

The instrumental method in Vygotsky's work: progress and challenges in investigating the child's cultural development¹

O método instrumental na obra de Vigotski: entre avanços e
obstáculos na investigação do desenvolvimento cultural da criança²

Eduardo Moura da Costa³

ABSTRACT

Vygotsky was a great critic of psychologists who did not take into account the role of culture in child development. It was through the instrumental method that he identified the role of cultural instruments in the development of higher psychological functions during ontogenesis. We will present the antecedents of this method and highlight that it is the result of several influences. We will discuss how it was used for empirical research focused on the genesis of children's cultural behavior. Finally, we will argue that it was the recognition of the limitations of the instrumental method that guided Vygotsky to develop a new research program, which was only initiated by the author in his last years of life.

Keywords: Vygotsky. Instrumental Method. Child Development.

RESUMO

Vigotski foi um grande crítico dos psicólogos que desconsideravam a importância da cultura para o desenvolvimento infantil. Foi a partir do método instrumental que ele identificou o papel dos instrumentos culturais para o desenvolvimento das funções psicológicas superiores durante a ontogênese. Apresentaremos os antecedentes desse método e destacaremos que ele é o resultado de várias influências. Discorreremos sobre como ele foi utilizado para a pesquisa empírica focalizada na gênese do comportamento cultural da criança. Por fim, argumentaremos que foi o reconhecimento das limitações do método instrumental que orientaram Vigotski a desenvolver um novo programa de pesquisa, que foi apenas iniciado pelo autor nos seus últimos anos de vida.

Palavras-chave: Vigotski. Método Instrumental. Desenvolvimento Infantil.

¹ English version by: Eduardo Moura da Costa. E-mail: eduardo.moura@unesp.br.

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³ Professor Assistente Doutor do Departamento de Psicologia da Educação, Universidade Estadual Paulista, Câmpus Araraquara. Doutor em Psicologia pela Universidade Estadual Paulista-UNESP, Câmpus de Assis (2020). Mestre em Psicologia pela Universidade Estadual de Maringá-UEM (2015). Graduado em Psicologia pela Universidade Estadual Paulista- UNESP, Câmpus de Assis, Assis, São Paulo, Brasil. Orcid: <https://orcid.org/0000-0001-5417-6675>. E-mail: eduardo.moura@unesp.br.

Introduction

Currently, one of the most fruitful lines of research regarding human development is the study of cultural learning. Psychologists like Tomasello (2019a) have conducted empirical research over the past few decades to examine the role of culture, particularly language, in the development of cognition throughout ontogeny. These studies challenge the prevailing individualistic view in psychology, which considers language a part of cognitive abilities but does not directly modify other general cognitive competencies (Tomasello, 2019b). Tomasello, Kruger and Ratner (1993) argue that this perspective offers nothing new and that its characteristics can be traced back to the theory developed by Vygotsky.

Thus, one of Vygotsky's main merits is that he anticipated several hypotheses about cultural learning. Even though he left his theory unfinished, he was responsible for developing a new area of study. The foundational thesis of the Vygotskian perspective on the role of cooperation in human development has been corroborated over the last few decades by a significant amount of evidence (Moll & Tomasello, 2007). Despite the recognition of Vygotskian theses today, his research project was developed by many of his collaborators and later generations of psychologists and educators. His findings guided the work of psychologists and educators in the Soviet Union who sought to orient teaching based on a consistent theory of human learning. Elkonin, Davidov, and Reptikin, for example, stood out in this endeavor by developing a didactic system based on the conception of teaching as a promoter of individual development, which has gained attention from Brazilian scholars in recent decades (Puentes, 2022).

In order to assess the current state of research on cultural learning, with a view to ensuring that this knowledge leads to an improvement in teaching, it is crucial to reconstruct the research trajectory developed by Vygotsky. According to Veresov (2024), despite the large number of publications about Vygotsky's concepts and theoretical principles, simplified and fragmented views of his work still

prevail. Furthermore, there is still a tendency to highlight certain periods of his production while underestimating others.

In this context, we intend to conduct a theoretical analysis of some of the author's texts with the goal of outlining the foundations of the development of the instrumental method, the first methodological principle developed to study the development of the cultural behavior of children. It was through this method that the author recognized the role of signs in the development of higher psychological functions, which serves as the basis for developmental didactics, for example. In light of the importance of this method for the development of the author's research and for the development of Cultural-Historical Psychology, we aim to focus on its methodological foundations, which are fundamental for advancements in research, but also to present some of its limitations, perceived by Vygotsky several years after its development.

