast to the maturation of instincts or innate tendencies, the motive force that determines the beginning of this process and sets in action the maturational mechanism of behavior impelling it forward along the path of further development is located not inside but outside the adolescent. The tasks that are posed for the maturing adolescent by the social environment ~ tasks that are associated with his entry into the cultural, professional, and social life of the adult world – are an essential functional factor in the formation of concepts. Repeatedly, this factor points to the mutually conditioned nature, the organic integration, and the internal unity of content and form in the development of thinking.

This research shows that like the development of any higher form of intellectual activity the process of concept formation is not simply the product of a quantitative transformation of lower forms. The difference between the process of concept formations involved. This process represents something fundamentally new, something qualitatively irreducible to any type of activity based on associative connections. The basic difference between these two qualitatively different kinds of intellectual activity consists in the *transition from unmediated intellectual processes to operations that are mediated by signs*.

The signifying structure (i.e., the function associated with the active use of signs) is the law that is common to the construction of all the higher forms of behavior. This law is not identical to the associative structure of the elementary processes. In itself, the accumulation of associative connections will never lead to the emergence of the higher forms of intellectual activity. The difference between the lower and higher forms of thinking cannot be explained in terms of quantitative change.

Chapter 6 THE DEVELOPMENT OF SCIENTIFIC CONCEPTS IN CHILDHOOD

A comparative analysis of the results for each age group demonstrates that with the appropriate educational program *the development of scientific concepts outstrips the development of spontaneous concepts*. [When the author uses phrases such as "spontaneous thinking" or "spontaneous concepts," he is referring to phenomena that develop through the child's practical activity and immediate social interaction, not to those that develop with his acquisition of a system of through instruction. Editor's note.]

These data lead to an hypothesis concerning the unique processes involved in the development of scientific as opposed to everyday concepts. The development of scientific concepts begins with the verbal definition. As part of an organized system, this verbal definition descends to the concrete; it descends to the phenomena which the concept represents. In contrast, the everyday concept tends to develop outside any definite system; it tends to move upwards toward abstraction and generalization.

The development of the scientific social science concept, a phenomenon that occurs as part of the educational process, constitutes a unique form of systematic cooperation between the teacher and child. The maturation of the child's higher mental functions occurs in this cooperative process, that is, it occurs through the adult's assistance and participation. In the domain of interest to us, this is expressed in the growth of the *relativeness* of causal thinking and in the development of a certain degree of *voluntary control* in scientific thinking.

This element of voluntary control is a product of the instructional process itself. The earlier maturation of scientific concepts is explained by the unique form of cooperation between the child and the adult that is the central element of the educational process; it is explained by the fact that in this process knowledge is transferred to the child in a definite system. This is also why the level of development of scientific concepts forms a zone of proximal possibilities for the development of everyday concepts. The scientific concept blazes the trail for the everyday concept. It is a form of preparatory instruction which leads to its development.

Thus, at a single stage in the development of a single child, we find differing strengths and weaknesses in scientific and everyday concepts.

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Our data indicate that the weakness of the everyday concept lies in its incapacity for abstraction, in the child's incapacity to operate on it in a voluntary manner. Where volition is required, the everyday concept is generally used incorrectly. In contrast, the weakness of the scientific concept lies in its verbalism, in its insufficient saturation with the concrete. This is the basic danger in the development of the scientific concept.

The strength of the scientific concept lies in the child's capacity to use it in a voluntary manner, in its "readiness for action." This picture begins to change by the 4th grade. The verbalism of the scientific concept begins to disappear as it becomes increasingly more concrete. This has its influence on the development of spontaneous concepts as well. Ultimately, the two developmental curves begin to merge (Shif, 1935).

How do scientific concepts develop in the course of school instruction? What is the relationship between instruction, learning, and the processes involved in the internal development of scientific concepts in the child's consciousness? Are these simply two aspects of what is essentially one and the same process? Does the process involved in the internal development of concepts follow instruction like a shadow follows the object which casts it, not coinciding with it but reproducing and repeating its movement, or do both processes exist in a more complex and subtle relationship which requires special investigation?

In contemporary child psychology, we find two answers to these questions. First, we find the position that scientific concepts do not have their own internal history, that they do not undergo a process of development in the true sense of the word. Rather, they are simply learned or received in completed form through the processes of understanding, learning, and comprehension. They are adopted by the child in completed form from the domain of adult thinking. From this perspective, the problem of the development of scientific concepts is essentially exhausted by that of teaching scientific concepts to the child and by that of learning concepts. This is the most widely accepted – indeed the generally accepted – perspective on this issue in contemporary child psychology. Until recently, it has provided the foundation for the construction of most theories and methods of school instruction.

Even the most rudimentary scientific critique makes the theoretical and practical inadequacy of this view apparent. We know from research on concept formation that the concept is not simply a collection of associative connections learned with the aid of memory. We know that the concept is not an automatic mental habit, but a complex and true act of thinking that cannot be mastered through simple memorization. The child's thought must be raised to a higher level for the concept to arise in consciousness. At any stage of its development, the concept is an act of generalization. The most important finding of all research in this field is that the concept – represented psychologically as word meaning – develops. The essence of the development of the concept lies in the transition from one structure of generalization to another. Any word meaning, at any age, is a generalization. However, word meaning develops. When the child first learns a new word, the development of its meaning is not completed but has only begun. From the outset, the word is a generalization of the most elementary type.

In accordance with the degree of his development, the child moves from elementary generalizations to higher forms of generalization. This process is completed with the formation of true concepts.

The development of concepts or word meanings presupposes the development of a whole series of functions. It presupposes the development of voluntary attention, logical memory, abstraction, comparison, and differentiation. These complex mental processes cannot simply be learned. From a theoretical perspective, then, there is little doubt concerning the inadequacy of the view that the concept is taken by the child in completed form and learned like a mental habit.

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The inadequacy of this view is equally apparent in connection with practice. No less than experimental research, pedagogical experience demonstrates that direct instruction in concepts is impossible. It is pedagogically fruitless. The teacher who attempts to use this approach achieves nothing but a mindless learning of words, an empty verbalism that simulates or imitates the presence of concepts in the child. Under these conditions, the child learns not the concept but the word, and this word is by the child through memory rather than thought. Such knowledge turns out to be inadequate in any meaningful application. This mode of instruction is the basic defect of the purely scholastic verbal modes of teaching which have been universally condemned. It substitutes the learning of dead and empty verbal schemes for the mastery of living knowledge.

Tolstoy, who had an extraordinary understanding of the nature of the word and its meaning, saw with both clarity and precision the futility of attempting to transmit concepts directly from teacher to student. He understood that it is impossible to transfer word meaning mechanically from one head to another through other words.

The incorrect aspect of this position, which is a direct expression of Tolstoy's general views on the issue of instruction, lies in his exclusion of any possibility of direct interference in this mysterious process. Tolstoy attempts to represent the process of concept development in terms of its own internal laws. He isolates the development of concepts from instruction. This condemns the teacher to extreme passiveness in the development of scientific concepts. This position emerges with particular clarity in Tolstoy's categorical formulation of his position, in his statement that "any interference is a crude, awkward force which retards development."

However, Tolstoy understood that not all forms of interference retard concept development. It is only crude, direct interference in the formation of concepts – interference which attempts to move in a straight line along the shortest distance between complex, and indirect method of instruction, will lead this developmental process forward to higher levels.

Thus, Tolstoy believes that there are a thousand paths other than that characteristic of traditional scholastic instruction through which we can teach new concepts to the child. He rejects only one path, the direct and crude mechanical construction of the new word from its "petals." Tolstoy's argument on this issue is correct. It is, indeed, indisputable, supported by both theory and practice.

However, Tolstoy ascribes too much significance to the natural and accidental. He ascribes too much significance to the work of vague representations and feelings, to the internal process of concept formation closed off within itself. He underestimates the potential for direct influence on this process. Stated more generally, he exaggerates the distance between instruction and development.

However, in the present context, we are interested primarily in the kernel of truth that is contained in his position that the attempt to develop the new concept from its "petals" is like trying to teach a child to walk in accordance with the laws of equilibrium. This position is absolutely correct.

Its task is to show that it must function as the corner stone of our working hypothesis. We must demonstrate that scientific concepts develop differently than everyday concepts, that the development of these two types of concepts does not follow the same path. Therefore, the task of our experimental research includes acquiring empirical support for the position that there is a difference between the development of scientific and everyday concepts. It also requires the acquisition of data that will permit us to clarify the precise nature of this difference.

We mentioned earlier that there are currently two positions on the issue of how scientific concepts develop in the course of school instruction. As we have pointed out, the first position consists of a complete rejection of any internal development in the emergence of scientific concepts. We have already attempted to point out the inadequacy of this perspective. There is, however, a second position on this issue. This position – currently the more widely accepted of the two – is based on the idea that the development of scientific concepts differs in no essential way from that of the concepts that there is no basis for the differentiation of these developmental processes. From this perspective, the process involved in the development of scientific concepts simply repeats the most basic and essential aspects of the process through which everyday concepts develop. The critical question at this point is whether this second position is well-founded.

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All the established laws and regularities of the development of the child's concepts have been derived from studies of everyday concepts. In spite of the differences in the internal conditions under which these two types of concepts develop, these findings have been extended to the domain of the child's scientific thinking. No attempt has been made to verify the validity of such an extension. That the extension of these findings to the domain of scientific concepts has occurred without any attempt to assess its validity is primarily a function of the fact that the question of the propriety of this extension has never been raised.

... these researchers were obliged to differentiate sharply between representations that develop primarily through the operation of the child's own thought and those that arise under the decisive and determining influence of knowledge the child acquires from those around him.

Piaget refers to the first of these two types of representations as spontaneous representations. Piaget demonstrated that these two types of representations have a good deal in common. They both: (1) manifest a resistance to external suggestion; (2) have deep roots in the child's thought; (3) manifest a certain commonality among children of the same age; (4) are maintained in the child's consciousness over a period of several years (giving way to new concepts gradually rather than disappearing suddenly); and (5) manifest themselves in the child's first true answers. These characteristics differentiate these two types of representations from suggested representations and from answers that are provided to the child through leading questions.

