Situational binding in cross-cultural studies, the works of L.S. Vygotsky and his school

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1. Some empirical findings.

The situational binding is a concept coined by Lev S. Vygotsky in his last works devoted to the development of higher psychological functions (HPF) as a united dynamic sense system of consciousness (Vygotsky, 2001; 1984a). The core methodological reason of Vygotsky's theory of consciousness is that its HPF should be studied both in onto- and sociogenesis (Ponomariov, 2012). Due to his early death Vygotsky did not implement the concept of situational binding to the sociogenesis of HPF. In this article such an attempt is made in pursuit of finding some connections of this concept with a broader range of scientific explorations.

The historical development of HPF was studied in several Vygotsky's works, the most prominent being: (1) 'Studies on the history of behaviour: ape, primitive, and child' – co-authored with Alexander R. Luria (Vygotsky, Luria, 1993a) – and a closely related unfinished book, 'Tool and sign in the development of the child' (Vygotsky, 1984b) and (2) the fourth chapter in 'Thinking and speech': 'Genesis of thinking and speech' (Vygotsky, 1934) [2]. It was also touched upon in the chapters 'Experimental study of concepts development' and 'Thought and word' of this book. Experimental investigations of sociogenesis of HPF, in Luria's now classic cross-cultural research, were designed by both Luria and Vygotsky (Luria, 1974; 1976). Let us start from the latter to find some intimate connections with the former works in the next sections.

Luria's research was designed as a first step in the ambitious set of cultural sociogenetic studies planned by Vygotsky (see for details: Cole et al., 2011). As a part of this larger project, Vygotsky and Luria managed to organize only two scientific expeditions to Central Asia (mostly to Uzbekistan) in the years 1931 and 1932. For many reasons, this research was not accomplished as designed and its results were only published in detail by Luria (1974; 1976), long after Vygotsky's death in 1934.

The methodological idea behind Vygotsky and Luria's research was to study two groups of adults within the same population: affected and not affected by 'cultural change' in the period of a rapid economical and educational transition. Such a period was the beginning of 1930s in some of economically retarded soviet republics suffering from massive collectivization and forced industrialization. Eventually in Luria's sample, the groups with different degrees of 'cultural change' were more than two as can be seen from protocols

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[2] For the critique of the quality of English translations of 'Thinking and speech', see: (van der Veer & Yasnitsky, 2011).

(Luria, 1976). The term 'cultural change' was used to describe different kinds of activity: basic school education by an adult (however brief), a study of literacy, visiting a town and its museums, change of household (from independent/communal to collective), participating in member-meetings on collective farms (which included discussions of agricultural work plans, reading decrees, etc), and other types of decontextualized activity.

The experimental tasks of the studies were adapted to the local traditional culture of rural peasants who constituted the main subjects. After the first empathetic contact had been established, all the tasks were presented to participants in a colloquial informal conversation, in the relaxed atmosphere of a tea-house or some other similar place. Because verbal riddles and puzzles were the hallmark of traditional peasant culture, they were expected to accept this quite naturally. Let us focus here on that part of Luria's research devoted to the syllogistic reasoning – results later replicated and confirmed from different methodological perspectives.

Peasants were introduced to two types of syllogisms. The first presented content partially familiar to them, e.g.: *Cotton grows where it is hot and dry./ England is cold and damp./ Can cotton grow there or not?* And the second presented totally unfamiliar content, e.g.: *In the Far North, where there is snow, all bears are white./ Novaya Zemlya is in the Far North./ What colour are the bears there?* What stood out was the fact that, in their answers, most non-literate or unschooled peasants bluntly refused to go beyond personal experience, e. g.:

> **The white-bears syllogism is presented.**
> **What kind of bears are there in the North?**
> "How could I say, I haven't seen. If I had seen, I would know."
> **But what can be concluded from my words?**
> "How could I know if they are white or black?!"
> **The syllogism is repeated.**
> "I don't know, how could I possibly know? If the mother and the father are white, then they are white."
> **Why have you thought that they are white?**
> "Perhaps, they are white because the place is white…"
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> <div align="right">(Luria, 1974, p. 115).[3]</div>

Peasants' explanations for their refusal to solve a presented syllogism leave no doubts that personal experience matters highly: 'We always speak only of what we see; we don't talk about what we haven't seen.', 'If there was someone who had a great deal of experience and had been everywhere, he would do well to answer the question.'. Moreover, it is a *visual* aspect of personal experience that is appealed to strongly by different participants: 'You've seen them: you know. I haven't seen them, so how could I say?!'; 'I don't know: I've never

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[3] This piece of Luria's book, as well as some other pieces, is missing in the English edition of 1976.

seen German villages.', 'Your words can be answered only by someone who [has seen]⁴, and if a person [hasn't seen] he can't say anything on the basis of your words.', etc (Luria, 1976, pp. 108–114).

