

Unknown Vygotsky: Cultural-Historical Theory in the Context of Pavlov's Theory of Higher Nervous Activity and H. Werner's Differential Development Theory

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The position about the internal connection between the cultural-historical theory of development of higher mental functions of L.S. Vygotsky and two prominent theories of the 20th century is substantiated. Firstly, this is the theory of conditioned reflex of I.P. Pavlov, including the idea of significant qualitative difference between human higher nervous activity and human behaviour and those of animals, due to the presence of the second signal system as a "grand speech signal" in humans. Second, this is the differential theory of development by H. Werner, which fits a number of key ideas of L.S. Vygotsky about the development of speech function and the role of the word in the psychological development of a child.

Keywords: I.P. Pavlov, H. Werner, apparatus for the closure of temporary connections, verbal signs as a key to this apparatus, principle of differentiation in speech function development, overcoming syncretism of children's perception.

In the report of E. Dafermos at the international symposium "Scientific school of L.S. Vygotsky: traditions and innovations", it was correctly stated that Vygotsky's school pays little attention to the study of the philosophical foundation of his works, although it is really hard to evaluate this theory in full without a sufficient understanding of the works [5]. We should also add that definitely little attention is paid to the methodological views of L.S. Vygotsky and the study of his theory in the broad historical context of the development of the world's psychological thought. E. Dafermos uses the ideas of Spinoza, Hegel, Feuerbach, and Marx to analyze the philosophical foundation of L.S. Vygotsky's theory.

As to L.S. Vygotsky's study of cultural-historical theory in the context of psychology development, as a rule, it is limited to the theory of Piaget, which is clearly insufficient.

In the introduction to the materials of this international symposium it has been noted that the understanding and knowledge of the theoretical and methodological foundations of this school are incomplete, although more and more foreign and domestic scientists use the ideas of L.S. Vygotsky. Therefore, reference to the original works of L.S. Vygotsky has become one of the priorities for the international psychological researches.

It seems that it is important to identify the deep inner connection of cultural-historical theory of development of higher mental functions of L.S. Vygotsky with two other

prominent theories of the 20th century. First, this is the well-known theory of I.P. Pavlov, whose importance for the world's psychology development is generally recognized. And second, the fundamental differential theory of mental development of H. Werner, remarkable, although less well known. Some of my publications [14; 17; 18] are dedicated to identification of this connection; however these publications are not directly addressed to the representatives and followers of L.S. Vygotsky's school. This article serves the purpose.

I. L.S. Vygotsky and I.P. Pavlov

L.S. Vygotsky's appraisal of I.P. Pavlov as a scientific methodologist

L.S. Vygotsky was well aware of Pavlov's works, valued them highly, and used his methodological ideas and principles of his reflex theory.

Vygotsky's fundamental research "The historical meaning of psychological crisis. Methodological Study" was written in 1927. Its basic idea is to find a philosophically based methodology, a system of concepts and ways of organizing knowledge, which could consistently combine diverse, loose, often unclear empirical material of various directions and schools of psychology.

The crisis of psychology at the end of the 19th – beginning of the 20th century was considered by Vygotsky

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as unresolved mind-body dualism and simultaneous existence of two different psychologies that he called natural science, materialistic, and spiritualistic psychology. He thought that the crisis could be overcome by complete breaking of materialistic psychology away from the spiritualistic one, creating a new materialistic psychology rejecting "... contemplation of ideal creatures based on the solid foundation of dialectical unity of rigorous scientific methodologies and practices" [3, p. 393].

L.S. Vygotsky paid a great deal of attention to the dismal state of psychological language, which consists of an eclectic conglomerate of three absolutely different kinds of words: 1) words of everyday language, words with vague and ambiguous meaning; 2) words of philosophical language with many different meanings due to the struggle between various philosophical schools, and very largely abstract; 3) words and forms of speech borrowed from natural sciences and used figuratively, which "serve just to deceive" according to L.S. Vygotsky. "When a psychologist talks about energy, strength, even about intensity, or when he talks about excitation, etc., he uses a scientific word for a non-scientific concept," wrote Vygotsky [3, p. 356–357]. The diagnosis put forward by L.S. Vygotsky is absolutely true nowadays: "...the dim status of psychological language reflects the dim status of science" [3, p. 357].

Against the background of the outlined picture of division and fragmentation of psychology, of hopeless dimness of its language, L.S. Vygotsky refers to I.P. Pavlov, in whose theory and research methodology he sees some kind of a pattern, some kind of a "lighthouse" that can help lift psychology out of crisis.