Vygotsky was a strong critic of psychologists who did not consider the role of culture in the development of psychological functions, which, in contemporary scientific terminology, are referred to as cognitive processes. To understand the nature of these criticisms, we will present the background of the method he created for studying higher psychological functions. Subsequently, we will discuss how this method was used for the empirical investigation of the genesis of cultural behavior. Finally, we will argue that it was the recognition of the limitations of the instrumental method that led Vygotsky to modify his research program, a task that was only begun by the author in his final years of life.

I. Instrumental method background

It was through the instrumental method that Vygotsky identified the role of cultural tools in modifying psychological functions during ontogenesis. These tools are used by the child to initially control the adult behavior and, over time, conduct to self-regulation. By appropriating these tools, which contain embedded modes of action, the tool becomes a source of development for the child's behavior (Vygotsky & Luria, 2007). Language was understood as the psychological tool that allows

human beings to understand both external and internal reality. Vygotsky (2000a) emphasized that psychological tools play a central role in developing both personality and worldview.

However, before Vygotsky and his collaborators developed numerous studies that led to these conclusions, some of the fundamental principles of mediated activity were perceived from different sources. The first influence came from findings in reflexology, which demonstrated that there was a correspondence between a stimulus and a psychophysiological process. Based on the reflexological premise that certain physiological reflexes trigger others, such as the salivary reflex in a dog triggering the swallowing reflex, producing “chain reflexes” Vygotsky (2004a) proposed that consciousness is “the ability of our body to be a stimulus (through its actions) for itself (for new actions)” (p. 70). The second influence on the creation of the instrumental method came from observations that Vygotsky made with children who had some kind of disability. He noticed that the mediation of signs created an alternative (mediated) pathway that allowed the child to establish social contact and, thus, to develop. Finally, he appropriated research on animal behavior, conducted by authors such as Wolfgang Kohler, and anthropological studies by authors such as Lucien Lévy-Bruhl, for example. Vygotsky essentially adapted experimental research on the use of tools by chimpanzees for experimental research with children. The anthropological studies provided a foundation for Vygotsky to conjecture that the use of psychological tools by children was linked to the creation of work tools throughout social history. We will present how each of these research lines influenced the development of the instrumental method.

In the mid-1920s, Vygotsky began to point out the limitations of the reflexological method in the analysis of consciousness (Vygotsky, 2004a; 2004b). He argued that reflexology would be forced to take into account thoughts and the entirety of the psyche if it wanted to understand behavior. Despite this observation, Vygotsky tried to reconcile the methods of reflexology with the methods of psychology. At this moment, consciousness is conceived by

Vygotsky (2004b, p. 15) as a “[...] mechanism of transmission between reflex systems”. In other words, the psyche is a movement of “inhibited reflexes”. Furthermore, it is also mentioned how the spoken word acts as a stimulus, and that this would be the basis for explaining the social development of consciousness. This idea can be considered the pre-history of the instrumental method. Let us see how the author synthesizes it:

In the broad sense of the word, it is in speech that the source of behavior and consciousness resides. Speech constitutes, on one hand, a system of social contact reflexes, and on the other hand, it is the preferred system of consciousness reflexes, that is, they serve to reflect the influence of other systems (Vygotsky, 2004b, p. 17).

In the text “Consciousness as a Problem of the Psychology of Behavior”, Vygotsky (2004a) states that social experience is an important component of human behavior. Animal behavior, on the other hand, results from a combination of hereditary and acquired experience. Animals adapt passively, although some have active instinctive forms; humans, however, actively adapt to their environment (Vygotsky, 2004a). Following Marx, Vygotsky explains that work allows humans active adaptation to reality, which occurs through “duplicated experience”, as humans create a model of this action in their minds before modifying reality.

From a physiological standpoint, Vygotsky asserts that behavior is a “system of triumphant reactions”, meaning it is the coordination of various reflexes. The behavior that is expressed is a very small manifestation of the countless excitations that occur within the organism. In other words, behavior is the result of a “struggle of reflexes”. In this perspective, the author characterizes consciousness in the following terms: “[...] the ability of our body to constitute itself as a stimulus (through its acts) for itself (and for other new acts) constitutes the basis of consciousness.” (Vygotsky, 2004a, p. 70). This notion is extremely important for understanding the instrumental act, in whose genesis structure and function relate to the creation of signs by humans to control their own behavior.

Therefore, we see that research on the cultural development of children is the result of reflections derived from the reflexological method.