In our view, these positions are correct. They recognize that the child's scientific concepts (which clearly belong to the second group of representations discussed by Piaget) undergo a true process of development rather than arising spontaneously. This is made clear by the five features of these representations listed above. Piaget goes further and deeper than other researchers into the problem which interests us. He even recognizes that this group of concepts can become an independent object of investigation.

However, Piaget makes several mistakes that detract from the positive aspect of his argument. Three interrelated aspects of Piaget's thought are mistaken and of special interest to us. The first concerns the potential for independent studies of the child's nonspontaneous concepts and the fact that these concepts have roots deep in the child's thought. Piaget is inclined to make an assertion that directly contradicts these ideas. He asserts that it is only the child's spontaneous concepts and representations which can serve as the source of direct knowledge of the unique qualities of the child's thought. In Piaget's view, the child's nonspontaneous concepts (concepts formed under the influence of the adults who surround the child) reflect not so much the characteristics of the child's thinking as the level and character of the adult thought that the child has learned. In this assertion, Piaget contradicts his own argument that the child reworks the concept in learning it. He contradicts the notion that the specific characteristics of the child's own thought are expressed in the concept in the course of this transformation. Piaget tends to argue that this applies only to spontaneous concepts, generally failing to see that it is equally true of nonspontaneous concepts. This constitutes the first mistake in Piaget's thought on these issues.

Piaget's second mistake flows directly from the first. Once it is accepted that the child's nonspontaneous concepts do not reflect the characteristics of the child's thought, and that these characteristics are contained only in the child's spontaneous concepts, we are obliged to accept the notion that between spontaneous and nonspontaneous concepts there exists an impassible, solid, eternal barrier which excludes any mutual influence. This notion is accepted by Piaget. Piaget succeeds in differentiating spontaneous and nonspontaneous concepts, but does not see that they are united in a single system that is formed in the course of the child's mental development. He sees only the break, not the connection. As a consequence, he views the development of concepts as a mechanical combination of two separate processes, processes which have nothing in common and move, as it were, along two completely isolated or separate channels.

Inevitably, these two mistakes tangle Piaget's theory in contradiction and lead to a third mistake. On the one hand, Piaget asserts that the child's nonspontaneous concepts do not reflect the characteristics of his thought. He asserts that this privilege belongs exclusively to spontaneous concepts. This implies that knowledge of these characteristics of the child's thought can have no practical significance, since the acquisition of nonspontaneous concepts is not dependent on them. On the other hand, a basic thesis of his theory is the recognition that the essence of the child's mental development lies in the progressive socialization of the child's thought. As we have seen, one of the basic and most concentrated contexts for the formation of nonspontaneous concepts is school instruction. If we accept Piaget's views on this matter, the process involved in the socialization of thought that we find in instruction (among the most important processes in the child's development) turns out to be entirely independent of the child's own internal processes of intellectual development. On the one hand, the internal development of the child's thought is deprived of any significance in explaining the socialization of the child in instruction. On the other the socialization of the child's thought (which moves to the forefront in the process of instruction) is represented as unconnected with the internal development of the child's representations and concepts.

Kritik an Piaget S175ff.

Our first basic assumption is the direct opposite of Piaget's first mistaken thesis. The development of nonspontaneous concepts (particularly scientific concepts, which consider a high, pure, and, both theoretically and practically, important type of nonspontaneous concept) will manifest all the basic qualitative characteristics of the child's thought at a given stage of development. This position is based on the idea that scientific concepts are not simply acquired or memorized by the child and assimilated by his memory but arise and are formed through an extraordinary effort of his own thought.

This implies that the development of scientific concepts must manifest the characteristics of the child's thought. This assumption is fully supported by our experimental research.

Our second assumption is also in opposition to Piaget's. As the purest type of nonspontaneous concept, scientific concepts not only manifest features that are the opposite of those manifested by spontaneous concepts but manifest features that are identical to those manifested by spontaneous concepts. The boundary that separates these two types of concepts is fluid. In the actual course of development, it shifts back and forth many times. If we are to make some assumption at the outset, it must be the assumption that the development of spontaneous and scientific concepts are closely connected processes that continually influence one another.

On the one hand, the development of scientific concepts will depend directly on a particular level of maturation of spontaneous concepts. There is evidence for this in our practical experience. The development of scientific concepts becomes possible only when the child's spontaneous concepts have achieved a certain degree of development. This level of development is characteristically attained by the beginning of the school age.

On the other hand, the emergence of higher types of concepts (e.g., scientific concepts) will inevitably influence existing spontaneous concepts. These two types of concepts are not encapsulated or isolated in the child's consciousness. They are not separated from one another by an impenetrable wall nor do they flow in two isolated channels. They interact continually. This will inevitably lead to a situation where generalizations with a comparatively complex structure – such as scientific concepts – elicit changes in the structure of spontaneous concepts. Whether we refer to the development of spontaneous concepts or scientific ones, we are dealing with the development of a unified process of concept formation. This developmental process is realized under varying external and internal conditions. By its very nature, however, it remains a unified process. It is not a function of struggle, conflict, and antagonism between two mutually exclusive forms of thinking. Once again, if we do not shy away from the results of the experimental research, we will find that this assumption is fully supported by the data.

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Finally (in opposition to Piaget's mistaken and contradictory third position), we would argue that – in the process of concept formation – the relationship between the processes of instruction and development must be immeasurably more complex and positive in nature than the simple antagonism proposed by Piaget. It is reasonable to anticipate that research will show that instruction is a basic source of the development of the child's concepts and an extremely powerful force in directing this process. This assumption is based on the generally accepted fact that instruction plays a decisive role in determining the entire fate of the child's mental development during the school age, including the development of his concepts. Further, scientific concepts can arise in the child's head only on the foundation provided by the lower and more elementary forms of generalization which previously exist. They cannot simply be introduced into the child's consciousness from the outside. Again, this third and final assumption is supported by the research findings. This position on the issue allows us to assess the usefulness of psychological research on the child's concepts for teaching and instruction from a perspective that is very different from Piaget's.

Thus, research indicates that: (1) the learning of a foreign language both depends on the child's native speech and influences it; (2) the course of its development does not repeat that of native speech; and (3) the strengths and weaknesses of native and foreign languages differ. We have every reason to believe that an analogous relationship exists between everyday and scientific concepts.

A theoretical consideration of no less importance is the fact that scientific and everyday concepts have different relationships to the object or act that is represented in thought. The development of these two types of concepts presupposes differences in the intellectual processes which underlie them. In receiving instruction in a system of knowledge, the child learns of things that are not before his eyes, things that far exceed the limits of his actual and or even potential immediate experience. To this extent, the learning of scientific concepts depends on the concepts developed through the child's own experience in the same way that the study of a foreign language depends on the semantics of his native speech. Just as the learning of a foreign language presupposes a developed system of word meanings, the learning of a system of scientific concepts presupposes the widely developed conceptual fabric that has emerged on the basis of the spontaneous activity of the child's thought.

Finally, learning a new language does not begin with the acquisition of a new orientation to the object world. It is not a repetition of the developmental process that occurred in the acquisition of the native language. The process begins with a speech system that has already been learned, a system that stands between the newly learned language and the world of things.

2

Since Piaget himself noted the fundamental inadequacy of Claparede's law of conscious awareness, our critical analysis of these laws can be brief. Stated simply, to explain the emergence of conscious awareness exclusively in terms of the need for it is much the same as explaining the development of feathers in birds by referring to the fact that birds need feathers to fly. This kind of explanation represents a great step backward in the development of scientific thought. It is based on the assumption that a creative capacity capable of producing that which is needed is present in the need itself. This conception of conscious awareness assumes the absence of any development. It implies that conscious awareness is preformed and always ready to emerge.

Is it possible that the higher level of concept development which is connected with conscious awareness arises only as a consequence of failure and defeat? Is it actually the case that striking ones head against a wall and the bump that results are the child's only teachers as he moves along this developmental path? Is it possible that the non-adaptiveness and inadequacy of the child's spontaneous thought is the source of the higher forms of abstraction that are characteristic of concepts? If these questions are formulated, it immediately becomes apparent that only a negative answer is possible. Just as we cannot explain the emergence of conscious awareness in terms of the child's need for it, we cannot explain the child's mental development in terms of the bankruptcy and failure of his thought.

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Of course, the idea that consciousness is a unified whole with the separate functions existing in insoluble connection with one another is nothing new for psychology. Indeed, it is as old as psychology itself. Nearly all psychologists note that the mental functions act in unbroken connection with one another. Remembering presupposes the activity of attention, perception, and the attribution of meaning. Perception requires attention, recognition (or memory), and understanding. In both traditional and contemporary psychology, however, this concept of the functional unity of consciousness – of the insoluble connections among the various aspects of its activity – has consistently remained on the periphery. Its most important implications have not been recognized. Moreover, psychology drew inferences from this concept that seem to be in direct opposition to those that should flow from it. Having established the interdependency of functions (i.e., having established the unity of the activity of conscious awareness) psychology continued to study the activity of the separate functions, ignoring their relationships. It continued to treat consciousness as a collection of functional parts. This tendency of general psychology was transferred to genetic psychology. As a consequence, the development of the child's consciousness was represented as the sum of the changes occurring in the separate functions. Even here, the primacy of the functional parts over consciousness as a whole remained the supreme dogma. To understand how this occurred, we must consider the implicit postulates that provided the foundation for this traditional conception of the interconnection of functions and the unity of consciousness.

Traditional psychology taught that the mental functions always act in unity with one another (perception with memory and attention, etc.) and it is in this that consciousness is unified. However, it implicitly supplemented this idea with three postulates: (1) that these connections among functions are constant, unchanging, and uninfluenced by development; (2) that these connections operate consistently and identically in the activity of each function and that they can, therefore, be removed from the analytic frame (i.e., they do not have to be taken into account in studies of the separate functions); and (3) that these connections are inessential and that the development of consciousness must be understood in terms of the development of its functional parts; though the functions are interconnected, the stability of their connections gives them an entirely autonomous nature, an independence in their development and change. The liberation of psychology from these postulates represents the liberation of psychological thought from the functional forms of analysis that imprison it.

It is a general law of development that conscious awareness and mastery characterize only the higher stages of the development of a given function. It arises comparatively late and must be preceded by a stage where conscious awareness is absent, a stage where there is no volition in the application of a given form of conscious activity. For conscious awareness of a function to be achieved, the individual must first possess what he is to become consciously aware of. If we are to master something, we must have at our disposal what is to be subordinated to our will.