The index of names to the work "Historical meaning of psychological crisis" shows that Pavlov is mentioned 30 times and only in a positive, but not in a critical sense. Chelpanov as one of his major opponents is mentioned 22 times, Freud – 20 times, Bekhterev – 19 times, Münsterberg – 18 times, Stern – 15 times, Kornilov – 14 times, Wundt, Buhler, and Diley – 11 times, Koffka – 10 times, James and Thorndike – 9 times, Wagner and Blonsky – 6 times. The rest of the authors have fewer references.

The issue is not only the number of references to Pavlov. The issue is that for Vygotsky, Pavlov is the scientist who created the methodology for studying brain activity and behaviour, which should serve as a model for the development of psychological methodology. The core of methodology for Vygotsky is a conceptual and terminological science language, which allows empirical facts to be described clearly, unambiguously, and logically, uniting them and making theoretical generalizations, i.e. the apparatus that unites facts and concepts. "The scientific study of facts is distinguished from recording, as it is an accumulation of ideas, processing of concepts and facts with the accumulation of concepts," he wrote [3, p. 317]. Vygotsky says about Pavlov: "Every scientific discovery, every step forward in empirical science is always an act of criticism of a concept. Pavlov discovered the fact of conditioned reflexes; but didn't he create new concepts at the same time; wasn't a well-behaved, learned movement formerly called a reflex?" [3, p. 316]. Let us give some more quotations from Vygotsky below.

"Thanks to his methodological coherence, especially in language, Pavlov achieved great successes. From a

chapter on the work of dogs' salivary glands his research turned into the research of higher nervous activity and behaviour of animals, only because he used enormous theoretical knowledge for studying salivary secretion and created a transparent system of concepts that became the basis of science. Pavlov's fidelity to methodological principles is amazing, and his book brings us into the laboratory of his studies and teaches how to create scientific language" [3, p. 363–364].

"And when Pavlov introduced a penalty for using psychological terms in his laboratories, it was as important and meaningful for the history of science as the dispute about the symbol of faith for the history of religion. Only Chelpanov can laugh at it: the scientist imposes a penalty for an incorrect term not in a textbook, not during the presentation of a subject, but in the laboratory during the research process. It is obvious that the penalty was imposed for causeless, spaceless, vague, mythological thinking that violated the research process and threatened to spoil everything, as with the Americans – to introduce fragmentation, lack of systematic, and sink the foundation" [3, p. 364] "The greatest discipline of thought is based on Pavlov's penalty: the same discipline of spirit is the basis of scientific understanding of the world, as a monastery – of the religious one. Anybody who comes to the laboratory with his/her own word, will have to repeat the example of Pavlov. A word is the philosophy of fact; it may be the latter's mythology, as well as its scientific theory" [3, p. 365].

None of the scholars, whose works and views were considered by Vygotsky in this study, was valued as highly as Pavlov. And it was at the time when no official cult of I.P. Pavlov existed at all.

I think here is something to reflect upon for contemporary theorists, methodologists and historians of psychology.

However, the issue is not only the highest evaluation of I.P. Pavlov as a theorist and a methodologist in the study of higher nervous activity and behaviour. L.S. Vygotsky developed his cultural-historical theory of development of higher mental functions under the direct influence of the theory of conditioned reflex of I.P. Pavlov and his fundamental ideas about the qualitative difference between human higher nervous activity and behavior and those of animals due to the presence of the second signal system of a human, "grand signalistic potential of speech". According to Pavlov, it was word that made us human beings, and Vygotsky's cultural-historical theory of development of higher mental functions is about the same thing. In my opinion, the creation of the theory of L.S. Vygotsky, Hegel, Marx, Potebnya and Janet was directly influenced by I.P. Pavlov.

***The conditional reflex theory I.P. Pavlov,
his idea of the human second signal system
and the cultural-historical theory of the origin
of higher mental functions L.S. Vygotsky***

One of the central statements of Vygotsky's theory is a person's mastering his/her behaviour due to the use of signs. This statement stems directly and immediately from two general principles of Pavlov's theory of conditioned reflex: firstly, from the principle of signality in the activity

of cerebral cortex and from the principle of formation of temporary nervous connections, and second, it is directly derived from Pavlov's ideas about the second signal system, about the radical difference of human higher nervous activity from that of animals. In Vygotsky's theory, higher mental functions appear, because human behavior is determined not only by the objects in the surrounding world, as in the case of "natural" functions, but also and primarily by social factors presented in verbal speech. The word as a mediating factor is primarily included in the child's behaviour in the form of the speech of adults surrounding it, and then in adulthood — in the form of their own inner speech.