In some cases the peasants pointed out to a 'not witty' researcher that, if the source of information is not personal, then it should be of great authoritativeness: 'If a man were sixty or eighty and had seen a white bear and had told about it, he could be believed, but I've never seen one and hence I can't say. That's my last word. Those who saw can tell, and those who didn't see can't say anything!'; 'I never traveled through Siberia. Tadzhibai-aka who died last year [saw Siberia]. He told [me] that there were white bears there, but he didn't say what kind.' (Luria, 1976, pp. 109–110).

The refusal to go beyond personal experience does not mean that peasants could not think logically. On the contrarily, they solve syllogisms with familiar content and sometimes can solve those with unfamiliar content, especially under the pressure of an investigator. The depth and logic of their thought can be seen in many examples:

> 'If the land is good, cotton will grow there, but if it is damp and poor, it won't grow. If it's like [our] Kashgar country, it will grow there too. If the soil is loose, it can grow there too, of course.'
> 'I don't know; I've seen a black bear, I've never seen any others… Each locality has its own animals: if it's white, they will be white; if it's yellow, they will be yellow.'
> 'I don't know… if it's cold, it won't grow, while if it's hot, it will. From your words, I would have to say that cotton shouldn't grow there. But I would have to know what spring is like there, what kind of nights they have.'
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> (Luria, 1976, pp. 108–111).

The last example is especially interesting. It shows that the participant understands the task and can solve it, but refuses to do so because it goes beyond personal experience. In that respect, the latest experimental investigation, confirming that unschooled people can solve 'theoretical' syllogisms under specially constructed conditions, do not change the perspective (Dias et al., 2005).

Luria's surveyed data are supported with the fact that the same explanations for refusal to solve syllogisms that go beyond personal experience were obtained from unschooled subjects in completely different cultures (e.g., Scribner, 1975; Scribner, Cole, 1981, pp. 126–128; Tulviste, 1988, pp. 232–241). Moreover, unschooled participants were able to solve these syllogistic tasks much more successfully if they were constructed to minimize the influence of personal experience (e.g., the premises referred to a situation on another planet) and what was expected was explained before the presentation of syllogisms (Scribner, Cole, 1981, pp. 154–156; Dias et al., 2005). On the other hand, schooled participants from the same localities as main subjects always performed more accurately and

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⁴ Here and further in the text in square brackets will be given author's variant of translation checked with the Russian originals.

successfully than unschooled ones. The need for especially favorable conditions for unschooled participants to solve syllogisms more successfully shows that something stops them from doing so otherwise. All facts seen so far lead us to conclude that this something is a deep reliance on the personal experience, especially visual experience.

The reliance on visual personal experience can be traced in five different series of Luria's experiments, exploring visual perception, semantic classification, simple mathematical problems, imagination, and self-consciousness (Luria, 1976). Only one additional example involving mathematical problems is presented here:

'A problem is given whose conditions conform to reality:

It is four hours on foot to Vuadil, and one hour to Mazar. How much sooner would you arrive in Mazar?

Replies at once:

"3 hours sooner."

A problem opposite to reality is given:

Suppose it were to take one hour to get to Vuadil on foot, and six hours to Mazar, how many hours sooner would it take a man to get to Vuadil?

"Well, if two man start from here, then a man will arrive in Mazar sooner? It is one hour to Mazar, and if one man stays in Mazar, then the second one will yet go on a way for 5 hours…"

Ok, and the teacher has given another problem. The conditions of the problem are repeated.

"No, they will arrive in Mazar sooner."

And suppose it were to take six hours to get to Mazar, and one hour to Vuadil, then who will arrive sooner?

"A man cannot arrive sooner in Vuadil! Vuadil is farther!.."

We know that is wrong! The teacher has simply given such a problem to check how pupils calculate. How could you calculate an answer to it?

"How could I possibly give you an answer?! It can't be so far! I do know that far is far and close is close."

(Luria, 1974, pp. 134–135).[5]

Thus the main conclusion that can be drawn from the experiments is that, for unschooled people, reliance on the personal experience is crucial. The visual aspect of the personal experience is referred most often and most insistently. When relying on the non-personal experience, the authoritativeness of a source is very important.

All these lines of the personal experience prevalence, as Luria's research shows and as the later experiments confirm (e.g., Cole et al., 1971; Sharp et al., 1979), completely vanish or are weakened with individuals who have obtained at least 1–2 years of schooling. The question remains, 'why is personal experience so strong an influence on unschooled

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[5] This piece of Luria's book is missing in the English edition of 1976.

participants' processes of inference, perception, imagination, etc?' Trying to find the answer to this question, the paper turns to a study that followed both in Vygotsky and Luria's footsteps.