The modification of the concept of consciousness from “inhibited reflexes” to consciousness as the “structure of behavior” originated from the limitations of the research methods of the time, notably reflexological and introspective methods. Based on these limitations, Vygotsky suggested that internal reflexes, those which would characterize consciousness, could be discovered indirectly. That is, the researcher should create experimental situations to observe the psychological mechanisms indirectly. As we will see, this is one of the foundational methodological principles of the instrumental method.

This text also contains a very important formulation for understanding the instrumental method, which states that “[...] experience determines consciousness” (Vygotsky, 2004a, p. 80). According to the author, consciousness is a particular case of social experience. What exists is the socialization of consciousness. In his words: “From this, we conclude that recognition, priority in time, and effectiveness belong to the social aspect and to consciousness. The individual aspect is constructed as derivative and secondary, based on the social, following its exact model” (Vygotsky, 2004a, p. 82). It is also possible to observe here the theoretical genesis of the “[...] general genetic law of cultural development” (Vygotsky, 2000a). Therefore, at this time, it is already clear how much Vygotsky emphasized the role of social experience in the constitution of mental life.

In addition to these theoretical discussions, it is important to clarify that what drove Vygotsky to the conception of the mediation of signs were his studies with children with physical or mental disabilities, which, at the time, fell under the field of study known as “defectology.” According to Veresov (1999; 2024), this aspect is often underemphasized in the literature on the origins of Vygotsky’s theoretical work. Veresov highlights that from these studies, Vygotsky began to develop his experimental psychology, which would be crucial for creating experimental situations for studying the instrumental function. Therefore, it is possible to verify that Vygotsky, at this time, the mid-1920s, was supported by the historical-materialist and dialectical method, for which practice is the criterion of truth.

Unlike the tradition of the time, Vygotsky understood disability not merely as the result of a biological alteration but also included the social impacts of such an alteration. For him, disability results in the loss of social functions, more than just physical ones. Disability harms social bonds and leads to the displacement of all behavior systems (Vygotsky, 1997a).

In 1924, borrowing from reflexology terminology, Vygotsky stated that disability simply means the absence of one of the “conditioned bonds” with the environment. According to him, the fundamental psychological principle of conditioned reaction formation is the same for children with disabilities as it is for those with typical development. As a result, the nature of the educational process would also be the same. Grounded in John Dewey, Vygotsky (1997b) asserts that physical stimulus alone does not explain behavior, but it is the interpretation given through social activity and thought that confers the full richness of its meaning. On this issue, the author made a statement that echoed through his later work: “What matters is the meaning, not the sign. Change the sign, and the meaning is the same” (Vygotsky, 1997b, p. 84).

When discussing the education of the hearing impaired person, Vygotsky (1997a) emphasized that the focus of intervention is not only to enable the child to communicate with others but also to develop their consciousness. Therefore, a conception of consciousness tied to the development of language as a communicative tool, which allows the grasping of social experience, was already beginning to take shape. In his words:

In strict terms, language is not only a tool for communication but also a **tool** for thinking; consciousness develops mainly with the help of language and emerges from social experience. [...] Indeed, language is the basis and bearer of this social experience. In other words, without language, there is no consciousness or self-consciousness. We can easily convince ourselves that consciousness emerges from social experience, precisely in the example of the deaf-mute (Vygotsky, 1997b, p. 88, our emphasis).

The central idea in the defectological production of his time, which consequently relates to the instrumental method, is that the way to overcome a disability is through “social super-compensation” (Vygotsky, 1997a). Such compensation would be made using new, artificial mediations, which create an alternative pathway to contact with cultural signs made impossible by the disability, thus developing consciousness. The theory of super-compensation understands the human being beyond their membership in the animal species, that is, in their “horizontal position,” as reflexology did. Vygotsky (2000b) proposes understanding humans in their “vertical position,” superior, as products of social relations. In this sense, we believe that, based on this view, the author begins to form hypotheses about the role of signs in the development of higher psychological functions, that is, their mediating character, which will become one of the foundations of his experimental research.