To see the direct connection of these provisions with I.P. Pavlov's theory and with his ideas of the second signal system, it is better to quote L.S. Vygotsky.

"The most common basis of behaviour, which is the same for animals and humans, is the alarm system," writes Vygotsky. He continues: "so, said Pavlov, the main and the most general activity of cerebral hemispheres is signal activity, with countless signals and variable signalling". As you know, this is the most general formulation of the whole idea of physiology of conditioned reflexes, which is the basis of physiology of higher nervous activity.

However, human behaviour is different due to the fact that it creates artificial stimuli, first of all, the grand signalistic potential of speech, and thus takes hold of the signalling activity of cerebral hemispheres. If the main and the most general activity of cerebral hemispheres of animals and humans is signalling, then the main and the most general activity of a human that distinguishes a human from an animal from the psychological point of view, is *signification*, i.e. creation and use of signs. We use this word in its most literal and precise meaning. Signification is the generation and utilization of signs, i.e. artificial signals.

Let us consider this new principle of activity more closely. It cannot be opposed in any sense to the principle of signalling. Variable signalling leading to the formation of temporary, contingent, special connections between an organism and environment, a necessary biological prerequisite for the highest activity, which we conventionally call signification, is the basis of its activity" [4, p. 79–80].

Then L.S. Vygotsky formulated the key provision of his theory arising from the fact of the use of verbal signs in human society.

"Thus, man has created signalling apparatus, a system of artificial conditional stimuli, through which he creates any artificial connections and causes the desired responses. If we compare cerebral cortex with a grand signalling board, we may say that a man has created a *key* to this board — grand signalistic potential of speech. This key helps to control the activity of cortex from outside and to control behaviour... There is no animal able to do anything like that. Meanwhile, it is easy to see that, together with almost completely new regulatory principle of mastering behaviour from outside, there is a new plan of mental development compared with the animal one — evolution of signs, means of behaviour and the related subordination of behaviour to human power.

To continue with the previous comparison, we may say that human mental development was in phylogenesis and is in ontogenesis not only through the perfection and compli-

cation of the most grand signalling board, i.e. the structure and function of the nervous system, but also through the development and acquisition of appropriate grand signalistic potential of speech, which is a key to this board.

So far, it has seemed quite clear to us. There is an apparatus intended for the closure of temporary connections, and there is a key to the apparatus allowing, along with the connections formed under the influence of natural agents, a new, artificial mechanism to be produced, which is subordinate to the power of a human and his choice of closure. The apparatus and the key are in different hands. One person influences another one using speech. However, the entire complexity of the issue becomes immediately apparent as soon as we connect the apparatus and the key in the same hands as soon as we turn to autostimulation and self-control. Here psychological connections of a new type appear within the same behavioral system" [4, p. 82–83].

In fact, L.S. Vygotsky's idea that verbal signs are key to the apparatus for the closure of temporary connections, which can close various connections subordinate to his will, fully coincides with I.P. Pavlov's opinion on the higher regulatory and supervisory role of the second signal system in human behaviour.

However, this provision of L.S. Vygotsky is naturally and logically followed by the principle as to the method of double stimulation in the formation of artificial concepts developed by him together with L.S. Sakharov. This method actually implements interaction of the first and the second signal systems in the formation of concepts, whereas all prior studies of this type used only direct stimuli of the first signal, and there were no second signals with their generalising and abstracting function. There were stimuli of the second signal in the method of Vygotsky-Sakharov. These were artificial words written on the back of each figure, that are the signs for experimental concepts.

According to L.S. Vygotsky, the idea of the experiments on the formation of artificial concepts according to the method of double stimulation was to reveal the role of the word and the character of its functional use in the process of concept formation in order to give causal and dynamic explanation of the cognitive function of the word in the development of conceptual thinking.

Vygotsky's causal and dynamic explanation of the role of a word as means of concept formation is that the word allows us to attract attention to, distract cognitively, and abstract individual features of an object, which are perceived immediately only in conjunction with other features, and then synthesizing these abstracted features in a new unity forming the content of a concept properly. This theoretical scheme clearly shows how and why words manage the processes of perception (separation and abstraction of individual features of objects from their sensory integration) and the work of the apparatus for the closure of temporary connections (synthesis of extracted features).