2. Later investigations.

In the late 1970s Peeter Tulviste, a student of Luria, decided to construct his experimental cross-cultural research so as to investigate both syllogistic reasoning and the developing of 'scientific'/'everyday' concepts, as described by Vygotsky. According to Vygotsky, the psychological operations in some word-meaning systems, which he called 'scientific concepts', are a unique ontogenetic '*neoformation'* specific to school-type activities. First developed in the scientific domain of cognitive activity, these psychological operations are then transferred as a structural principle to other spheres of consciousness fundamentally reorganizing its higher psychological functions (Vygotsky, 1934; 2001, pp. 285–302).

In composing the hypothesis of his research, Tulviste refers to the activity approach theorized by A.N. Leontiev, one of Vygotsky's students: 'Applying an activity approach to the problems of historical development of thinking makes us consider the differences between people's activity in different epochs and in different cultures as the reason both for historical changes and for cross-cultural differences in their thinking' (Tulviste, 1988, p. 192). Hence the general hypothesis of the study: 'The qualitatively new type of verbal thinking, Vygotsky called thinking in scientific concepts, should appear in connection with the advent of school education in this or other cultures' (Tulviste, 1988, p. 195). Two cross-cultural expeditions were organized by Tulviste to Western Siberia and Kyrgyzstan.

The first series of trials were made with schoolchildren[6] from 2 to 6 grades in the remote regions of Western Siberia (Tulviste, 1988, pp. 218–220). The syllogisms were constructed so as their content referred to either 'scientific' and culturally unspecific knowledge of an individual (e.g., *All precious metals do not rust./ Molybdenum is a precious metal./ Does molybdenum rust or not?*) or 'everyday' and culturally specific knowledge of an individual (e.g., *Saiba and Nakupte always drink tea together./ Saiba drinks tea at 3 o'clock afternoon./ Does Nakupte drink tea at 3 o'clock afternoon or not?*). Whenever a participant solved a suggested syllogism, they were asked to justify their solution: 'Why do you think so?'. Participants' justifications were evaluated as either theoretical or empirical – a framework developed in earlier cross-cultural studies (e.g., Scribner, 1975). Justifications were regarded as theoretical if they referred to information presented only in the premises, and empirical if they referred to personal practical experience.

The working hypothesis of the first series was that, if the content of a syllogism has no support in children's everyday experience, then a theoretic solution will prevail over an empirical one; by contrast, if the content of a syllogism directly appeals to children's everyday experience, then an empirical solution will prevail over a theoretic one. The

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[6] Predominantly they were of the Nganasan whose language is close to the Finno-Ugrian ones.

experimental evidence found that schooled children prefer theoretical solutions, when they could not appeal to their everyday experience. The theoretical solution – and, moreover, children's theoretical justifications for why they solved the problem a particular way – prevailed when the syllogism content was unfamiliar to a child's everyday practice, i.e. obtained in the theoretical school context. The empirical solution and justifications were preferred if the content of a syllogism had roots in child's everyday activity.

Summarizing these results, Tulviste argues that the certain operations with word meanings ('scientific concepts') are formed at school that are specific to this type of activity (Tulviste, 1988, pp. 221–228). This finding further supports Vygotsky's thesis that the theoretical verbal thinking acquired at school is a unique *neoformation*, not the transferring of universal human mental abilities into a new sphere of knowledge.

A second expedition was organized to the mountain plateaus of Kyrgyzstan, where some people had achieved a grade 10 school education, but then returned to the traditional types of economic and cultural activity involving little or no theoretical activity. Besides, among the 70 participants aged 25 to 87 (average 52.7) 18 were completely illiterate. Syllogisms close to those of the first study were used, but referring only to 'everyday' knowledge.

Most participants' solutions and justifications of their solutions showed that personal experience plays a central role in their judgments of syllogisms. Some of participants were able to solve the syllogism using both theoretical and empirical methods, but in a confused way: 'If they drank tea before together, they should do it, though I cannot, of course, say precisely, because I haven't seen, what these people are' (Tulviste, 1988, pp. 234–235). Surveying a large corpus of scientific data, Tulviste comes to the conclusion that the participants of his study lost some of their skills of theoretical verbal thinking obtained at school (Tulviste, 1988, pp. 237–238). Almost contemporaneous with Tulviste's study, similar data confirmed the deterioration of theoretical skills learned at school if they are not used in everyday practice (Scribner, Cole, 1981, p. 131).