The studies conducted by Vygotsky and his collaborators on animal behavior aimed to understand what “modern humans” had that was unique compared to anthropoid monkeys and “primitive humans”. The primary research sources were the experimental findings of Kohler and Buhler, both psychologists from the Gestalt school. According to Vygotsky and Luria, “Buhler and Koffka were absolutely right in saying that the emergence of a child’s first word, as a sign to denote an object, constitutes a perfect psychological parallel to the use of a stick by chimpanzees in their experiments” (Vygotsky & Luria, 1996, p. 145). Through Kohler’s research, the authors were able to verify that the ability that monkeys developed in using a tool to achieve a goal was a first step in the evolution of higher mental processes. Therefore, the idea that the creation of tools is the primary achievement of human behavior was derived from Buhler’s findings. Vygotsky understood that it was not the creation of tools that differentiated humans from other primates, but the fact that these tools modified their behavior. Vygotsky and Luria formulated this hypothesis based on the findings of the time. Kohler’s research on the use of tools demonstrated that chimpanzees only used tools within their field of vision.

In addition to these experimental data, anthropological research by scholars such as Lévy-Bruhl was crucial. From this author, they borrowed idea that higher mental functions are linked to various forms of society. Based on his findings, Vygotsky and Luria (1996, p. 126) concluded: “It is easy to see that language and its character determine the nature and organization of mental operations to the same degree that tools determine the organization and structure of all human manual tasks”.

Vygotsky and Luria (1996) suggest that in "primitive" humans, the tool and the sign were united. This relationship is expressed in magical thinking, where the laws of nature coincide with the laws of thought. According to Vygotsky, this type of thinking emerged at a specific stage of technological development, arising from certain social structures. It appeared as a means to understand and control nature, though the explanations were fantastical. Vygotsky argues that this form of thinking was tied to the level of development of the productive forces in these early civilizations. Thus, technical development was a prerequisite for the emergence of magical thinking. Moreover, this relationship is also evident in primitive labor practices. Vygotsky and Luria cite the example of a people who used a special digging stick equipped with a device that, when used to till the soil (e.g., for planting rice), produced a specific sound that guided behavior.

This sound, resembling a work chant or a command, served to rhythmically organize labor. The sound from the device attached to the stick acted as a substitute for the human voice. In this case, a tool (used to impact nature) and a sign (used to stimulate behavior) were combined in the same device, from which the primitive shovel and drum later developed (Vygotsky & Luria, 1996, p. 149).

After this period of unity, where the tool and the sign were jointly involved in altering both nature and human behavior, the two paths diverged.

Alongside a higher level of control over nature, human social life and labor began demanding even greater control over his own

behavior. Language, calculation, writing, and other cultural-technical resources developed. With these means, human behavior ascended to a higher level (Vygotsky & Luria, 1996, p. 149).

The comparison between tools and psychological instruments also appears in Vygotsky's assessment of the crisis in psychology. In his analysis, the crisis lay not in the facts but in the concepts used to interpret them, that is, in the "method of cognition" (Vygotsky, 2004c). Drawing on Spinoza, he compares the method of knowledge to the means of production: knowledge production, analogous to material production, requires the creation of "conceptual tools" to better grasp facts. In this regard, Yaroshevsky notes that "[...] the comparison of scientific concepts to tools that wear out with use was followed by instrumental psychology, where cultural signs and their meanings were seen as a kind of instrument through which the individual constructs their psychic world" (Yaroshevsky, 1989 apud Veresov, 1999, p. 147).

It is worth noting that the first step toward studying instrumental acts in child development began with research on practical and verbal intelligence in children (Vygotsky & Luria, 2007). The goal was to identify psychological processes unique to children and determine which factors made their behavior superior to that of an anthropoid ape. Through experiments, Vygotsky and Luria found that, contrary to prevailing views, speech does not merely accompany practical activity but plays an organizing role in behavior.

As a way to study what is not directly observable, Vygotsky emphasizes the need to reconstruct phenomena, that consist to analyze objects by interpreting their traces and influences. Accordingly, the instrumental method also employed this analytical research principle, as Vygotsky sought to historically reconstruct the phenomenon enabling cultural development. To do so, he turned to the instrumental act, then understood as the smallest explanatory unit of cultural behavior. This knowledge-seeking method, which traces the origins of phenomena, was termed the "genetic-experimental method."

After this brief contextualization of the instrumental method's antecedents, we will next outline its main characteristics from a methodological and research procedural standpoint. We will demonstrate its general principles, objectives, and explanations for how children's cultural development occurs.

II. The Instrumental Method and the Study of the Child's Cultural Development

The instrumental method received its name because it is based on the discovery of the "instrumental function" of sign-mediated behavior and its role in cultural development. At the experimental level, this investigative method relies on the "functional method of double stimulation", which in essence, simplifies the organization of a child's behavior using a series of two stimuli, each with a distinct "functional significance" in behavior (Vygotsky, 1994). The core of this method lies in creating experimental situations that allow for the observation of mediated behavior through its reconstruction.