Human higher mental functions are characterized by consciousness, arbitrariness, and flexible selectivity. However, how do these features appear, what are their sources, determinants, and mechanisms? The proposed theoretical approaches still remain vague, uncertain, full of everyday views and very different with different authors. They

talk about the determining trends, activity of the subject, installation, influence of motives, goals and objectives of activities, drawing attention, resources, etc. Meanwhile, if we put a very unique role of speech in human behaviour at the forefront, as I.P. Pavlov and L.S. Vygotsky did, then the theoretical framework of the approach to the nature of higher mental functions may become much more clear and specific. Words accumulate all achievements of human conceptual thought in their meaning. Therefore, their use raises the whole human mental activity to a new level and creates higher mental functions. In real human life and activity, the generalized abstract semantic meaning of words acquires the ability to subordinate the processes of immediate sensory first signal reflection of reality. As for psychology, there is a possibility to produce a more accurate and clear conceptual and terminological apparatus. L.S. Vygotsky called upon psychologists to learn from I.P. Pavlov.

II. Ideas of L.S. Vygotsky in the context of a general differentiation-integration theory of development

For 350 years, there have been the ideas of the same law of general universal development used in the history of European theoretical thought in the works of philosophers, biologists, psychologists, including outstanding and ingenious ones. This law is very simple. In short it states that development, wherever it occurs, begins with a relatively simple embryo, goes from the whole to parts, from homogeneous to heterogeneous, from general to particular, from more global and little differentiated forms to more internally differentiated and hierarchically ordered forms. In other words, development is based on two universal principles — the principle of differentiation and the principle of integration (Y.A. Komensky, H. Hegel, Spencer, V.S. Solovyev, A.A. Bogdanov, Ch. Darwin, Karl Baer, I.M. Sechenov, T. Ribot, Gestalt psychologists, etc.).

The work of H. Werner “Comparative psychology of mental development” has become a fundamental event in the development of the differentiation-integration law. The first edition was published in Germany (1926), and later — in the United States (1948, 1957, 2004). Based on the views of Spencer and broad general biological understanding of development, he formulates the orthogenetic principle as a general universal fundamental principle of development of all life forms and processes, including the psyche of animals and humans. According to this principle, any development goes from relatively global and low differentiated states to more differentiated and hierarchically integrated structures, components and functions. The orthogenetic principle allowed H. Werner to organize in accordance with a single general scheme the accumulated material in comparative psychology, general and child psychology, language development, abnormal psychology, psychology of peoples, and in differential psychology of intelligence [21].

The work started by Werner on generalizing and systematizing empirical data in the field of developmental psychology within the general orthogenetic principle (or the general universal development law) was continued in my works [15; 16]. First, it was possible to show that not

only individual empirical data, but also many individual development laws in the field of sensation, perception, thought and speech formulated by well-known psychologists of the past (E. Claparede, G. Volkelt, K. Koffka, T. Ribot, K. Goldstein, N. Lange, I.M. Sechenov), fall within this law. Secondly, it was found that similar individual laws of the differentiation-integration ways of development of different mental processes are found again and again in the works of contemporary authors (J. and E. Gibson, E. Clark, K. Nelson, F. Cale, J. Mandler, H. Witkin, R. Jakobson, V.I. Belyukov, T.N. Ushakov, A.A. Mitkin, E.A. Sergienko, etc.). The advantage of the differentiation-integration development theory is that it well assimilates almost all known facts described by Piaget, whose works are full of concepts of syncretism, non-differentiation and differentiation of mental content and psychological operations. The phenomena of non-conservation of amounts in small children and the confusion of ideas about the motion of a moving body and its speed in adolescents are easily explained by the lack of cognitive differentiation of various properties and parameters of perceived objects that has been described by P.Y. Halperin and D.B. Elkonin long ago [15; 16].

The results of numerous studies on the development of brain functions and structures are in full accordance with psychological data. Morphological structure and integrative activity of the brain and central nervous system in phylogenesis and ontogenesis are formed according to the general principle: from diffuse low-specialized forms of structural organization and functioning to more specialized differentiated and discrete forms (L.A. Orbeli, A.I. Karamyan, N.I. Filimonov, J. Coghill, P.K. Anokhin, Y.I. Aleksandrov, D.A. Farber and co-workers, et al.).

Currently, H. Werner's orthogenetic theory is regaining popularity in the United States.

In 2004, a new edition of his work was published [21]. In 2006, a collective monograph on Werner's life and works edited by Y. Valsiner was published [19], as well as the articles on the prospects of development of his theory [20].