These findings implicitly confirm that concrete activity determines ways of thinking, as Tulviste's general hypothesis proposed. Cognitive skills deteriorate when not used more or less regularly in the everyday practice. For example, we can develop rather good skills in some foreign language, but if we do not use it, we will lose these skills rapidly. Thus, Tulviste's experiments provide the new evidences in support of Vygotsky and Luria's conclusion that, functionally, verbal thinking in 'scientific' concepts depends on school education. The role of practical experience is obvious in both Tulviste's studies and the visual aspect of practical experience can be traced in the second one.

3. Discussion of empirical findings.

The psychometric techniques, applied in cross-cultural researches, raise doubts even among scientists who use them. The cross-cultural psychologists Michael Cole and Sylvia Scribner, who made many research in Luria's footsteps, prefer to speak about the specific influence of school education on cognitive development not about general influence

(Scribner, Cole, 1981, p. 234). Tulviste sticks to the close position in his later article, written in collaboration with one of well known western vygotskians (Wertsch, Tulviste, 1992). Moreover, in his basic work Tulviste admits that we do not know 'to what degree syllogistic schemas are adequate for the description of the real processes of thinking' (Tulviste, 1988, p. 245). Therefore, it is impossible to draw any conclusions about both the general and the specific influences of school education on the cognitive development based on the data from these syllogistic tests. As Vygotsky said in his analysis of first cross-cultural researches, conducted in the beginning of the XX century, and referring to E. Thorndike: '…We never know precisely what we investigate. We do not know even what the units of our analyses are and what our statistical conclusions mean' (Vygotsky, 1929, p. 374). The problem of cross-cultural psychometric techniques has been discussed by the author and his colleagues earlier (Cole et al., 2011; Ponomariov, 2007b) and here the focus will be on a different subject.

Understanding the biases of the psychometric approach, Vygotsky and Luria chose a different paradigm, in which such tests are only a part of a bigger experimental background and theoretical structure: 'Thus we used no standard psychometric tests, and we worked only with specially developed tests that the subjects found meaningful and open to several solutions, each indicating some aspect of cognitive activity. <…> We also introduced some learning tasks in the experiment. By offering to help subjects in certain ways, we tried to show them how, and how much, they could use this assistance in solving a given problem and in proceeding to solve others. By[7] uniting direct and learning tests, an element of experimental-genetic analysis was added to the study that became a combination of experimental and clinical procedures, which allowed for the desired completeness of information retrieved' (Luria, 1976, p. 17).

In the western scientific tradition the tests from their cross-cultural study were analyzed or replicated separately from Vygotsky's cultural-historical methodology and experiments, on which this methodology was constructed. One of the reasons for misunderstanding is that some important works of Vygotsky only became available to scientific community in the mid 1980s and later (Vygotsky, 1984a; 2001). Another reason for this is cultural biases impeding proper understanding of Vygotsky's ideas in a different cultural context (see for some useful comments on this: Ageyev, 2003). One of the purposes of this paper is to place Vygotsky-Luria's cross-cultural study in its proper scientific and historical context.

As it was mentioned earlier, Luria's research was only published in full over 40 years after its completion (see for details: Cole at al., 2006). Hence, we find only scattered appraisals of it by Vygotsky (see the section 5 of this paper). But such a delay before publication gave Luria an opportunity to compare his results with many data obtained to that date by western cross-cultural researchers (Luria, 1974, pp. 11–19). These comparative data are absent in the English edition of the book (Luria, 1976). Constantly rethinking the results in light of these comparisons and his own later data, Luria used two diagnostic criteria to

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[7] This last sentence is missing in the English edition.

describe psychological processes: theoretical (verbal-logical) and visuo-practical[8]. The reliance on the visual personal experience is found when the visuo-practical processes predominate over the theoretical ones (Luria 1974, pp. 163–166). What is the origin of these theses in the Vygotskian heritage?

Luria refers to Vygotsky's conception of the sense and system organization of consciousness as a hallmark of Vygotsky's theory (Luria, 1974, p. 66). And he does so several times, throughout the first chapters of the book (Luria, 1974, p. 23, p. 30, p. 35, p. 45, p. 53, p. 63), highlighting that the whole study was constructed based on this conception. Luria admits that his experimental techniques afforded to explore only the sense processes of consciousness (Luria, 1974, pp. 30–31). But, as Vygotsky proposed, the sense and system organization of consciousness forms a unity (Vygotsky, 1984a). Relying on this, Luria suggested that fundamental changes of both the sense and the system organization of consciousness were partially revealed in his experiments and the mutual historical development of culture and cognition to some extent experimentally disclosed (Luria, 1974, pp. 161–166). To explain what the sense and system organization of consciousness is, a deep and sophisticated account of Vygotsky's theory is necessary. The content-analysis of recently published Vygotsky's works shows that his concept of 'situational binding' is crucial for understanding of his theory of consciousness (Ponomariov, 2012). In the next sections an attempt will be made to show how this concept deepens scientific understanding for the phenomenon of reliance on personal experience, found in cross-cultural studies, placing it in the wider context of studies devoted to the development of speech and word-meaning systems.