As previously mentioned, by the mid-1920s, Vygotsky had already recognized the role of signs in compensating for disabilities. We know from his letters that by 1927, he had already established the "instrumental method". In a letter to Luria dated July 26, 1927, he writes: "The only serious comment is that everyone should work in their fields according to the instrumental method. I am devoting the rest of my life and all my energy to this" (Vygotsky, 2007, p. 19). This passage highlights the importance Vygotsky placed on the instrumental method at that time.

The first publication introducing the instrumental method was the article "The Problem of the Cultural Development of the Child" (Vygotsky, 1994), submitted to *The Pedagogical Seminary and Journal of Genetic Psychology* in 1928 and published in 1929. This article is a milestone in Vygotsky's work, as it presents, for the first time, a description of the instrumental method for studying the child's cultural development, that is, the means by which the genesis and structure of cultural behavior could be analyzed.

Following anthropological studies, Vygotsky and his collaborators sought to investigate how cultural behaviors develop throughout childhood (Vygotsky, 2000a; Vygotsky & Luria, 2007). This premise guided the experimental studies conducted by Vygotsky and his laboratory colleagues in the late 1920s. They began by studying higher mental functions in children and later expanded their research to include semi-literate adults from remote regions. Various symbolic tools were used to observe how this mediation process occurs internally.

Vygotsky (2000a) criticized the psychology of his time for failing to distinguish between organic and cultural processes in human development, focusing only on the natural sphere. An example of this was Bühler's research, which sought to identify similarities between chimpanzee behavior and children's actions (Vygotsky & Luria, 2007). According to this view, speech development would not alter a child's actions. Vygotsky and Luria argued that this perspective risked "animalizing" child psychology.

For Vygotsky (1994), the difference between the "natural" and "cultural" lines of development did not lie in innate abilities but in the acquisition of "cultural tools". As he stated: "We have every reason to assume that cultural development consists in mastering methods of behavior based on the use of signs as a means of carrying out any particular psychological operation" (Vygotsky, 1994). Unlike Bühler's conception, Vygotsky argued for an integration of language and practical thinking (Vygotsky & Luria, 2007).

Thus, the study of "higher psychological functions" encompasses two groups of phenomena that, though seemingly heterogeneous, are interconnected: 1) Processes of mastering external means of cultural development: language, writing, arithmetic. 2) Processes of developing special mental functions, not strictly limited or defined, which traditional psychology name as attention, memory, logic, concept formation, etc. (Vygotsky, 2000a).

In Vygotsky's assessment, the research methods of the early 20th century were based on the stimulus-response (S-R) scheme. This approach limited itself to studying elementary psychological functions. Only by

overcoming this method could researchers properly investigate the cultural development of behavior. Vygotsky (2000a) proposed that human psychological development is part of the general historical development of humanity. Because of this, the distinctive human activity is that which is oriented toward mastering one's own behavior: "[...] man himself creates the stimuli that determine his reactions and uses these stimuli as means to master the processes of his own conduct" (Vygotsky, 2000a, p. 77). Therefore, the qualitative leap of humans in relation to animals lies in creating auxiliary stimuli for the active determination of one's own behavior with the help of these stimuli.

The response triggered in reflexive behavior has a direct connection between stimulus and the nervous system, that is, the origin of this process is in the organism. In cultural behavior, however, the response to behavior is not in the organism, but in the social relations between people, which are collectively created and transmitted (Vygotsky, 2000a).

The problem of empiricist approaches in psychology rested precisely in denying historicity (Vygotsky, 2000a). Consequently, a method that incorporated the historical perspective of phenomena's development was required to access the peculiarities of higher behaviors. Vygotsky (2000a) established three principles for studying higher mental functions: 1) studying the process rather than the object; 2) analysis based on explanation rather than description; 3) analysis of fossilized (automatic and mechanical) psychological processes through observation of their genesis. These principles constitute what Vygotsky called the "genetic-experimental method".

Vygotsky (2000a) refers to analyzing the process rather than the object because he sought to understand phenomena at all moments of their development. Experimental situations needed to be created that would artificially produce the process from its genesis. The primacy of explanation over simple description relates to the problem between essence and appearance. Vygotsky criticized psychological theories that merely described the external appearance of psychological phenomena. Contrary to this view,

his proposal of dynamic analysis aimed to provide access to the essence of phenomena, that is, the path of explaining phenomena from their origin, determining their dynamic-causal connections and their relationship with other processes related to their development (Vygotsky, 2000a).