In Russia, a number of conferences and workshops have been dedicated to the differentiation-integration theory of development, the results of which were reflected in the collective monographs [6; 7]. The following famous scholars took part in these events: V.A. Lektorsky, N.N. Poddiakov, A.P. Poddiakov, Y.I. Aleksandrov, I.O. Aleksandrov, E.A. Sergienko, M.S. Egorova, M.A. Kholodnaya, G.G. Filippova, A.A. Melik-Pashaev and others.

It is extremely significant that the name of L.S. Vygotsky may be included in this 350-year old fundamental tradition of developing the differentiation-integration theory of development.

According to the work “History of development of higher mental functions”, Vygotsky was not only familiar with the theory of H. Werner, but deeply understood its meaning and methodological significance for psychology. He describes this theory briefly, but very clearly. He fully agrees that “Werner sees the very essence of development in progressive differentiation and in the centralization associated with it”, that, according to Werner, “is not creative synthesis, but creative analysis, which is valid through the formation of higher forms of behaviour”,

that a complex system is not built of elements, but “on the contrary, due to a decomposition of a dynamic whole that exists as a whole from the very beginning, its constituent parts and connections, and their relationships developing among them on the basis of that whole must be brought out and understood”. In accordance with these general principles, the original structure changes in the development process “towards greater differentiation of parts.

First of all, the higher structure is different from the lower one due to the fact that it is the differentiated whole, where individual parts have different functions”. Werner quotes Goethe, who said that the difference between the lower and the higher organism is in greater differentiation of the higher one: the more perfect organism is, the less similar its parts are [4, p. 118, 115–116].

I must say that I have not found such a precise statement of the theory of H. Werner as the statement by L.S. Vygotsky.

Three important ideas of L.S. Vygotsky fully agree with the theory of H. Werner and meet the ontogenetic development principle.

***Development of a categorical system of knowledge:
from the general and global to the particular***

Nowadays, there are three levels in the hierarchy of categories: global (for example, furniture, animals), middle or basic (for example, different kinds of furniture – tables, chairs, different kinds of animals – dogs, cats) and detailed (for example, the types of chairs – chairs, stools; dog species – sheep dogs, huskies) [12].

Many studies carried out over the past years have shown that even babies aged from 5 to 6 months to 14 to 20 months are capable of forming a number of global and basic categories. The results of these studies have also led to the conclusion that global categories are formed prior to basic ones and much earlier than detailed ones. They confirm the action of universal development principle from general to particular in the development of categories, and confirm the view that the development of knowledge base is more subtle distinction in more global original categories [11; 12; 15; 16].

The findings of this cycle of studies are based on well-documented factual material. However, it is very significant that L.S. Vygotsky came to the same theoretical conclusions much earlier (in 1931) when analyzing the particular facts obtained by J. Piaget and his own observations as to the behaviour of babies. In the final chapter of the work “History of development of higher mental functions”, he wrote the following: “We see a false view, according to which a child begins from getting to know single things, and only by the way of generalization he comes to the concept. In fact, a child, like an animal, begins with the most general schemes, there are five groups of things for it which are not individually different, but perceived according to this assimilation scheme¹.

A pyramid of concepts, as Volkelt says, is being built simultaneously from both ends – from partial one and from general one. We could go even further and say that, judging by the behaviour of a child up to one year, the pyramid of

concepts is being built starting from the undifferentiated quotient, the child goes from general to particular, gradually allocating more and more fractional groups, and a single object is apparently allocated later” [4, p. 322].

L.S. Vygotsky brings this conclusion directly into a broader theoretical context of general principle of operation of cerebral cortex developed by I.P. Pavlov – the principle of primary generalization of all emerging forms of behaviour, which become more specialized only gradually, due to differentiation processes. He writes: “It also matches with what we know about the basic feature of nervous activity, in particular, about irradiation of nervous excitement, which always leads to the formation of generalized conditioned reflexes.

Only later, as a result of differentiation that never comes at once, a child begins to allocate and distinguish objects” [4].

Unfortunately, these conclusions by L.S. Vygotsky made in 1931 did not stimulate further experimental researches in this direction. Only after 50 years, American and Russian authors came back to this issue in the context of the studies of cognitive sphere of babies, the amazing results of which were called the “cognitive revolution”.