4. The role of speech for psychological development

Vygotsky's terms 'situational binding' and 'binding with a visual field' come from Kurt Lewin's terms 'Situationsgebundheit' and 'Feldmassigkeit'[9] (Vygotsky, 1984a, p. 346, p. 350; Vygotsky, 1966, p. 68, p. 71; Samukhin et al., 1934), which in turn directly links to Wolfgang Köhler's studies of primates. In Vygotsky's project of a science for child's development (paedology) this concept refers to the process, observed on the first stages of ontogenetic development, when the actual impelling environment binds our perception, thinking, etc into a coherent experience of consciousness (Vygotsky, 1984a; 1966; 2001). The surrounding milieu guides behaviour with affective vectors initiated constantly through

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[8] The term 'visuo-practical' (наглядно-практическое) is usually translated in English as 'graphic-functional' (Luria, 1976). A.V. Zaporozhets (one of Vygotsky's students) finds the term 'visuo-practical' to be close to the term 'sensori-moteur' of J. Piaget (see: Zaporozhets, 2000, p. 39).

[9] *Editor's comment*: Indeed, these two words are rendered here verbatim, in full agreement with the published Russian version of Vygotsky's text of the Soviet edition of 1980s that came out under the editorship of M. Yaroshevskii and others. The first one, although rendered with a mistake, can be easily identified as *Situationsgebunendheit*, which seems to be fairly legitimate word from standpoint of Lewinian topological psychology. However, the other word is neither a legitimate word in the German language nor a Lewinian coinage, and seems to have never occurred in Kurt Lewin's discourse. For consultation on this matter we would like express our gratitude to Alexandre Metraux, an editor of several volumes within a multi-volume series of collected works of Kurt Lewin's works *Kurt Lewin Werkausgabe*, in German.—*A. Yasnitsky.*

child's perception. Continuity of tool-environments helps to create the higher psychological functions of consciousness in the process of interaction with adults, because cultural practices and possible types of activity are inherited with the human tools that play a communicative role from the first steps of child's development (Vygotsky, 1984b). Systematic using of such simple (at first sight) tools as a spoon and a stool in the situation of food-consumption mediates a breakthrough in the complete isolation of deafblind children. The detailed structuring of these children's tool environment and time-table minute by minute helps to humanize gradually their psyche; otherwise, these children remain in a completely animal state (Meshcheriakov, 1974). Alexander I. Meshcheriakov's unique methods, developed to humanize deafblind children, were derived from Vygotsky's principles of tool-mediation and internalization.

In clinical and experimental research of dementia, conducted under the supervision of Vygotsky, a detailed description of intellectual, affective, verbal and other characteristics of situational binding, coming as a result of massive damage to the frontal cortex, were elaborated (Samukhin et al., 1934). This research allowed Vygotsky to find a unit of analysis for studying relations and connections between affect and intellect – dynamic sense systems – a cornerstone of his conception of the sense and system organization of consciousness (Vygotsky, 1934, p. 14; 1935, p. 29, p. 32). He describes these systems with the term 'sense' because he managed to show in his experimental researches that the simplest systems, uniting affective and intellectual psychological functions, could be formed only on the basis of word (speech) processes. The term 'dynamic' refers to many aspects, one of which is affective elasticity, that find support in the latest data from the neurobiology of consciousness (Tononi, Edelman, 1998; see for details: Ponomariov, 2012). The concept of situational binding is relevant also to the 'biding problem', widely discussed in the contemporary neuroscience (e.g., Velik, 2010); more specifically, the problem of explaining what binds diverse neural activity into a coherent conscious experience.

Lidia I. Bozhovich, one of Vygotsky students, conducted in the late 1920s and early 1930s three series of experiments to find how speech is related to thinking. These experiments were published only in the year 2006 (Bozhovich, 2006). The first series of her experiments relied on the theoretical schema of a creative act of thinking developed by Wolfgang Köhler. The content-analysis of Bozhovich's texts reveals the logical consequence of terms derived from Köhler's schema: 'effective stopping of (impulsive) movements' → 'temporal disruption of perception and action/ of sensorimotor unity' → 'stabilization of perception/ of a visual field' → 'overcoming of (affective) vectors of a (visual) field' → 'intellectual act'. Bozhovich's hypothesis was that, if the effective stopping of primates' movements, leading them by the way described to the creative act of thinking, happens occasionally (e.g., because of physical exhaustion), the disruption of sensorimotor unity in human beings would occur due to speech. Using almost the same terms though in a much broader context, Vygotsky described, based on his experiments, the gradual formation of 'functional barrier' created with speech for division of sensorimotor unity (Vygotsky, 1984b). He also writes synonymously about 'a speech field', 'a sense field', and 'a semantic field' that helps to overcome the binding with a visual field during the early child's

development (Vygotsky, 1984a; 1966; 2001). It seems reasonable further to speak of a semantic field of speech.