The research methodology, or the practical instruments created for studying mediated activity, consisted of creating experimental situations where children had to employ external means to help solve specific tasks. The experimenter needed to introduce means that would allow the child “[...] to establish the corresponding connection” (Vygotsky, 2000a, p. 114). Tasks were designed so that children couldn’t solve them directly, that is, through a direct stimulus-response connection. The external sign functioned as a mediator between stimulus and response.

Therefore, Vygotsky interpreted that there is a complex functional and structural unity, which is affected both by the task to be solved through instrumental function and by the paths this function will follow. In other words, the same problem, if solved by different means, will have a different structure. The author suggested that including a sign reshapes the entire structure of the psychological operation, just as including a tool reshapes the entire structure of a work operation (Vygotsky, 2000a). Despite the analogy, Vygotsky emphasizes that the difference between tool and sign lies in the fact that the former modifies reality, while the latter modifies psychological functions. A neutral stimulus acquires sign function when an obstacle is interposed in solving a task; from that point on, the operation’s structure acquires an essentially distinct form. The basic laws governing this phenomenon are not abolished with the mastery of one’s own behavior, but are subordinated to this new structure (Vygotsky, 2000a).

The genetic method for studying mediated activity is directly tied to a specific conception of child development. The predominant view at the time saw children as miniature adults, that is, it viewed development purely as growth and maturation. Vygotsky (2000a) opposed this view and reaffirmed the need to understand development in terms of qualitative transformations.

He argued that the essence of development lies in the collision between “cultural” forms of behavior and inherited ones, with the former being more important as it stems from the organism’s interaction with its environment. While “primitive” behaviors don’t disappear, they are transcended through the use of cultural tools. However, Vygotsky (2000a) emphasizes that transcendence doesn’t mean negation, something is always preserved in development. This approach seeks to dialectically reproduce the phenomenon’s development.

In the history of sign-mediated behavior development, children begin applying to themselves the behavior patterns that others previously applied to them. Social behavior patterns are transferred to the child. Initially, signs serve to influence others; later they become means of self-influence. This transition from interpsychological to intrapsychological functioning is called the “general genetic law of cultural development”. Vygotsky (2000a) notes that children master their own behavior when they master a system of stimuli that serves as their key.

Vygotsky (2000a) devoted much of his work “History of the Development of Higher Psychological Functions” to examining how the instrumental act manifests in different higher mental functions. Using experimental data, he showed how behavior is first organized through psychological tools, externally at first, then internally. He analyzed the development of oral language, prehistory of writing, arithmetic operations, attention, memory, the relationship between language and thought, and self-regulation.

Memory functions most clearly demonstrate the instrumental act in both its functional and structural aspects, revealing the distinction between “natural” and “cultural” memory. When children use external signs to mediate memorization, they redirect their neural connections, replacing innate associations with new, culturally constructed ones (Vygotsky, 2000a). In memory experiments, children performed two tasks: memorizing words without aids, and using picture cards as psychological tools.

Vygotsky and his collaborators observed that older children no longer used external signs. They concluded that there was a transition from using external signs as mediators of this function to internal mediation, that is, without the need for external signs. He hypothesized that throughout development, children learn to master memorization processes and begin to direct and control them much more rapidly. In the experiments conducted, Vygotsky noted a tendency among adolescents and adults to not use external stimuli, but instead employ internal means to actively establish connections between memorized words and their meanings. This would serve as evidence of the developmental progression toward internal mastery of signs.

Vygotsky (2000a) sought to generalize these findings into an integrated theory of personality development, while acknowledging the need for more empirical support. He argued that no function develops in isolation, cultural development and personality are inseparable. Personality is a social concept encompassing both natural and historical aspects of human existence, not innate, but emerging through cultural development as a historical phenomenon. As he stated: “Personality is a reflective concept formed when children apply to themselves the same adaptive procedures they apply to others” (Vygotsky, 2000a, p. 337). Personality is thus “the social within us”, that requiring study of human development as a whole, even as individual mental functions are analyzed separately.

The essence of cultural development, as we have seen, lies in humans gaining mastery over their behavioral processes. However, the indispensable prerequisite for this mastery is the formation of personality, meaning that the development of any particular function depends on and is always conditioned by the overall development of personality (Vygotsky, 2000a, p. 329).

Language, for instance, reconstructs thought, memory, and other functions. In child development, language first emerges as a means to influence one’s environment. Initially serving communicative purposes with others, it later

transforms into inner speech, based on self-communication (Vygotsky, 2000a). The conclusion, therefore, is that inner speech becomes the child's tool for thinking.