Research tells us that conscious awareness is a very special process. We will attempt to identify its general features. At the outset, we must pose the first and the has two meanings, and serious confusion has arisen because Claparede and Piaget have confused them. Specifically, Claparede and Piaget have confused Freud's terminology and the terminology more characteristic of general psychology.

What then, does it mean to say that the thought of the school child lacks conscious awareness? For Piaget, it means that the child's egocentrism is accompanied by a certain degree of unconsciousness. It means that thought is characterized by conscious awareness but not consistently. Thought contains elements of both the conscious and the unconscious. Piaget himself recognizes that one is on slippery ground if we view the development of consciousness as the gradual transition from the unconscious (in Freud's sense) to full consciousness, this representation of the process is correct. However, Freud's research established that the unconscious – which is carved out from consciousness – emerges comparatively late. In a certain sense, it is a product of the development and differentiation of consciousness itself.

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Therefore, there is a great difference between the concepts of "unconscious" and "lack of conscious awareness." Lack of conscious awareness is not simply part of the conscious or unconscious. It does not designate a level of consciousness. It designates a different process in the activity of consciousness. I tie a knot. I do it consciously. I cannot, however, say precisely how I have done it. My action, which is conscious, turns out to be lacking in conscious awareness because my attention is directed toward the act of tying, not on how I carry out that act. Consciousness always represents some piece of reality.

Thus, *the foundation of conscious awareness is the generalization or abstraction of the mental processes, which leads to their mastery.* Instruction has a decisive role in this process. Scientific concepts have a unique relationship to the object. This relationship is mediated through other concepts that themselves have an internal hierarchical system of interrelationships. It is apparently in this domain of the scientific concept that conscious awareness of concepts or the generalization and mastery of concepts emerges for the first time. And once a new structure of generalization has arisen in one sphere of thought, it can — like any structure — be transferred without training to all remaining domains of concepts and thought. Thus, *conscious awareness enters through the gate opened up by the scientific concept.*

On this basis alone, we can state the core of our hypothesis (we will discuss this hypothesis in more detail later in summarizing our experiments): *Only within a system can the concept acquire conscious awareness and a voluntary nature. Conscious awareness and the presence of a system are synonyms when we are speaking of concepts, just as spontaneity, lack of conscious awareness, and the absence of a system are three different words for designating the nature of the child's concept.*

What Piaget himself has to say makes it clear that a system is significant for the internal nature of the child's concepts. Piaget notes that the child manifests little systematicity, connectedness, or deduction in his thought. The need to avoid contradiction is foreign to him. He places assertions alongside one another rather than synthesizing them. He is satisfied with synthetic schemes rather than submitting problems to analysis. In other words, the child's thought is closer to a collection of these flowing simultaneously from actions and dreams than to adult thought, thought which is conscious of itself and has a system.

The essence of any scientific concept was defined in a profound manner by Marx:
If the form in which a thing is manifested and its essence were in direct correspondence, science would be unnecessary (Marx and Engels, Collected Works, v. 25, chap. 2, p. 384).

In this statement, Marx touches on the essence of the scientific concept. The scientific concept would be superfluous if it reflected the object in its external manifestation as an empirical concept. The scientific concept necessarily presupposes a different relationship to the object, one which is possible only for a concept. However, as we have shown above, the relationship to the object that is characteristic of the scientific concept presupposes the presence of relationships of concepts to one another. It presupposes a system of concepts. From this vantage point, we can say that the concept must be seen as part of the entire system of the relationships of generality that define its level of generality, just as a stitch must be seen as part of the fibers that tie it to the common fabric. At the same time, it becomes apparent that the distinction between spontaneous and nonspontaneous concepts in the child coincides logically with the distinction between empirical and scientific concepts.

It is well known that more general concepts arise in the child earlier than more specific ones. Thus, the child usually learns the word flower earlier than the word "rose." In this context, however, the concept of "flower" is not actually more general than the concept of "rose"; it is merely broader. When the child has mastered only a single concept, its relationship to the object is different than it is after he masters a second. However, even after he masters a second concept, there is a long period during which the concept of "flower" continues to stand alongside, rather than above, the concept of "rose." The former does not include the latter. The narrower concept is not subordinated. Rather, the broader concept acts as a substitute for the narrower one. It stands alongside it in a single series. When the concept of "flower" is generalized, the relationship between it and the concept of "rose" changes as well. Indeed, there is a change in its relationship with all subordinate concepts. This marks the emergence of a concept system.

We return again, then, to the point where we began our discussion, that is, to the initial question posed by Piaget: How does conscious reflection arise? We have attempted to clarify why the school child's concept lacks conscious awareness and how it acquires conscious awareness and a volitional nature. We found the source of the lack of conscious awareness of concepts not in egocentrism but in the absence of system in the child's spontaneous concepts. This is why spontaneous concepts lack conscious awareness and volitional control. We found that conscious awareness is realized through the formation of such a system, a system which is based on specific relations of generality among concepts. We also found that conscious awareness of concepts leads to their volitional control. By its nature, the scientific concept presupposes a system. Scientific concepts are the gate through which conscious awareness enters the domain of the child's concepts.

3

The previous sections illustrate the extraordinary importance of scientific concepts for the development of the child's thinking. It is in this domain that thinking first crosses the threshold that separates preconcepts from true concepts. This is a critical point in the development of the child's concepts and is the focus of our research.

In essence, the problem of nonspontaneous concepts — of scientific concepts in particular — is the problem of instruction and development. Spontaneous concepts create the potential for the emergence of nonspontaneous concepts in the process of instruction. Instruction is the source of the development of this new type of concept. Thus, the problem of spontaneous and nonspontaneous concepts is a special case of the more general problem of instruction and development.

The first perspective on the relationship between instruction and development that we will consider is probably the most widely accepted. It is based on the assumption that instruction and development are two distinct and essentially independent processes. Within this framework, the child's development is conceptualized as a process that is subordinate to natural laws. The child develops in accordance with a maturational model. Instruction is understood as an external utilization of the potentials that emerge in development. The typical expression of this perspective in the analysis of the child's mental development is the attempt to isolate that which is a function of development from that which is a function of instruction. The fact that not a single investigator has succeeded in this task is generally attributed to limitations in research method.

The attempt is made to compensate for these inadequacies of method through the power of abstraction. It is on this basis that the child's intellectual characteristics are differentiated into those which: (1) arise from development, and (2) owe their origin to instruction. It is generally assumed that a normal and high level of development can be attained without instruction. It is assumed that children will develop all the higher forms of thinking attainable by man without school instruction, that they will manifest all the intellectual potentials manifested by children who have received school instruction.

This theory more often takes a somewhat different form which begins with the recognition of an indisputable dependency that exists between instruction and development. Development creates the potentials while instruction realizes them. The relationship between these processes is represented in much the same way that preformism represents the relationship between dispositions and development. Dispositions contain the potentials that are realized in development. Here again, we find the notion that it is development itself that creates potentials that are then realized in instruction. Instruction is constructed over a framework provided by maturation. As it is conceptualized within this framework, the relationship between instruction and development can be compared to the relationship between production and consumption. Instruction consumes the products of development. It uses them and applies them to life. There is a one-sided dependency between development and instruction. Instruction depends on development while development is not influenced by instruction.

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In accordance with this theory, then, it is sufficient to recognize that a certain level of maturation in certain mental functions is a prerequisite for instruction. It is impossible to teach a one year old to read or a three year old to write. Consequently, analysis of the mental processes involved in instruction is reduced to the clarification of the types of functions and the degree of maturation necessary for instruction to occur. Instruction in writing can begin if the child's memory has reached a level of development that makes it possible for him to remember the letters of the alphabet, if his attention has developed to the extent that it can be maintained on matters of little interest to him for a given period of time, and if his thinking has matured to the point that makes it possible for him to understand the relationships between sounds and the written signs that symbolize them.

Fundamental to this conception of the independence of the processes of instruction and development is a notion that has received little attention until recently. This notion concerns the issue of sequence as it relates to the processes of instruction and development. This theory resolves this basic issue of sequence with its assumption that *instruction rides on the tail of development*, that development must complete certain cycles or stages or bear certain fruits before instruction is possible.

Of course, this notion contains a certain element of truth. There are certain developmental prerequisites that must be met before successful instruction can begin. New forms of instruction are without question dependent on the completion of certain cycles in the child's development. There is a lower threshold prior to which instruction is not impossible. However, this dependency is not the most important characteristic of the relationship between instruction and development.

In response to the question of whether instructing the child in writing or arithmetic affects his memory, attention, or thinking, however, traditional psychology suggested that these processes always change when they are exercised whatever form that exercise may take. The course of development itself, however, does not change as a consequence of instruction. Nothing new emerges in the child's mental development when we teach him to write. The child we have when we finish is identical to the one we had when we began, with the sole exception that he is literate.

This perspective completely dominated traditional educational psychology, including Meumann's well known work. Piaget pushes this perspective to its logical limit. He assumes that the child's thinking inherently passes through certain stages and phases of whether or not he receives instruction. That the child receives instruction has no direct impact on the developmental process. It is not in any way unified with the processes of the child's own thinking. It is external to them. The teacher must view the autonomous characteristics of the child's thinking as a lower threshold that determines the possibilities which exist for instruction. When the child develops new potentials for thinking, new types of instruction will be possible. For Piaget, the index of the level of the child's thinking is to be found not in what the child knows or what he is able to learn but in his capacity for thinking in a domain where he has no knowledge. Here, instruction and development or knowledge and thinking are placed in the sharpest possible opposition.

Proceeding from this thesis, Piaget presents the child with problems from domains where his lack of knowledge can be assumed. The underlying premise is that if we ask the child about things that he may know, the results we receive may represent not the child's thinking but his knowledge. Spontaneous concepts which arise in the child's development are therefore considered the proper indices of his thinking. Scientific concepts, which have their source in instruction, cannot be used as indices in this way. In this opposition of instruction and development we are brought once again to Piaget's basic premise: Scientific concepts do not emerge from spontaneous concepts or transform them; they force them out and replace them.

The second perspective on this issue is diametrically opposed to that we have just outlined. Here, instruction and development are merged. The two processes are identified. This perspective first developed in the educational psychology of William James. James attempted to demonstrate that the formation of associations and habits lies at the foundation of both instruction and mental development. Of course, when these processes are identified, there is no foundation on which to differentiate them. This thesis inevitably leads to the declaration that instruction is development, that instruction and development are synonymous.