The first series of Bozhovich's experiments was conducted with aphasic children and adults and accompanied by tests with typically developing children. It proved the hypothesis. Rosa U. Levina, another Vygotsky's student, conducted several series of experiments with the speech of aphasic adults, normal and mentally retarded children. Her research was carried out at the same time as Bozhovich's study, with the results confirming that of the latter in relation to the role of speech for overcoming of the binding with a visual field (Levina, 2005). The second series showed that relations and connections between speech and intellect cannot be found with those experimental methods that explore only outer features of speech process and ignore the development of word meanings. The current studies of private speech, though much more elaborate and precise than Bozhovich's, seems to follow the same methodological path when they do not take account of the functions and structures of word meanings in the investigation of relations between speech and other psychological processes: voluntary control, social competence, cognitive skills, etc (Lidstone et al., 2011; Martinez et al., 2011; etc). Trying to find new methods and rethinking the problem, Bozhovich began the third series of experiments. This was not accomplished due to Vygotsky's early death and the political repressions of the mid 1930s against paedologists, though it first results were very promising and used later by Alexander V. Zaporozhets (2000).

It has still remained a task for future to create classification of relationships and connections between speech and other psychological processes on the basis of experiments. Even though some studies show that there is a clear relationship (e.g., Winsler et al., 2003; 2007), the main word structures and functions that allow speech to change fundamentally behaviour has not been described. Vygotsky and Luria understood the complexity of this problem (Luria especially underlined it in an experimental study of children's speech development: Luria, Yudovich, 1956) and tried to find as many as possible ways to investigate it. In the next section some of their works concerned with this problem will be regarded.

5. *The development of word meanings*

There are many evidences of Vygotsky's students besides his own works that he constantly highlighted the role of word meanings for psychological development (Luria, 1974; 1979; Bozhovich, 2006; Levina, 2005, etc). Almost in all his investigations, Vygotsky tried to show that the studying of word meanings is able to find not only speech functions but the structures and functions of other psychological processes. Gathering information from many brunches of psychology and medicine in his lectures on child's development, Vygotsky scrupulously described how consciousness and its functions evolve from infancy to adolescence largely due to the progress in word meanings of children speech (Vygotsky, 1984a; 2001).

He also studied experimentally the development of children's word meanings in collaboration with L.S. Sakharov (Vygotsky, 1934). The research showed that the different

word meanings have a different structure and the range of operations possible for this structure, i.e. they exist in different sense systems. The detailed analysis of the dynamics of sense systems, i.e. of their relations to affect, supported further these conclusions with empirical data (Vygotsky, 1935; Samukhin et al., 1934; cf., Luria, Vinogradova, 1959; Luria, 1979). The results allowed Vygotsky to formulate *three ontogenetic stages* in the development of word-meaning systems – proper names (syncrets), complexes, and concepts – each distinguished by different structures and operations (Vygotsky, 1934). Evidence of word-meaning development in ontogenesis suggested such development also occurring in sociogenesis. Vygotsky tried to find such facts in the anthropological descriptions and ethnopsychological studies available at his time. Extrapolating on the data, extracted from these researches, the three ontogenetic stages in the development of word-meaning systems, he concludes:

'The primitive[10] man does not have concepts; abstract, generic names are completely alien to him. He uses the word differently than we do. A word may acquire a different functional usage. The way it is used will determine the thinking operation to be realized with the help of this word. A word can be used as a [proper name] – as a sound associated with this or that individual object. For primitive man, it is a proper name and it is used to perform a simple associative operation of memory. We have seen that, to a large degree, primitive language is precisely at this stage of development.

Let us remember the number of proper names we found in the languages of primitive people, as well as the tendency toward maximal specification of each individual feature and object. The way an individual uses a word defines in any given case the way that individual thinks. That is why thinking in a primitive man indeed takes a second seat when compared to the activity of his memory.

The second stage in the development of word usage is that stage when the word appears as an associative sign not for an individual object, but for a [complex] or group of objects. The word becomes similar to a family or group name. It performs not so much an associative function, but a mental [operation]; for with its help, different individual objects are categorized and combined into a certain [complex].