Vygotsky (2000a) emphasizes that the child's worldview becomes structured through personality formation. This worldview constitutes a logical system that forms a conscious conception about the world and its most fundamental aspects. In his words: "For us, the worldview encompasses everything that characterizes human behavior as a whole, the child's cultural relationship with the external world" (Vygotsky, 2000a, p. 328). The discovery of the "self" or self-concept begins around age seven, when children overcome egocentric logic and start mastering their own thought processes. Nevertheless, the formation of a worldview only occurs in adolescence, since before this period there exists merely "activity within the world".

III. New findings and the constraints imposed by the instrumental method

The instrumental method was Vygotsky's first attempt to apply Marx's approach to the experimental study of psychological phenomena. He incorporated the methodological principle of dialectical materialism, which views method not as a starting point but as the result of research. Therefore, it was natural to expect that as new experimental studies developed and researchers engaged with concrete phenomena, the limitations of the methods and procedures used in the instrumental phase would become apparent. We believe this is exactly what happened. Regarding the factors that led Vygotsky to change his interpretation, he stated:

The need for a new stage in research did not arise because a new idea emerged or became interesting, but because the development of the research itself demanded it. The new facts pushed us to search for new and more complex explanations (Zavershneva & Van Der Veer, 2018, p. 274).

This passage clearly expresses the author's materialist orientation, as he states that the explanation of a phenomenon is not the product of thought

alone, but rather emerges from the interaction between consciousness and the object of study. In the late 1920s, Vygotsky and at least one of his collaborators, Leonid Sakharov, began investigating the development of conceptual thinking. Since conceptual thought begins in childhood but completes its development in adolescence, Vygotsky was compelled to examine the most developed form of his object of study. We hypothesize that it was this encounter with adolescent thinking, a new facet of his subject, that led him to reformulate his research program.

In this sense, exposure to adolescents conceptual thinking made Vygotsky aware of the instrumental method's inability to fully explain it. The experimental results led Vygotsky to initially adopt a static view of signs. This understanding produced an interpretation of cultural development as a direct relationship between mastering signs and changes in children's behavior. In his later research, signs were no longer seen as static but were instead related to concept development, that is, as the result of a dynamic conceptual system that develops throughout childhood. In notes from the second half of 1932, Vygotsky acknowledged, despite its limitations, that the instrumental method had been necessary for the development of his research.

Until now we have disregarded sense and meaning. That is (in the experiments with memory), we made no distinction between the knot and the word, i.e., with the word we focused on what it has in common with the knot and not what is specific for it. This was a legitimate, necessary abstraction, of which we must be proud. It was important to show the essence of the higher psychological function: the rudimentary functions suited this goal best; it was necessary to show the psychological mechanism of the sign. In order to do this, logical memory in a certain sense had to be reduced to the knot (Zavershneva & Van Der Veer, 2018, p. 300).

The interpretation of the sign that have a static nature derived from the genetic-experimental method. By focusing on the beginning of the development of the instrumental act and taking it as a parameter for studying

later ages, Vygotsky failed to perceive the changes in the relationship between sign and meaning. In a note likely written in 1932, Vygotsky expressed that in child development, “the most important thing does not happen at the beginning, but at the end, for the end contains the beginning” (Zavershneva & Van der Veer, 2018, p. 247). The same position appears in his critique of contemporary authors such as Stern, Bühler, and Gesell, who also believed that “all child development occurs in the first years of life” (Vygotsky, 2006, p. 324). Vygotsky realized that the child does not immediately discover the relationship between sign and meaning. Instead, this connection goes through several phases before reaching full development. Moreover, it does not end during the preschool period but continues to develop into adolescence.

When investigating adolescent thinking, Vygotsky observed that the element that allows us to identify the transformations in thought is the meaning of the word. Upon recognizing that the unity between thought and language lies in meaning, he concluded that his efforts should be directed toward what he called the “semantic method”. In 1932, he stated: “The sign has meaning. The study of the sign in its real psychological role necessarily requires the study of meanings. This is the core of the semantic method” (Zavershneva & Van der Veer, 2018, p. 300). This method was accompanied by the rejection of the component parts analysis method, typical of the instrumental phase, in favor of the unity analysis method. The unity analysis method was the basis for Marx’s approach in taking the commodity as the unity of analysis for the capitalist system. There is evidence to suggest that Vygotsky was already aware of this method by the mid-1920s (Vygotsky, 2004c). However, it was only toward the end of his work that empirical data led him to elevate meaning to the unity of consciousness. A passage from 1933, found in his manuscripts, directly indicates his alignment with Marx’s method: “The [psychological] system is reproduced in every meaning, just as the capitalist system is reproduced in the operation with the commodity” (Zavershneva & Van der Veer, 2018, p. 354). Tragically, in another

note, possibly from 1932, he stated that the systemic perspective had been introduced too late.