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The foundation for this theory is provided by associationism, the concept that provided the basis for the whole of traditional psychology. The rebirth of this concept in educational psychology is now represented by the "last of the Mohicans," that is, by Thorndike and the reflexologists who have translated the concept of association into the language of physiology. This theory represents the development of the child's intellect as a sequential and gradual accumulation of conditioned reflexes. It represents instruction in precisely the same way. The result is the conception that instruction and development are synonymous. The child develops to the extent that he is taught. Development is instruction; instruction is development. Rather than untying the knot which represents the relationship between instruction and development, the first theory cuts it. This theory recognizes no relationship between the two processes. This second theory eliminates or avoids this knot entirely. Since they are one and the same thing, the issue of the relationship between instruction and development or the nature of this relationship cannot arise.

There is a third group of theories that have been particularly influential in European child psychology. These theories attempt to rise above the extremes inherent in the two perspectives outlined above, they attempt to sail between the Scylla and Charybdis. The result, however, is typical of theories that attempt to occupy a middle ground between two extreme perspectives. This third group of theories fails to gain a position above the other two and assumes a position between them. To the extent that it overcomes the extremes of one perspective, it assumes the extremes of the other. It rises above the first false theory by yielding to some extent to a second which is equally false. It overcomes the extremes of the second by yielding to the first. This type of theory has an inherent duality. By occupying a position between two contradictory perspectives, it leads to a certain *unification of these points of view*.

This type of position is taken by Koffka. From the outset, he makes it clear that development always has a dual character and that it is necessary to distinguish development as maturation and development as instruction. Of course, this implies that we must recognize each of the two extreme positions in turn, that we must unify them. Instruction are independent of one another. Koffka reiterates this position, arguing that development is maturation which has its own internal laws independent of instruction. The second perspective is based on the concept that instruction is development. Koffka literally reiterates this position.

If the first theory cuts the knot rather than untying it and the second eliminates or avoids it entirely, Koffka's theory tightens the knot further. Koffka's position not only pie which underlies the mistake that is common to both the first two groups of theories, to the level of the principle that produced their shared misstatement of the problem. Koffka's theory proceeds from a fundamentally dualistic understanding of development. Development is not represented as a unified process. There is development as maturation and development as instruction. In three respects, however, Koffka's thinking moves us beyond the other two theories.

1. The unification of these two contradictory perspectives requires the assumption that there is a mutual dependency between the two types of development, that is, between maturation and instruction. This assumption is included within Koffka's theory. Koffka establishes that maturation depends on the functioning of the organ and consequently on the development of its function in instruction. In turn, maturation moves instruction forward by opening up new potentials. Thus, instruction has some influence on maturation and maturation has some influence on instruction. This "some" is, however, left entirely uninterpreted in Koffka's theory. His theory does not go beyond a general recognition of this mutual influence. Rather than making it an object of investigation, Koffka is satisfied with merely postulating the mutual dependency between these two processes.

2. This third theory also leads to a new understanding of instruction. For Thorndike, instruction is a meaningless mechanical process which produces its results through trial and error. For structural psychology, instruction represents the emergence of new structures and the development of old ones. Since the process of structural development is recognized as primary – recognized as an independent prerequisite for instruction – this theory suggests from the outset that instruction has a meaningful structural character. The fundamental characteristic of any structure is that it is independent of the elements that form it, of the concrete material that provides its basis. Its fundamental characteristic is its potential for being transferred to other material. Thus, if the child forms a structure or learns an operation in the course of instruction, he has acquired more than the potential of reproducing that structure or operation. He has acquired much greater potentials that extend to the domains of other structures. We have given the child a penny's worth of instruction and the consequence has been a dollar's worth of development. A single step in instruction can represent a hundred steps in development. This constitutes the most positive feature of this new theory. This theory teaches us to see the difference between instruction which provides only what it provides directly and instruction which provides more. Learning to type may not change the general structure of consciousness. Learning a new method of thinking or a new type of structure produces a great deal more than the capacity to perform the narrow activity that was the object of instruction.

3. The third positive feature of this new theory is a direct function of the second and is related to the issue of the sequence of instruction and development. This issue fundamentally distinguishes this third theory from the first two.

We have seen that the first theory takes the position that instruction follows on the tail of development. First there is development and only then instruction. The second theory cannot even state this question because the two processes are identified from the presupposition that instruction and development proceed synchronically as two parallel processes, that development follows instruction step for step just as a shadow follows the object which casts it. To the extent that it unites these two perspectives and differentiates maturation and instruction, the third theory preserves both these representations of the temporal connections between instruction and development. However, it supplements them with something fundamentally new which stems from its conception of instruction as a structural and meaningful process. We have seen that within this framework instruction can give more to development than is present in its direct results. Applied to one point in the child's thought, it alters and restructures many others. Its developmental consequences may be distal as well as proximal. *Instruction is not limited to trailing after development or moving stride for stride along with it. It can move ahead of development, pushing it further and eliciting new formations.* This insight has immeasurable importance and value. It atones for many of the inadequacies of Koffka's eclectic theory, a theory which accepts all three of the logically conceivable temporal relationships between instruction and development as equally plausible and significant. In spite of their differences, the first and second theories lead to the conclusion that instruction changes nothing in development. Thus, this third theory leads to an entirely new problem, a problem that is extremely important for the hypothesis that we are developing.

Though in many respects entirely new, this problem also represents a return to a very old issue in psychology and education, an issue that has almost been forgotten. This return does not represent the rebirth of the conceptions associated with the original expression of the problem, conceptions whose inadequacy has long since been demonstrated. However, as is frequently the case in the history of scientific thought, the reanalysis of a theory from the new perspectives which science has achieved leads to the restoration of several correct positions that were found not only in the older theory that is being reanalyzed but in theories that preceded it.

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We are referring here to the theory of formal discipline, a theory usually associated with the name of Herbart. Fundamental to the concept of formal discipline is the notion that there are educational subjects which provide something more than the knowledge and skills that constitute the subject itself. These subjects contribute to the development of the child's general mental capacities.

Proponents of this theory distinguished educational subjects in terms of their relative significance as formal disciplines. Though itself progressive, this perspective led educational practice to reactionary forms of teaching, the most direct instantiation of which were the German and Russian classical gymnasiums. In the gymnasium, a great deal of attention was focused on the study of the Latin and Greek languages. This was done not because it was thought to be important for life, but because it was thought that the study of these subjects facilitated the child's general mental development. In the Realschule, this same significance was attributed to the teaching of mathematics. Just as ancient languages were thought to provide for the development of the mental capacities required in the humanitarian sciences, mathematics was thought to provide for the development of the mental capacities needed in the practical [scientific and technical] disciplines.

The total demise of the theory of formal discipline was partially a function of the undeveloped state of the theory. The primary factor in its demise, however, was its failure to correspond with the practical tasks of the new bourgeois pedagogy. It was Thorndike who emerged as the major ideologist here. In a series of studies, he attempted to show that the concept of formal discipline was a myth or legend, that instruction does not have any long term influences on development.

In this research, Thorndike completely rejected the concept that there is any dependency between instruction and development. The theory of formal discipline had a correct premonition of this dependency but depicted it largely in caricature. Thorndike's position, however, is convincing only to the extent that it deals with the caricatured exaggerations and distortions of this dependency that were developed within the theory of formal discipline. He does not even address the core of the idea, much less destroy it.

In theoretical terms, Thorndike approaches the problem of formal discipline within a framework which assumes that everything in instruction influences everything else. Thorndike raises the question of whether studying the multiplication tables will influence the capacities to choose a mate or understand anecdotes. In answering this kind of question in the negative, Thorndike demonstrates only what we knew from the outset. In neither instruction nor development does everything influence everything else. Influences cannot have a universal range. They cannot link points of instruction and development that have nothing of a mental nature in common. He is absolutely wrong, however, when he extends this perfectly correct thesis and concludes that nothing influences anything.

Thorndike merely demonstrated that instruction which influences functions that have nothing in common with the functions that underlie other forms of activity or with the functions of thinking will not have any influence on these other forms of activity. This thesis is beyond dispute.

It does not, however, clarify the question of whether instruction might have some influence on functions whose resolved the question of whether instruction can facilitate the development of a certain system of functions or the study of subjects that depend on related mental processes. Thorndike's rejection of the concept of formal discipline is valid only where we are dealing with functions that are combined in a meaningless way.

Thus, Thorndike's conclusions are valid only if we are concerned with meaningless combinations of functions. On what basis does he extend these conclusions to the child's instruction and development as a whole? Why does his finding that everything does not influence everything convince him that nothing influences anything? The answer to these questions lies in the general theoretical conception that underlies all Thorndike's work. In accordance with this conception, there are no combinations in the activity of consciousness other than meaningless ones. Within this framework, all instruction and development are reduced to the mechanical formation of associative connections. That is, all the activities of consciousness are connected in a single manner. The learning of the multiplication tables is connected with the understanding of anecdotes in the same way that the formation of algebraic concepts is connected with the understanding of the laws of physics. We know, however, that this is not the case. In the activity of consciousness, structured and meaningful connections and relations dominate. The presence of meaningless connections is more the exception than the rule. This view is fundamental to contemporary psychology. If we accept it, all the thunder and lightning that Thorndike attempts to bring down on the teaching of formal discipline strikes his own theory. Thus, though he does not recognize it, Koffka must to some degree return to the concept of formal discipline. Koffka represents structural psychology, and structural psychology rejects the very core of the associative conception of the child's instruction and mental development.