However, this combination still remains a group of [separate, concrete] objects, each of which, upon entering the new combination, preserves its individuality and uniqueness. At this stage a word becomes a means of forming a complex. A typical example of such a [function of a word] in our languages is the family name. When I talk about a certain family, "the Petrovs", for example, I use this word to denote a definite group of persons not because they have some common feature, but because they definitely belong to a certain common group.

A complex differs from a concept by the relationship established between the individual object and the group name. Looking at an object, I can state absolutely

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[10] The term 'primitive' can sound offensive to contemporary 'cultural relativists' (see for details: Barnard, 2004), but not so for Vygotsky's time, or even later. Nevertheless, the author should mention that he is far from considering 'primitives' inferior human beings.

objectively whether it is a tree or a dog, because "tree" and "dog" stand for the designations of concepts, that is, general, generic groups to which different individual objects can be referred on the basis of certain essential features. Looking at a human being, I cannot say whether or not he is a Petrov. To do this, I must simply determine in *fact* whether or not this person belongs to this family. Thus, in the complex, the individual is retained as such. In the complex, different elements are combined not on the basis of some intrinsic substantial bond, but on the basis of the real, concrete contiguity that actually exists between them in one way or another.

It is at this stage of thinking in complexes that the primitive man primarily stands. His words are proper or family names, that is, signs for individual objects or signs for complexes. The primitive thinks not in concepts, but in complexes. This is the most essential feature that distinguishes primitive thinking from ours.

<…>

The main progress in thought development affects a shift from the first mode of using a word as a proper name to the second mode, where a word is a sign of a complex, and finally to the third mode, where a word is a tool or means for developing the concept. Just as the cultural development of memory was found to have the closest connections with the historical development of writing, the cultural development of thinking is found to have the same close connection with the history of the development of human language'[11].

(Vygotsky, Luria, 1993a, pp. 118–121).

In the book from which the citation is borrowed Vygotsky gave some examples of complexes in the languages of traditional cultures. But one of the best examples he considered in 'Thinking and speech', revealing the structure and operations of a concrete complex (Vygotsky, 1934, pp. 139–142). The example is taken from L. Lévy-Bruhl's work whose idea of mystical participation finds simple scientific explanation in perspective of Vygotsky's stages of word-meaning development. Vygotsky's theses are in agreement with the latest works of ethnolinguists and anthropologists (Everett, 2005; Gordon, 2004; Arseniev, 2000; Turner, 1967), and paleolinguists working with the most ancient texts (Diakonoff, 2005; Romanov, 2008; see also: Ponomariov, 2007a; 2009; 2013). Of particular interest is a study of Vladimir N. Romanov, who applied Vygotsky's concept of situational binding to many ethnographical and anthropological data, and developed some of Luria and Tulviste's ideas from their cross-cultural researches (Romanov, 2003).

Perhaps, some of the most disputed results of Luria's cross-cultural research (e.g., Cole, Scribner, 1981, p. 252; Frumkina, 1991) are those from a series of probes about semantic classification, entitled, 'Abstraction and generalization' (Luria, 1974, pp. 58–105). The hypothesis and method of these probes was constructed based on something central to 'Thinking and Speech', namely again, that word meanings develop during ontogenesis

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[11] The translation is checked with the Russian original (Vygotsky, Luria, 1993b) and the terms in the square brackets represent our corrections.

(Vygotsky, 1934). Luria's probes on semantic classification were a first attempt to experimentally prove Vygotsky's thesis about the development of word meanings *in sociogenesis,* as Luria points out at the beginning of the chapter in which this is discussed (Luria, 1974, p. 63, p. 66), and when he draws conclusions (Luria, 1974, pp. 99–104). In this chapter Luria (1974, p. 66, pp. 93–94, pp. 97–98) also refers to the study conducted by Vygotsky and Josefina Sheef on the development of 'scientific' and 'everyday' concepts (or 'word meanings', because Vygotsky used synonymously these terms) among schoolchildren (Vygotsky, 1934; Sheef, 1935), stressing its importance for his probes. These intrinsic connections between Vygotsky's investigations and Luria's cross-cultural research are usually not taken into account by critics.

Following Luria's expedition to Central Asia, Vygotsky was convinced enough by his experimental findings to write in a private letter to him: 'As for my inward assessment, I have shared it with you many times: I continue to think and will continue to think, until I am persuaded otherwise, that there is now *experimental proof* (proof based on factual material, material *richer* than in *any* ethnopsychological study, and *purer* and more correct than Lévy-Bruhl [)][12] for the phylogenetic[13] existence of a level of [complex] thinking [and] of a *different* structure [that depends on it][14] of all the principal systems of the psyche, of all the major types of activity, and eventually of consciousness itself. Surely that is not so little as to be dissatisfied with the outcome of the two trips' (Vygotsky, 2007, p. 45).