***Manifestation of the process of differentiation
in the development of the speech function***

As is known, in his few convincing experiments L.S. Vygotsky showed that, contrary to Piaget, the so-called children’s egocentric speech is actually socially oriented speech, i.e. he proved the premise about the original sociality of children’s speech. However, this is only half the issue. Moreover, Vygotsky put forward his famous idea of the initial original entity of two forms of speech in young children and their differentiation in adults: speech addressed to others (external audible speech) and speech addressed to oneself (silent inner speech). He talked about age differentiation of the above two speech functions, about the “differentiation of speech for oneself and speech for others from common undifferentiated speech function performing at an early age both of these purposes almost in the same way.” [2, p. 346] From this point of view, egocentric speech, as Piaget put it, is the inner speech somehow allocated functionally and structurally, “... which in its manifestation, however, has not been completely separated from social speech, within which it evolved and matured” [ibid, p. 354]. In other words, egocentric speech is a mixed and transitional form. By its function, it is different from social speech to a certain extent, but not fully, as it can only function in a situation making social speech possible.” [ibid] From psychological point of view, it is an independent form of speech, but also not in full, as “... it is not recognized as internal speech and is not distinguished by a child from the speech of others.” [ibid] As the events unfold, the structure and the work of inner speech become more defined, and more distinguished from external speech. Finally, it gets rid of external audible speech and egocentric speech turns into the inner one. Thus ends long differentiation process of two types of speech from the common source.

¹ The issue is about some facts of Piaget, but it is not clear what specific facts are meant.

It is significant that in 25 years after the publication of L.S. Vygotsky's book "Thought and Speech", Piaget fully admitted the truth of Vygotsky's opinion on this issue. He wrote that "... I agree with Vygotsky, when he concludes that the early function of language must be the function of global communication, and that later speech is differentiated into egocentric and communicative" [8, p. 93].

The role of language in the separated-differentiated cognition of reality

In the context of differentiation-integration theory, language acts as a powerful means of analytically separated cognition, as necessary means of the development of thinking [18].

The point is that all objects and phenomena of the world and all human actions are ontologically only parts of integrated situations, and all properties and relations of objects are ontologically inseparable. Human perception is just the same, the images of it are always integrally syncretic, no matter which may be the extent to which they are internally differentiated. However, some elements, properties and relations of the reality of human cognition (starting from perceived ones and ending with abstract ones) may act and do act separately and independently from each other. In the developed form, it is impossible without the use of language, without linking different elements of the world with the own psyche using different verbal signs. This view of the role of language in perceiving the world and thinking was expressed by many authors: V. Humboldt, E. Cassirer, T. Ribot, J. Mead, I.M. Sechenov, A.A. Potebnya, and A.N. Sokolov. The name of L.S. Vygotsky ranks high among them.

L.S. Vygotsky has repeatedly talked about a word as the necessary means of cognitive analytical division of reality in the context of overcoming the syncretism of child's psyche. For Vygotsky, the syncretism of initial stages of child's psyche was a kind of axiom. The concept of syncretism is one of the most repeated concepts used by Vygotsky to characterize the behaviour and the characteristics of children's cognitive sphere. In overcoming syncretism, L.S. Vygotsky cast in a leading role to language. Let us quote L.S. Vygotsky in full: "Not yet thinking in terms of words, a child sees the whole picture, and it is reasonable to believe that he sees life situation globally, syncretically. Let's recall how all impressions of a child are tied up syncretically, let's recall how this fact is reflected in the causal thinking of a child. The word that separates one object from another is the only means for the separation and fragmentation of the syncretic communication.

Let us imagine how radically the thinking may be changed in a child, who cannot speak, especially in a deaf – mute child, if it needs to allocate any part from rather complex combination of things or to detach particular features from this situation. This is the operation, which may wait for its implementation for years.

Now let us imagine a person, or even better a child, who can speak, and to whom an adult shows an object using his number one finger: a person allocates one object or a feature from the entire situation immediately, and the entire situation begins to take a new shape. A particular object is detached from the entire block of experience and,

thus, the person goes to the division of the block of experience into separate parts for the first time.

How does the most important change in the development of child's thinking happen under the influence of speech, and what does it consist of? We know that a word detaches particular objects, divides syncretic relation, and analyzes the world, it is the first means of analysis; a child uses a word to allocate an object from the total number of active objects" [4, p. 270].

As you can see, the above statements by L.S. Vygotsky in 1931 are focused on the role of speech as means of cognitive separation of particular objects from originally syncretic perceived situations. However, he goes even further. In the book "Thought and Speech" (1934), he analyzes the role of speech as means of cognitive division of reality. From postulating the role of the word as a means of detaching particular objects, and he moves on to postulating its role as means of further analysis of reality, as a means of allocating and abstracting certain features of things and phenomena.