Even Koffka, however, overlooked a second mistake in Thorndike's critique of the theory of formal discipline. In his attempt to refute Herbart's conception, Thorndike resorted to experimentation on extremely narrow, specialized, and, therefore, elementary functions. He provided subjects with practice in discriminating the lengths of line segments and then studied how this form of instruction influenced their capacity to discriminate the size of angles. Of course, no influence was found. This was a function of two factors. First, Thorndike did not teach his subjects material of the type typical of school instruction. No one has ever argued that teaching someone to ride a bicycle, to swim, or play golf (forms of activity that are much more complex than the discrimination of the magnitude of angles) has any significant influence on the general development of the child's mind. Such an argument has been made only with respect to the study of subjects such as arithmetic or the child's native language, only with respect to complex subjects that are linked to the entire system of mental functions. That the discrimination of line lengths has no direct influence on the discrimination of angles provides no basis for the assumption that the study of the native language – and the general development of the meaningful aspect of speech that is associated with it — is not linked in some way to the study of arithmetic. Thorndike has demonstrated only that there are two kinds of instruction. One is epitomized by the formation of specialized, narrow skills. This form of instruction is often encountered in the professional adult instruction. The other form of instruction is typical of childhood and incorporates whole complexes of mental functions. It leads to the development of entire domains of the child's thinking. This form of instruction clearly influences similar, related, or even identical mental processes. For the first form of instruction, formal discipline is more the exception than the rule. It is a fundamental law of the second form of instruction.

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Basic to our approach is the concept that instruction and development are neither two entirely independent processes nor a single process. In our view, they are two processes with complex interrelationships.

The most important issues that we were able to address through this research concerned: (1) the maturity of specific mental functions when instruction begins; (2) the influence of instruction on their development, the temporal relationship between instruction and development, and; (3) the nature and significance of instruction as a formal discipline.

Why is written speech so difficult for the school child? Why, at several stages, is there a difference of six to eight years in the speech age for written and oral speech? The most common explanation for this is based on the assumption that because written speech is a new function it must repeat the basic developmental stages that oral speech has already passed through. Thus, the eight year old's written speech will be similar to the two year old's oral speech. It has even been proposed that the age level for written speech should be measured from the point when instruction begins in order to establish this correspondence between written and oral speech.

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This explanation is clearly unsatisfactory. The two year old uses comparatively few words and a primitive syntax because his vocabulary is still poor and because he has not mastered complex sentence structures. The vocabulary of the school child's written speech, however, is not poorer than that of his oral speech. They are one and the same vocabulary. The syntax and the grammatical forms of written and oral speech are also the same. The child has already mastered them by the time he reaches school. Thus, the poverty of vocabulary and the undeveloped syntax that explain the primitive nature of oral speech in the two year old cannot explain the primitive nature of the school child's written speech. This analogy does not adequately explain the large disparity in the school child's written and oral speech.

Research indicates that the development of written speech does not reproduce that of oral speech. Any similarity that exists between the two processes is external and symptomatic rather than essential. Written speech is more than the translation of oral speech into the written sign. Mastering written speech requires more than learning the techniques of writing. Otherwise, we would expect that once these mechanisms of written speech were learned, written speech would be as rich and developed as oral speech; the two would be as similar as the translation is to the original. This is not the case however.

Written speech is an entirely unique speech function. Its structure and mode of functioning are as different from those of oral speech as those of inner speech are from external speech. Even the most minimal level of development of written speech requires a high degree of abstraction. Written speech lacks intonation and expression. It lacks all the aspects of speech that are reflected in sound. Written speech is speech in thought, in representations. It lacks the most basic feature of oral speech; it lacks material sound.

The result is that the psychological conditions characteristic of written speech are very different from those of oral speech. Through oral speech, the child has achieved a rather high level of abstraction with respect to the object world. With written speech, the child is presented with a new task. He must abstract from the sensual aspect of speech itself. He must move to abstracted speech, to speech that uses representations of words rather than words themselves. In this respect, written speech differs from oral speech in the same way that abstract thinking differs from graphic thinking. This means that written speech cannot repeat the developmental stages of oral speech. The abstract nature of written speech – the fact that it is thought rather than pronounced — represents one of the greatest difficulties encountered by the child in his mastery of writing. Those who continue to assume that the critical problems are factors such as the underdevelopment of the small musculature and factors associated with the techniques of writing fail to see the root of the problem.

Written speech is more abstract than oral speech in other respects as well. It is speech without an interlocutor. This creates a situation completely foreign to the conversational speech the child is accustomed to. In written speech, those to whom the speech is directed are either absent or out of contact with the writer. Written speech is speech-monologue. It is a conversation with a white sheet of paper, with an imaginary or conceptualized interlocutor. Still, like oral speech, it is a conversational situation. Written speech requires a dual abstraction from the child. It requires an abstraction from the auditory aspects of speech and an abstraction from the interlocutor.

This is the second of the basic difficulties the school child encounters in his mastery of written speech. Speech that lacks real sound (speech that is only represented or thought and therefore requires the symbolization of sound – a second order symbolization) will be more difficult than oral speech to the same degree that algebra is more difficult for the child than arithmetic. Written speech is the algebra of speech. The process of learning algebra does not repeat that of arithmetic. It is a new and higher plane in the development of abstract mathematical thought that is constructed over and rises above arithmetic thinking. In the same way, the algebra of speech (i.e., written speech) introduces the child to an abstract plane of speech that is constructed over the developed system of oral speech.

Moreover, *the motives that would cause one to resort to written speech are even less accessible to the child when he begins to learn to write*. As is true of any new form of activity, the motivation for speech and the need for it is fundamental to its development. The need for oral communication develops throughout infancy. It is a basic prerequisite for the first meaningful word. To the extent that this need has not matured, we find delays in speech development. When school instruction begins, however, the need for written speech is comparatively undeveloped. When he begins to write, the school child does not sense the need for this new speech function.

The relevance of the notion that motivation generally precedes activity to the special difficulties that the child encounters in the mastery of written speech is not limited to the ontogenetic domain. Every conversation and phrase is preceded by a speech motive. This motive is the source of the affective inducements and needs that feed the activity. With every moment, the situation that is inherent in oral speech creates the motivation for each turn of speech; it creates the motivation for each segment of conversation or dialogue. The need for something produces the request. The question creates the answer. The expression brings the retort and the failure to understand – the clarification. A multitude of similar relationships between speech and motive are fully determined by the situation inherent in real oral speech. Thus, oral speech is regulated by the dynamics of the situation. It flows entirely from the situation in accordance with this type of situational-motivational and situational-conditioning process. With written speech, on the other hand, we are forced to create the situation or – more accurately — to represent it in thought. The use of written speech presupposes a fundamentally different relationship to the situation, one that is freer, more independent, and more voluntary.

The child must act with more volition with written speech than with oral speech. This is a general thread that links the distinguishing characteristics of written speech. Even the sound form of the word must be differentiated in written speech, while with oral speech it is pronounced automatically and without any differentiation into separate sounds. In saying a word, the child is not conscious of how he pronounces the sound. He does not intentionally pronounce each separate sound. With written speech, however, he must become consciously aware of the word's structure. He must partition it and voluntarily recreate it in written signs.

We find an analogous situation with the child's activity in forming phrases. In writing, he constructs the phrase in the same voluntary and intentional way as he creates the word from separate letters. That is, the child's syntax is as voluntary as his phonetics. The semantic aspect of written speech also requires voluntary work on word meanings. It requires that they be arranged in a particular syntactic and phonetic sequence. This reflects the fact that written speech stands in a different relationship to inner speech than does oral speech.

While the development of external speech precedes the development of inner speech, written speech emerges only after the development of the latter. Written speech presupposes the existence of inner speech. According to Jackson and Head, written speech is the key to inner speech. The transition from inner to written speech requires what we have called voluntary semantics, which is associated with the voluntary phonetics of written speech. The grammar of thought characteristic of inner and written speech do not coincide; the meaningful syntax of inner speech is completely different from that of either oral or written speech.

Entirely different laws govern the construction of the whole and of meaningful units. In a certain sense, the syntax of inner speech is the polar opposite of that of written speech. The syntax of oral speech stands somewhere between these two poles.

Inner speech is maximally contracted abbreviated, and telegraphic. Written speech is maximally expanded and formal, even more so than oral speech. Written speech does not contain ellipses while inner speech is filled with them. Syntactically, inner speech is almost entirely predicative. In oral (audible) speech, syntax becomes predicative where the subject and related parts of the sentence are known to the interlocutors. This is consistent with the nature and structure of inner speech. With inner speech, the subject – indeed the whole conversational situation – is known to the individual who is thinking. Here, speech consists almost entirely of predicates. We do not have to tell ourselves what this speech is about. That is always implied, forming the background of consciousness. This explains the predicative nature of inner speech. Even if inner speech were made audible to the outsider, only the speaker would understand it. No one else would know the mental field in which it flows. Inner speech is, therefore, completely idiomatic.

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In contrast, written speech requires the situation to be established in full detail so it can be understood by the interlocutor. Written speech is the most expanded form of Speech. Even things that can be omitted in oral speech must be made explicit in written speech. Written speech must be maximally comprehensible to the other. Everything must be laid out fully. This transition from a maximally contracted inner speech (i.e., from speech for oneself) to a maximally expanded written speech (i.e., to speech for the other) requires a child who is capable of extremely complex operations in the voluntary construction of the fabric of meaning.

The second basic characteristic of written speech (i.e., its greater consciousness) is closely linked with its volitional nature. Wundt noted that the intentional and conscious nature of written speech is among the most important features that distinguishes it from oral speech. In his view, the difference between the development of language and of writing is that the latter is directed by consciousness and intention almost from the outset. This is why change in sign systems can be voluntary (as in the development of cuneiform writing systems for example) while the processes involved in language change are always unconscious.

In our research, we were able to establish that this is as true of the ontogenesis of written speech as it is of its phylogenesis. From the very beginning, consciousness and intention direct the child's written speech. The child learns the signs of written speech and the use of these signs consciously and volitionally. In contrast, oral speech is learned and used unconsciously. Written speech forces the child to act more intellectually. It requires conscious awareness of the very process of speaking. The motives of written speech are more abstract, intellectualistic, and separated from need.

In summarizing this brief discussion of our study of the psychology of written speech, we can say that the mental functions which form written speech are fundamentally different from those which form oral speech. Written speech is the algebra of speech. It is a more difficult and a more complex form of intentional and conscious speech activity.

Two conclusions follow: (1) this explains the radical difference between the child's oral and written speech (this difference is a function of differences in the level of development required by activities that are spontaneous, involuntary, and without conscious awareness and those that are abstract, voluntary, and characterized by conscious awareness); and (2) *when instruction in written speech begins, the basic mental functions that underlie it are not fully developed; indeed, their development has not yet begun.* Instruction depends on processes that have not yet matured, processes that have just entered the first phases of their development.