Many years after these words had been written, Luria concluded on the basis of his and other scientist's studies in neuroscience, neurolinguistics and anthropology: 'Therefore, the whole evolution of language can with full justification be represented as the path of liberation from dependence on the synpractic context, as the path of gradual formation of means increasing the role of linguistic (constructed with words) synsemantic context' (Luria, 2002, pp. 245–246; see also: Luria, 1979, pp. 32–36). Splitting the sympractic (a more correct Latin form) and the synsemantic context has a direct link to the visuo-practical and the theoretical character of a psychological activity (see the section 3 of this paper). The 'liberation from dependence on the synpractic context' means the overcoming of situational binding with personal experience. It is accomplished with the help of mutual development of speech, literacy and writing (Luria, 1979; Vygotsky, Luria, 1993a).

As Vygotsky's experiments showed, children use the same words, as do adults, but the meanings of children's words can be quite different and to find this difference, we need to trace how words are formed, i.e. to trace every verbal operation in the process of word formation (Vygotsky, 1934, pp. 158–159; cf., Tulviste, 1988, pp. 260–261). Similarly, a word from archaic and sympractical languages can coincide with our word in its reference

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[12] A round bracket here is missing; the translation is checked with the Russian original (Vygotsky, 2004, p. 36).

[13] Vygotsky used term 'phylogenesis' as a category including the historical development of human society (cf., Vygotsky, 1984b; 1934).

[14] In the English edition of 2007 it is translated as 'independent of it' (Vygotsky, 2007, p. 45) which turns the meaning of the phrase into the opposite. Most explicitly this part of Vygotsky's phrase can be translated thus: 'the phylogenic existence of a level of complex thinking and the phylogenic existence of a *different* structure (that depends on this level of complex thinking) of all the principal systems of the psyche, of all the major types of activity, and eventually of consciousness itself'.

but it does not mean that those people, who used it, made the same operations in a semantic field of speech, as we do. The concept of a semantic field expresses the idea that a word does not exist separately, that its meanings emerge in connection and against a background of other words, i.e. in some semantic system (cf., Luria, Vinogradova, 1959; Luria, 1979). Behind each word, there is a system of psychological operations, which form mutually connected meanings of this word in a semantic field of speech and consciousness (Vygotsky, 1934; 2001). These systems can be almost incompatible with each other, because the different operations are executed on the different stages of word development: proper names, complexes, concepts (see for comments: Ponomariov, 2013). The historical development of psychological operations with word-meaning systems was understood by Vygotsky as 'the historical development of language', or linguogenesis (Vygotsky, 1934, p. 263). Linguogenesis, being the process of formation of different psychological systems of analysis and synthesis, is not reflected in the *lineal* changes in lexis and grammar: archaic and sympractical languages often have richer lexis and grammar as compared to more 'abstract' ones (Vygotsky, Luria, 1993a). Verbal thinking and linguogenesis cannot be explored without knowing the nomenclature of psychological operations with word-meaning systems, discovered first in ontogenetic studies (Tulviste, 1977; 1981).

7. Conclusions.

1. Luria's cross-cultural research suggests that there are two types of the psychological activity: visuo-practical (sympractic) and theoretical (synsemantic). Neither his own neuroscientific and neurolinguistic experimental data, nor the results of later cross-cultural researchers and other scientists, convinced him to change this position 40 years after the 1931/32's expedition. The transition from sympractic to synsemantic psychological processes, coming as a result of schooling and word-meaning development, can be understood as a gradual weakening of the situational binding with personal experience. The systems of operations with word meanings, having a cardinal impact on all major psychological processes via the semantic field of speech, can be incompatible on the different stages of linguogenesis.

2. Tulviste's cross-cultural researches of the late 1970s confirmed Luria's conclusions, derived from the findings about syllogistic reasoning, and productively expanded Vygotsky's methodology in relation to 'scientific' and 'everyday' concepts. In Tulviste's experiments, the role of different verbal structures and operations was shown for psychological processes. By means of these structures and operations, the different systems of word meanings are formed in school or everyday contexts. In the first approximation, these systems can be described as 'scientific' and 'everyday' concepts. The results, obtained by Luria and Tulviste with syllogistic tests, are in agreement with the latest western cross-cultural studies.

3. The methodological roots of Luria's cross-cultural research lie deep in Vygotsky's theory of consciousness and should not be analyzed separately from this theory. In turn, Vygotsky's methodology relies on experimentation with a concrete phenomenon in a wide

range of psychological and medical knowledge. Highly relevant to the positive understanding of Luria's research are explorations of 'scientific' and 'everyday' concepts, the systems of operations with word meanings, and the concept of situational binding with a visual field.

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