Summarizing the results of experiments on the role of the word in the formation of concepts conducted using the method of double stimulation, L.S. Vygotsky focuses on the fundamentally irreplaceable role of the word in detaching and mental isolation of particular characteristics and features of objects. He came to understand this role of the word when analyzing the nature of developed human concepts. "A concept, – he writes – in its natural and developed form is not only integration and generalization of specific elements of experience, it also involves allocation, abstraction, isolation of particular elements and the ability to consider these allocated abstract elements beyond the specific and actual communication, in which they are given in the experiment." [2, p. 198] For this purpose, the use of verbal or any other sign is required for this purpose. "The experimental study of the formation process of concepts, – he concludes the study – has shown that the functional use of the word or other sign as means of active attention drawing, separation and allocation of features, their abstraction and synthesis is the major and the necessary part of the process" [2, p. 163].

The principal ideas expressed by L.S. Vygotsky find certain factual endorsement.

Thus, according to audiopsychological data, deaf children without a specially organized education are very much behind their peers as to the ability to divide things into pieces and to allocate particular features in them. In their perception, specific features of objects are "... united, tightly adjacent to each other", i.e. their perception is much more syncretic than the perception of hearing and speaking peers [10].

According to A.N. Sokolov, the inner speech of adults in the form of hidden movements of the speech organs is included into the solution of almost all (except the most simple) Raven's matrix problems. It means that the solution of these problems requires verbalization of visually perceived experiences. A.N. Sokolov writes that the identification or semantic features of these figures are primarily verbalized (their general shape, separate parts, number of parts), if they are perceived with no contrast [13].

In his famous recently reprinted book "About the beginning of human history", B.F. Porshnev upholds the idea that the beginning of human history should be related to

the emergence of the second signal system [9]. To prove this idea, Porshnev leans on the ideas of I.P. Pavlov and L.S. Vygotsky. Describing the role of the second signal system as a leading factor in the formation and development of society, he writes that, thanks to it people get rid of the power of immediate sensory stimulation. Only thanks to the second signal system a person has acquired the ability to perform and retard various activities that are dictated not by its direct environment, not by its individual sensory sphere, but are determined by the content of the psyche of other people, the content of society, and the content of all achievements of human thinking. In his opinion, this neurophysiological system of mutual retardation and excitation of certain actions is closely connected with the emergence of social relations and society, and it may be considered a primary source of social relations. Since this is about the neurophysiological system, about the functions of frontal lobes with their inhibitory and excitatory mechanisms, there exists a direct connection be-

tween the cultural-historical theory of Vygotsky and the issues of specific human processes of higher nervous activity.

On the other hand, there are a great deal of data proving that cultural-historical development is performed in the form of transition from less differentiated to more differentiated forms. Quoting such authors as Bogdanov, Weber, Durkheim, Sechenov, Y.I. Aleksandrov says that cultural differentiation is evident in the transition from unity and integration to the stage of division and growing complexity of social life, in the increasing complexity of social relations and the norms for their regulation, in the increasing number of various cultural "specialities", as well as in increasing specialization of individuals within the society [1]. In this context, the cultural-historical theory of higher mental functions by L.S. Vygotsky fits well into the broader context of the law of universal differentiation-integration development in the field of culture and the emergence of cross-cultural differences.