This latter point is supported by research in other areas. Instruction in arithmetic, grammar, and natural science do not begin when the appropriate functions are mature. On the contrary, the immaturity of the required mental functions at the beginning of the instructional process is a general and basic law in all domains of school instruction.

Since grammar would seem the least necessary or useful school subject for the child, the issue of the value of instruction in grammar is methodologically and psychologically complex. Arithmetic provides the child with new abilities. By acquiring knowledge of arithmetic, a child who once lacked the ability to add or divide now has this ability. Instruction in grammar does not seem to provide the child with new capacities in this sense. The child has the capacity to decline and conjugate before he comes to school. What does he learn from instruction in grammar? This is the argument that underlies the "agrammatical" movement which suggests that grammar should be removed from the list of school subjects because it is unnecessary, because it provides no new speech capacities. If we analyze instruction in grammar and written speech, however, we find that it has tremendous significance for the general development of the child's thought.

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Within a defined structure, the sounds emerge spontaneously in the child's speech. Outside speech, however, these same sounds are not available to the child. The child is able to pronounce a given sound, but he is not able to pronounce it volitionally. This is the common characteristic of all the speech operations of the child who is on the threshold of school age.

This means that the child has certain speech capacities, but he does not know that he has them. These operations lack conscious awareness. This is reflected in the fact that the child possesses them only when they are used spontaneously or automatically, when they are used in situations where they are elicited by the structure of the situation. Outside this structure, the child is not able to do what he can within it. That is, he is not able to do volitionally, consciously, and intentionally what he is able to do without voluntary control. As a consequence, he has limited use of his capacities.

If he is to fully evaluate the state of the child's development, the psychologist must consider not only the actual level of development but *the zone of proximal development*. How can this be accomplished?

When we determine the level of actual development, we use tasks that require independent resolution. These tasks function as indices of fully formed or fully matured functions. How, then, do we apply this new method? Assume that we have determined the mental age of two children to be eight years. We do not stop with this however. Rather, we attempt to determine how each of these children will solve tasks that were meant for older children. We assist each child through demonstration, leading questions, and by introducing the initial elements of the task's solution. With this help or collaboration from the adult, one of these children solves problems characteristic of a twelve year old, while the other solves problems only at a level typical of a nine year old. This difference between the child's mental ages, this difference between the child's actual level of development and the level of performance that he achieves in collaboration with the adult, defines the zone of proximal development.

These children are not at the same level of mental development. The difference between these two children reflected in our measurement of the zone of proximal development is more significant than their similarity as reflected in their actual development. Research indicates that *the zone of proximal development has more significance for the dynamics of intellectual development and for the success of instruction than does the actual level of development*.

To explain this, we cite the well known fact that with collaboration, direction, or some kind of help the child is always able to do more and solve more difficult tasks than he can independently. What we have here is only an example of this general rule.

This allows us to introduce an addendum to what we said earlier concerning collaborative work and imitation. We said that in collaboration the child can always do more than he can independently. We must add the stipulation that he cannot do infinitely more. What collaboration contributes to the child's performance is restricted to limits which are determined by the state of his development and his intellectual potential. In collaboration, the child turns out to be stronger and more able than in independent work. He advances in terms of the level of intellectual difficulties he is able to face. However, there always exists a definite, strictly lawful distance that determines the differential between his performance in independent and collaborative work.

Our research demonstrates that the child does not solve all unresolved problems with the help of imitation. He advances only up to a certain limit, a limit which differs for different children.

Comparative psychology has established several indices that allow us to distinguish intellectual, meaningful imitation from automatic copying. In the first case, the resolution problem is learned suddenly – once and forever. It does not require repetition. The error curve falls steeply and suddenly from one hundred percent to zero. Every indication of an independent, intellectual solution is manifested. This solution is attained as a consequence of grasping the structure of the field, of grasping the relationships among objects. With training, however, learning proceeds by trial and error. The learning curve representing mistaken solutions falls slowly and steadily. Learning requires frequent repetition. The training process manifests no meaningfulness and no understanding of structural relations. It is realized blindly and without structure.

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This fact is of fundamental significance for the psychology of instruction. It is significant that in none of the three theories of instruction that we have reviewed in this chapter is any fundamental distinction made between the instruction of animals and the instruction of people. The same explanatory principle is applied to training and instruction. Even on the basis of what we have said here, however, it is clear that there is a fundamental difference between these processes. Not even the most intelligent animal can develop his intellectual capacities through imitation or instruction. He cannot learn anything that is fundamentally new. He can learn only through training. If we consider instruction in this specifically human sense, animals cannot be instructed.

In contrast, development based on collaboration and imitation is the source of all the specifically human characteristics of consciousness that develop in the child. Development based on instruction is a fundamental fact. Therefore, a central feature for the psychological study of instruction is the analysis of the child's potential to raise himself to a higher intellectual level of development through collaboration, to move from what he has to what he does not have through imitation. This is the significance of instruction for development. It is also the content of the concept of the zone of proximal development.

The orientation was towards the thinking that the child is able to do independently. No consideration was given to the child's potential to move from what he is able to do to what he is not. The state of development was evaluated in the tradition of the foolish gardener, the gardener who considers only the fruit that has ripened. No consideration was given to the fact that instruction must carry development forward. No consideration was given to the zone of proximal development. The orientation was toward the path of least resistance, toward the child's weakness rather than his strength.

We have seen that instruction and development do not coincide. They are two different processes with very complex interrelationships. Instruction is only useful when it moves ahead of development. When it does, it impells or wakens a whole series of functions that are in a stage of maturation lying in the zone of proximal development.

This is the major role of instruction in development. This is what distinguishes the instruction of the child from the training of animals. This is also what distinguishes instruction of the child which is directed toward his full development from instruction in specialized, technical skills such as typing or riding a bicycle.

The incompetent child in a group of competent children will be delayed in his development and in the relative success of his mental activity. So will the competent child in a group of incompetent children. For one of these children the problem lies in the fact that instruction is too difficult — for the other in the fact that it is too easy. These opposing conditions lead to the same result. In both cases, instruction occurs outside the zone of proximal development, below it in one case and above it in the other. It is as fruitless to teach the child what he is not able to learn as it is to teach him what he can already do independently.

We can identify characteristics of instruction and development that are unique to the school age, since instruction and development do not begin when the child comes to school. Instruction occurs on all levels of the child's development. As we shall see in the following section, however, instruction takes on forms that are specific to each age level. Further, at each of these levels, instruction has a unique relationship to development.

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All this work on concepts, the entire process of their formation, is worked out by the child in collaboration with the adult in instruction. Now, when the child solves a problem, what does it require of him? It requires the ability to imitate and solve the problem with the help of teacher even though we do not have an actual situation of collaboration at this moment. The situation lies in the past. Here, the child must make independent use of the results of that earlier collaboration.

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The fundamental difference between the problem which involves everyday concepts and that which involves scientific concepts is that the child solves the latter with the teacher's help. When we say that the child acts on the basis of imitation, we do not mean that he looks at another person in the eye and imitates him. If today I see something and tomorrow do it, I do it on the basis of imitation. When the school child solves a problem at home on the basis of a model that he has been shown in class, he continues to act in collaboration, though at the moment the teacher is not standing near him.

The strengths and the weaknesses of everyday and scientific concepts differ. The strength of the school child's concept of "brother" is that it has undergone a long path of development and that his concept exhausts the greater part of the empirical content of the concept. This is precisely the weakness of his scientific concept. The strength of the scientific concept (i.e., concepts such as "Archimedes' law" or "exploitation") also turns out to be the weakest aspect of the everyday concept. The child has outstanding knowledge of what a brother is and this knowledge is saturated with experience. However, when he must solve an abstract problem such as those we find in Piaget's experiments (e.g., the problem about "the brother of a brother"), the child becomes confused. He is powerless to operate with this concept in a nonconcrete situation.

We find the weakness of the scientific concept where we find the strength of the everyday concept, that is, in its spontaneous usage, in its application to various concrete situations, in the relative richness of its empirical content, and in its connections with personal experience. Analysis of the child's spontaneous concept indicates that he has more conscious awareness of the object than of the concept itself. Analysis of his scientific concept indicates that he has more conscious awareness of the concept than of the object that is represented by it. Therefore, the threat to satisfactory concept development differs fundamentally for scientific and everyday concepts.

Thus, while scientific and everyday concepts move in opposite directions in development, these processes are internally and profoundly connected with one another. The development of everyday concepts must reach a certain level for the child to learn scientific concepts and gain conscious awareness of them. The child must reach a threshold in the development of spontaneous concepts, a threshold beyond which conscious awareness becomes possible.

The child's concepts of history, for example, begin their development only when his everyday concept of the past is sufficiently differentiated, only when his life and the life of those near to him are placed in the framework of an initial abstraction of the "before and now" in his consciousness.

In essence, there are only two possibilities for explaining the relationship between the development of verbal and written speech, between native and foreign languages, between the logic of action and the logic of thought, and between graphic logic and the logic of verbal thinking. These two possibilities are mutually exclusive. The first type of explanation relies on the *law of displacement*. Here it is assumed that processes of development that have occurred at earlier stages are repeated or reproduced with the development of more advanced functions; the basic difficulties encountered in earlier processes of development are manifested once again at the higher level. This approach has been applied frequently by psychologists in resolving the problems mentioned above. Recently, Piaget has renovated this approach and used it as his ace in the hole.

The second type of explanation provides the basis for our hypothesis of the zone of proximal development. This form of explanation is based on the notion that analogous systems in higher and lower domains develop in contrasting directions. This is the law of interconnections between higher and lower systems in development. This law was discovered, and has been supported, through our studies of the development of spontaneous and scientific concepts; native and foreign languages, and verbal and written speech. Later, we will attempt to apply it to Piaget's analysis of the development of graphic logic and the logic of verbal thinking as well as to his theory of verbal syncretism.

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The basic finding of our research is that relationships of generality between concepts are closely associated with the structure of generalization (i.e., they are closely associated with the stages of concept development that we studied in our experimental research). Each structure of generalization (i.e., syncretic, complexes, precepts, and concepts) corresponds with a specific system of generality and specific types of relationships of generality between general and specific concepts. Each structure of generalization has a characteristic degree of unity, a characteristic degree of abstractness or concreteness, and characteristic thought operations associated with a given level of development of word meaning.

Where there is a pathological disintegration of concepts, there is a disturbance in the measure of generality and a disintegration of the unity of abstract and concrete in word meaning. Concepts lose their measure of generality and their relationship to other concepts (i.e., those that are higher, lower, and within their own series). The movement of thought begins to occur in a broken, incorrect, and inconsistent line. Thought becomes alogical and unrealistic to the extent that neither the act through which the concept grasps the object nor the relationship of the concept to the object any longer form a unity.

In our earlier research, the relationship of the word to the object was analyzed with each stage in concept development (i.e., with the stages characterized by syncretic concepts, complexes, and true concepts). We ignored the fact that *each new stage in the development of generalization depends on the generalizations found in the preceding stages*. A new stage of generalization arises on the foundation provided by the previous stages. It does not emerge from a direct generalization of objects by thought, but from the generalization that was generalized in the previous structure of objects. It arises as a generalization of generalizations, not as a new mode of generalizing isolated objects. The results of previous efforts of thought which are expressed in the generalizations that dominate previous stages do not come to naught. They are included in the new work of thought. They are prerequisites for it.

The existence of this system that is introduced into the child's thinking with the development of scientific concepts helps to clarify the general theoretical issue of the nature of the relationships that exist between the development of thinking and the acquisition of knowledge (i.e., the relationships that exist between instruction and development). As we have said, Piaget divorces the two processes. In his view, the concepts that the child learns in school have no significance for research on the child's thought. The characteristics of the child's thought are lost in the characteristics of adult thinking with this concept. Therefore, Piaget pursues the study of thinking outside the context of instruction. He proceeds from the assumption that what develops in the child in the process of instruction is of no interest for those who are concerned with the development of the child's thought. For Piaget, instruction and development are incommensurable processes. They are entirely independent and unrelated.

Chapter 7 THOUGHT AND WORD

1

We have attempted to demonstrate that those who begin with this mode of analysis are doomed to failure from the outset. To explain the characteristics of verbal thinking, they decompose the whole into the elements that form it. They decompose verbal thinking into speech and thinking, elements that do not contain the characteristics inherent to the whole. This closes the door to any real explanation of these characteristics. We have compared the researcher who takes this approach to one who decomposes water into hydrogen and oxygen in the attempt to explain why water extinguishes fire.

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As we noted, this researcher would find to his surprise that oxygen sustains combustion while hydrogen is itself combustible. We also argued that decomposition into elements is not analysis in the true sense of the word but a process of raising the phenomenon to a more general level. It is not a process that involves the internal partitioning of the phenomenon which is the object of explanation. It is not a method of analysis but a method of generalization. To say that water consists of hydrogen and oxygen is to say nothing that relates to water generally or to all its characteristics. It is to say nothing that relates to the great oceans and to a drop of rain to water's capacity to extinguish fire and to Archimedes's law. In the same way, to say that verbal thinking contains intellectual processes and speech functions is to say nothing that relates to the whole of verbal thinking and to all its characteristics equally. It is to say nothing of relevance to the concrete problems confronting those involved in the study of verbal thinking.

... question of the development of word meaning. The entire process of development is reduced to changes in the associative connections between words and objects. The word may initially designate one object and then become connected with another through the processes of association. The coat, being transferred from one owner to another, may initially remind us of one person and subsequently of another. The development of the meaningful aspect of speech is reduced to the changes that occur in the object content of words. The notion that the semantic structure of word meaning might change through the historical development of language is completely foreign to linguistics. Linguistics cannot perceive the possibility that the psychological nature of meaning changes, that linguistic thought moves from primitive forms of generalization to higher and more complex forms, that the very nature of the reflection and generalization of reality in the word changes with the emergence of abstract concepts in the process of the historical development of language.

This associative perspective on word meaning also leads to the view that the development of the meaningful aspect of speech in ontogenesis is impossible and inexplicable. The development of word meaning in the child is reduced to purely external and quantitative changes in the associative connections that unite word and meaning, to the enrichment or reinforcement of these connections. The notion that the structure and nature of the connections between word and meaning might change during the development of the child's speech – the fact that they do change during ontogenesis – is inexplicable from the associative perspective.

3

If we are to understand this phenomenon, we must begin with the thesis that *inner speech is a psychological formation that has its own unique nature*, the thesis that inner speech is a unique form of speech activity that has unique characteristics and stands in complex relationships to other speech forms. To study the relationships of inner speech to thought and to the word, we must identify what distinguishes inner speech from thought and word. We must clarify its unique function.

In our view, it is important in this connection that in one case I am speaking to myself and in the other to another. Inner speech is speech for oneself. External speech is speech for others. This is a fundamental functional difference in the two types of speech that will have inevitable structural consequences. In our view, then, it is incorrect to view the difference between inner and external speech as one of degree rather than of kind (as Jackson and Head, among others, have done). The presence or absence of vocalization is not a cause that explains the nature of inner speech. It is the consequence of its nature. Inner speech is not merely what precedes or reproduces external speech. Indeed, in a sense, it is the opposite of external speech. External speech is a process of transforming thought into word; it is the materialization and objectivization of thought. Inner speech moves in the reverse direction, from without to within. It is a process that involves the evaporation of speech in thought. This is the source of the structure of inner speech, the source of all that structurally differentiates it from external speech.

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In contrast, our own theory suggests that the child's egocentric speech is one aspect of the general transition from inter-mental functions to intra-mental functions, one aspect of the transition from the child's social, collective activity to his individual mental functions. As we have shown in one of our earlier works,* this transition constitutes the general law of the development of all higher mental functions. Initially, these functions arise as forms of cooperative activity. Only later are they transformed by the child into the sphere of his own mental activity. Speech for oneself has its source in a differentiation of an initially social speech function, a differentiation of speech for others. Thus, the central tendency of the child's development is not a gradual socialization introduced from the outside, but a gradual individualization that emerges on the foundation of the child's internal socialization.

In Piaget's view, egocentric speech arises from the inadequate socialization of what is initially an individual form of speech. In our view, it arises from the inadequate individualization of an initially social speech, from the inadequate isolation and differentiation of egocentric from social speech. In the first case, egocentric speech is a point on a falling curve that culminates in its disappearance. Here, egocentric speech has nothing but a past. In the second case, egocentric speech is a point on a rising curve, the culmination of which lies in the future in inner speech. Here, egocentric speech has a future. In the first case, speech for oneself – inner speech – is introduced from the outside in the socialization process in accordance with the principle mentioned earlier through which the red water is forced out by the white. In the second case, speech for oneself arises from egocentric speech; it develops from within.

If the child's egocentric speech stems from the egocentrism and inadequate socialization of his thinking, then any weakening of the social aspects of the situation, any seclusion or liberation of the child from his links with the collective, any increase in his psychological isolation, any loss of psychological contact with other people – anything that liberates the child from the necessity of adapting to the thought of others and using socialized speech – should lead to a sharp increase in the coefficient of egocentric over socialized speech. This would create the most favorable conditions possible for the liberation and full manifestation of the child's inadequately socialized thought and speech. If, on the other hand, egocentric speech stems from the inadequate differentiation of speech for oneself from speech for others, if it flows from an inadequate individualization of what is initially a social form of speech, these changes in the situation will be reflected in a sharp reduction in egocentric speech.

When they are engaged in joint play, children between three and five years of age are frequently occupied only with themselves. Each speaks only to himself. If this talk is printed, it looks like conversation. Analysis indicates that it is a collective monologue where the participants do not listen or respond to one another. In reality, however, this prototype of the child's egocentric set demonstrates the social connectedness of the child's mind. The collective monologue does not represent an intentional isolation from the collective, an autism as that is defined by modern psychiatry. Indeed, it is symptomatic of the opposite mental structure. Even Piaget, who takes the child's egocentrism as the cornerstone of his whole theory of the child's mental characteristics, recognizes that children believe that they are speaking and listening to one another in the collective monologue.

In the initial series of experiments, we attempted to destroy the illusion that egocentric speech is understood by other children by placing our subjects either among children who were either deaf or spoke a different language. In other respects, the experimental situations were no different from those where the coefficient of egocentric speech had been measured earlier with the same subjects, situations similar to those in Piaget's experiments. The sole variable in the experiment was the illusion of understanding. In the original experimental situation this illusion had emerged naturally. In these new experiments it was carefully excluded. We found that when the illusion of understanding was excluded the coefficient of egocentric speech fell sharply. In the majority of cases it fell to nothing. In the remaining cases, it was reduced on the average by a factor of eight.

Thus, the illusion of understanding is not accidental. It is not a by-product, an appendage or an epiphenomenon of egocentric speech but is functionally connected with it. These results are paradoxical for Piaget's theory. The less psychological contact between the child and the children around him, the weaker the child's connection with the collective, the less the situation presents the child with demands for socialized speech and for adapting his thought to the thought of others, the more freely egocentrism should be manifested in the child's thinking and, consequently, in his speech. If the child's egocentric speech is actually a function of the inadequate socialization of his thought and speech, no other conclusion is possible. From this perspective, when we exclude the illusion of understanding we should find not an increase but a decrease in the coefficient of egocentric speech.

Our hypothesis suggests the true source of egocentric speech is the inadequate individualization of speech for oneself, the failure to differentiate it from speech for others. These data indicate that egocentric speech cannot live and function in isolation from social speech. When we exclude the illusion of understanding — a critical psychological feature of social speech — egocentric speech atrophies.

Consider the following situation: I sit at a desk and converse with a person who is behind me, a person whom I do not see. Unnoticed, this person leaves the room. However, I continue to speak guided by the illusion that I am heard and understood. Here, my speech is externally reminiscent of egocentric speech (i.e., speech in private and for oneself). Psychologically, however, it is social speech.

Compare this to the child's egocentric speech. Piaget assumes that the psychological nature of the child's egocentric speech is the opposite of that in our illustration. From the perspective of the child (i.e., psychologically and subjectively) his speech is egocentric; it is speech for himself. Only in its external manifestation is it social speech. Thus, its social character is an illusion, just as in the illustration the egocentric character of my speech is an illusion.

4

Here, we find the predicative sentence in external speech because the subject and associated words are known directly from the situation where the interlocutors find themselves.

In both cases, pure predication arises where the subject of the expression is present in the interlocutors' thoughts. If their thoughts coincide, if both have the same thing in mind, complete understanding can be realized through a single predicate. If the predicate is related to different subjects, however, inevitable and often humorous misunderstandings arise.