References

1. Aleksandrov Yu.I. Razvitie kak differentsiyatsiya [Development as differentiation]. In Chuprikova N.I. (eds.) *Differentsionno-integratsionnaya teoriya razvitiya [Differential-integral theory of development]*. Moscow: Yazyki slavyanskikh kul'tur, 2011, pp. 49–69.
2. Vygotskii L.S. Myshlenie i rech' [Thinking and speech]. Leont'ev A.N. (eds.). Moscow: Publ. APN RSFSR, 1956, pp. 39–386.
3. Vygotskii L.S. Istoricheskiy smysl psikhologicheskogo krizisa Metodologicheskoe issledovanie. *Sobr. soch. v 6 tomakh*. T. 1. [Historical sense of psychological crises]. Moscow, 1982, pp. 291–436.
4. Vygotskii L.S. Istoriya razvitiya vysshikh psikhicheskikh funktsii. *Sobr. soch. v 6 tomakh*. T. 3 [History of development of high psychological functions]. Moscow: Pedagogika, 1983, pp. 6–328.
5. Dafermos E. Pereosmyslenie filosofskikh osnov kul'turno-istoricheskoi teorii [Thinking of philosophic basis of cultural-historical theory]. *Materialy mezhdunarodnogo simpoziuma «Nauchnaya shkola L.S. Vygotskogo: traditsii i innovatsii»* (26 iunia 2016 g. Moskva) [Proceedings of International simposium. "Vygotsky's Scientific school: traditions and innovations"]. Moscow, 2016, pp. 100–101.
6. Chuprikova N.I. (eds.) *Differentsionno-integratsionnaya teoriya razvitiya [Differential-integral theory of development]*. Moscow: Yazyki slavyanskikh kul'tur, 2011. 496 p.
7. Chuprikova N.I. (eds.) *Differentsionno-integratsionnaya teoriya razvitiya. Part 2 [Differential-integral theory of development]*. Moscow: Yazyki slavyanskikh kul'tury: znak, 2014. 720 p.
8. Piazhe Zh. Kommentarii k kriticheskim zamechaniyam L.S. Vygotskogo na knigi «Rech' i myshlenie rebenka» i «Suzhdeniya i rassuzhdeniya rebenka». [Comments to remarks by L.S.Vygotsky on "Child's speech and thinking"]. In Obukhova L.F.(eds.) *Zhan Piazhe: teoriya, eksperimenty, diskussii [Zhan Piazhe: theory, experiments, discussions]*. Moscow: Gardariki, 2001, pp. 89–94.
9. Porshnev B.F. O nachale chelovecheskoi istorii (problemy paleopsikhologii) [About beginning of mankind history]. Moscow: Akademicheskii projekt; Triksta, 2013. 542 p.
10. Solov'ev I.M. (ed.) *Psikhologiya glukhikh detei [Psychology of deaf chils]*. Moscow: Prosveshchenie, 1971. 447 p.
11. Sergienko E.A. Raneie kognitivnoe razvitie: Novyi vzglyad [Early cognitive development]. Moscow: IP RAN, 2006. 463 p.
12. Sergienko E.A. Printsipy differentsiatsii-integratsii i kontinual'nosti-diskretnosti v ontogeneticheskoi perspektive [Principles of differeciatio-integration and continuum-discreetness in ontogenetic perspective]. In Chuprikova N.I. (eds.) *Differentsionno-integratsionnaya teoriya razvitiya [Differential-integral theory of development]*. Moscow: Yazyki slavyanskikh kul'tur, 2011, pp. 387–413.
13. Sokolov A.N. Vnutrennyaya rech' i myshlenie [Internal speech and thinking]. Moscow: Prosveshchenie, 1989. 248 p.
14. Chuprikova N.I. Zatormozila li pavlovskaya kontseptsiya razvitiya otechestvennykh nauk o povedenii [Brake of Pavlov's concept of developnebt of Russian sciences on behavior]. *Voprosy psikhologii [Questions of psychology]*, 1990, no. 1, pp. 117–124.
15. Chuprikova N.I. Psikhologiya umstvennogo razvitiya: Printsip differentsiatsii [Psychology of intellectual differentiation: principle of differentiation]. Moscow: AO «Stoletie», 1997. 471 p.
16. Chuprikova N.I. Umstvennoe razvitie. Printsip differentsiatsii [Intellectual development: Principle of differentiation]. Saint Petersburg: Piter, 2007. 448 p.
17. Chuprikova N.I. O nekotorykh ideyakh L.S. Vygotskogo, sozvuchnykh universal'nomu differentsionno-integratsionnomu zakonu razvitiya [About some L.S.Vygotsky's ideas, modern to universal differential-integral law of development]. In Chuprikov N.I. (eds.) *Differentsionno-integratsionnaya teoriya razvitiya. Kniga 2 [Differential-integral theory of development]*. Moscow: Yazyki slavyanskikh kul'tury: znak., 2014, pp. 191–200.
18. Chuprikova N.I. Psikhika i psikhicheskie protsessy (sistema ponyatii obshchei psikhologii) [Psycho and psychics processes (terminology of general psychology)]. Moscow: Yazyki slavyanskikh kul'tury, 2015. 448 p.
19. Heinz Wezner and developmental science Plenum publishers / ed. Y. Valsiner. New York:Kluwer Academic, 2005. 660 p.
20. Raeff C. Distinguishing between development and Change: Reviving of organismic-development theory. *Human development*, 2011, no.1, pp. 21–32.
21. Werner H. Comparative psychology of mental development. New York: Percheron press, 2004. 540 p.