The understanding of speech requires a knowledge of the matter at hand. In Polivanov's view, everything we say requires a listener who understands the nature of the matter at hand. If we had to include everything we wanted to say in formal word meanings, we would have to use many more words to express each thought than we do. We speak through hints and allusions.

Where the thoughts of the interlocutors focus on a common subject, full understanding can be realized with maximal speech abbreviation and an extremely simplified syntax. Where they do not, understanding cannot be achieved even through expanded speech. Thus, two people who attribute different content to the same word or who have fundamentally different perspectives often fail to achieve understanding.

As Tolstoy says, people who think in original ways and in isolation find it difficult to understand the thought of others. They also tend to be particularly attached to their own thought.

In contrast, people who are in close contact can understand mere hints which Tolstoy called "laconic and clear." They can communicate and understand the most complex thoughts almost without using words.

5

Polivanov has noted that if we included all that we wanted to say in the formal meanings of the words we use, we would need to use many more words to express each of our thoughts than we do. This is precisely the situation we find in written speech.

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To a much greater extent than in oral speech, thought is expressed in formal word meanings. Written speech is speech without the interlocutor. It is, therefore, maximally expanded and syntactically differentiated. Because of the separateness of the interlocutors, understanding through hints and predicative expressions is rarely possible in written speech. The differing situations in which the interlocutors find themselves in written speech preclude the presence of a common subject in their thought. Thus, compared with oral speech, written speech is maximally expanded as well as syntactically complex. As Thompson has pointed out, we commonly use words, expressions, and constructions in written expositions that would seem artificial in oral speech.

For the psychology of speech and for linguistics the differentiation of dialogic and monologic forms of speech has become particularly important. Written speech and inner speech are *monologic* speech forms. Oral speech is generally *dialogic*.

Dialogue always assumes the interlocutors' knowledge of the crux of the matter. As we have seen, this knowledge allows abbreviations in oral speech. In certain situations, it produces purely predicative statements. Dialogue presupposes visual perception of the interlocutor (of his mimics and gestures) as well as an acoustic perception of speech intonation. This allows the understanding of thought through hints and allusions. Only in oral speech do we find the kind of conversation where (as Tarde has stated it) speech is only a supplement to the glances between the interlocutors.

Because we discussed the tendency of oral speech toward abbreviation earlier, we will limit ourselves here to a discussion of its acoustic aspects. Dostoevskii's writing provides us with an excellent example of the extent to which intonation facilitates subtle differentiations in the comprehension of word meaning.

Dostoevskii describes the language of several drunks which consisted of a single unprintable noun: ...

Here we see another of the sources that underlie the tendency for abbreviation in oral speech. Dostoevskii writes that it is possible to express all thoughts, all sensations ~ even a whole chain of argument – through a single word. Here, this becomes possible when we use intonation to transfer the internal psychological context, that is, the context within which the word's sense can be understood. In this conversation, this context consists in sharp rejection, doubt, or indignation. When the internal content of thought can be expressed through intonation, speech will tend to become abbreviated.

Let us analyze the circumstances that facilitate abbreviation in inner speech in more detail. Remember, with oral speech, elision and abbreviation arise where the subject of the expression is known to the interlocutors. In inner speech, we always know what our speech is about; we always know our internal situation, the theme of our inner dialogue. Piaget once noted that we easily believe our own word, that the need for proof and the ability to provide evidence for our thought emerges only in the encounter between our own ideas and the foreign ideas of others. In the same way, it is particularly easy to understand ourselves through hints and allusions. In inner speech, we are always in the kind of situation that arises from time to time in oral dialogue, the kind of situation that we have illustrated in our examples.

Moreover, we always have the capacity to express our thought in inner speech without clothing it in precise words. This was what happened in the conversation between Levin and his wife. As we indicated above, the mental intimacy of the interlocutors creates a shared apperception that is critical for attaining comprehension through allusions, critical for the abbreviation of speech. This shared apperception is complete and absolute in the social interaction with oneself that takes place in inner speech. Therefore, the nearly wordless yet laconic and clear communication of complex thoughts is a consistent characteristic of inner speech, where in external speech it is possible only where there is a profound internal intimacy between the speakers. In inner speech, we never need to name the subject. We limit ourselves to what needs to be said of this subject, to the predicate. This is the source of the dominance of predicativity in inner speech.

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First, in inner speech, we find a predominance of the word's sense over its meaning. Paulhan significantly advanced the psychological analysis of speech by introducing the distinction between a word's sense and meaning. A word's sense is the aggregate of all the psychological facts that arise in our consciousness as a result of the word. Sense is a dynamic, fluid, and complex formation which has several zones that vary in their stability. Meaning is only one of these zones of the sense that the word acquires in the context of speech. It is the most stable, unified, and precise of these zones. In different contexts, a word's sense changes. In contrast, meaning is a comparatively fixed and stable point, one that remains constant with all the changes of the word's sense that are associated with its use in various contexts. Change in the word's sense is a basic factor in the semantic analysis of speech. The actual meaning of the word is inconstant. In one operation, the word emerges with one meaning; in another, another is acquired. The dynamic nature of meaning leads us to Paulhan's problem, to the problem of the relationship between meaning and sense. Isolated in the lexicon, the word has only one meaning. However, this meaning is nothing more than a potential that can only be realized in living speech, and in living speech meaning is only a cornerstone in the edifice of sense.

Paulhan states that the word's sense is complex, fluid, and constantly changing. To some extent, it is unique for each consciousness and for a single consciousness in varied circumstances. In this respect, the word's sense is inexhaustible. The word acquires its sense in the phrase. The phrase itself, however, acquires its sense only in the context of the paragraph, the paragraph in the context of the book, and the book in the context of the author's collected works. Ultimately, the word's real sense is determined by everything in consciousness which is related to what the word expresses. According to Paulhan, the sense of the Earth is the solar system, the sense of the solar system the Milky Way, and the sense of the Milky Way ... We never know the complete sense of anything, including that of a given word. The word is an inexhaustible source of new problems. Its sense is never complete. Ultimately, the sense of a word depends on one's understanding of the world as a whole and on the internal structure of personality.

Paulhan's most important contribution, however, lies in his analysis of the relationship between word and sense. Paulhan demonstrated that the relationship between a word and its sense is not characterized by the same direct dependency as the relationship between a word and its meaning. Words can be disassociated from the sense that is expressed in them. It has long been known that words can change their sense. More recently, it has been noted that we must also study how senses change their words or, more precisely, how concepts change their names. Paulhan provides several examples illustrating how the word can remain after sense has evaporated. He analyzed stereotyped phrases such as, "How are you doing?", as well as other situations that illustrate the independence of word from sense. Paulhan also shows how sense can be isolated from the word that expresses it, how it can become fixed in another word. He argues that in the same way that the word's sense is connected not with each of its sounds but with the word as a whole, sense is connected not with each of the words that constitute the phrase but with the phrase as a whole. This creates the potential for one word to take the place of another, for sense to be isolated from the word yet still preserved. However, the word cannot exist without sense nor can sense exist without the word.

... validity of our basic thesis, the thesis that *inner speech is an entirely unique, independent, and distinctive speech function*, that it is completely different from external speech. This justifies the view that inner speech is an internal plane of verbal thinking which mediates the dynamic relationship between thought and word. After all that we have said about the nature of inner speech, about its structure and its function, there is no question that the movement from inner to external speech is incomparable to the direct translation of one language to another. The movement from inner to external speech is not a simple unification of silent speech with sound, a simple vocalization of inner speech. This movement requires a complete restructuring of speech. It requires a transformation from one distinctive and unique syntax to another, a transformation of the sense and sound structure of inner speech into the structural forms of external speech. External speech is not inner speech plus sound any more than inner speech is external speech minus sound. The transition from inner to external speech is complex and dynamic. It is the transformation of a predicative, idiomatic speech into the syntax of a differentiated speech which is comprehensible to others.

What is contained simultaneously in thought unfolds sequentially in speech. Thought can be compared to a hovering cloud which gushes a shower of words.

Vygotsky - Thinking and Speech

We followed several unusual paths in this investigation. We attempted to study the internal aspect of the problem of thinking and speech, what is hidden from immediate observation. We attempted to analyze word meaning, a phenomenon that has always been as foreign to psychologists as the other side of the moon, a phenomenon that has always remained unstudied and unknown. The sense aspect of speech, indeed the entire internal aspect of speech that is oriented toward the personality, has until recently been unfamiliar territory for psychology. Psychology has primarily studied the external aspects of speech, those that are oriented toward us. The result has been that the relationships between thought and word have been understood as constant, eternal relationships between things, not as internal, dynamic, and mobile relationships between processes. The basic conclusion of our investigation can therefore be expressed in the thesis that these processes – which have previously been thought of as connected permanently and uniformly — in fact have changing and dynamic connections.

What has previously been considered a simple construction has turned out to be a complex structure.

Our desire to differentiate the external and sense aspects of speech, word, and thought has concluded with the attempt to illustrate the complex form and subtle connections of the unity that is verbal thinking. The complex structure of this unity, the complex fluid connections and transitions among the separate planes of verbal thinking, arise only in process of development. The isolation of meaning from sound, the isolation of word from thing, and the isolation of thought from word are all necessary stages in the history of the development of concepts.

Associative psychology represented the relationship between thought and word as an external relationship that is formed through repetitive connections between two phenomena. In principle, this relationship was thought to be analogous with the associative connections that arise between two meaningless words. Structural psychology replaced this representation with one based on a structural connection between thought and word. However, it left unchanged the underlying postulate that this connection is non-specific. It placed this connection alongside all other structural connections that can arise between two objects such as the stick and the banana in the chimpanzee experiments.

All theories that have attempted to resolve this question have remained polarized around two opposing positions. At one pole is the behaviorist conception of thinking and speech, expressed in the formula that thought is speech minus sound. At the other is extreme idealism, a view developed by the Wurzburg school and Bergson in their conception of the complete independence of thought from word and in their view that the word distorts thought. Tiutchev's line, "Thought verbalized is a lie." expresses the essence of this view. This is the source of the attempts of psychologists to isolate consciousness from reality. In Bergson's words, it is the attempt to grasp our concepts in their natural state, in the form in which they are perceived by consciousness, by destroying the parameters of language.