Vygotsky's concern with understanding the relationship between the biological and cultural foundations of child development was based on a problem he termed, toward the end of his work, "transfer" [*perenós*] (Zavershneva & Van der Veer, 2018). This problem relates to the connection between practical activity and thought. He believed this issue was central to psychology. The study of mediated activity through the instrumental method was his first attempt to analyze this process. However, the method led him to understand transfer as a direct process between socially created cultural tools and the child's inner world. This was one of the main limitations of the instrumental method. In a manuscript from 1932, Vygotsky acknowledged this problem as follows: "We focused our attention on the sign (on the tool) at the expense of the development of the operation with the sign, presenting it as something simple that goes through three stages: magical, external, and internal" (Zavershneva & Van der Veer, 2018, p. 275). In his final years, he sought to overcome this simplicity by investigating the development of concepts throughout childhood (Vygotsky, 2001).

The notion of "higher mental functions" was expanded into a more unified framework, introducing the concept of "psychological systems". Controlled experimental settings, central to research on mediated activity, gave way to clinical case studies and pedagogical experiments, less confined to the laboratory. In his studies on the role of signs in the development of higher psychological functions, Vygotsky recognized that these functions did not form in isolation but constituted a totality. Despite this, by the late 1920s, he could not explain how the sign produced such integration. It was only through his studies on concept development in adolescence and the disintegration of consciousness in schizophrenia that he realized it was the systemic nature of concepts that structured and produced the psychological system (Vygotsky, 2004d). In his words:

The main idea (extraordinarily simple) is that during the process of behavioral development, particularly in its historical development, what changes is not so much the functions themselves, as we had previously assumed (this was our mistake), nor their structure, nor the developmental stage, but rather what changes and transforms are precisely the relations, that is, the connections between functions, in such a way that new groupings emerge, unknown at the previous level. This is why, when moving from one level to another, the essential difference often does not stem from intrafunctional changes, but from interfunctional changes, the shifts in interfunctional connections, in the interfunctional structure (Vygotsky, 2004d, p. 105).

In short, it was through contact with adolescents, the most developed form of the object he sought to study, that Vygotsky recognized the limitations of the instrumental method. The main limitation was that this method only encompassed the genesis of the process and failed to account for the transformations occurring throughout child development. Thus, although he was aware of Marx's reverse method, which stated that "the anatomy of man is the key to the anatomy of the ape", as early as the mid-1920s, it was only through his studies on concept development in adolescence that this method was effectively put into practice. The same occurred with the method of analysis. Vygotsky acknowledged in the mid-1920s that Marx employed a method of analysis based on the delineation of unities. The observation made in 1926, that psychology must find its "commodity", that is, the explanatory unity of psychological phenomena, could only be answered at the end of his life, when he concluded that meaning is the unity unifying thought and language.

We agree with Veresov (2024) when he argues that there was no rupture between the instrumental period and the final stage of Vygotsky's work, which focused on analyzing the systemic reorganization of interfunctional relations in human consciousness, supported by the semantic analysis method. What occurred was an awareness of the instrumental method's limitations and a search for theoretical concepts capable of capturing the essence of the phenomenon. For example, the concept of "neoformation" did not replace that

of “higher psychological functions” but rather expanded the understanding of the relationship between elementary and higher psychological functions. Thus, what took place was a partial shift in the research program rather than a change in the theoretical approach. Veresov emphasizes that the understanding of continuity and discontinuity between these two phases still requires further investigation.

IV. Conclusion

Despite the advances enabled by the instrumental method, particularly its ability to demonstrate the role of cultural transmission in psychological development, its limitations led Vygotsky to a partial understanding of the phenomenon. In other words, while the explanatory principle for the development of consciousness remained unchanged, the interpretation of the phenomenon proved more complex than the sign-based explanation suggested. However, as the author himself argues, science also needs books “[...] that teach how to seek the truth, even if they have not yet found it” (Vygotsky, 2004c, p. 267). Even if the instrumental method did not uncover the truth about cultural development, it guided Vygotsky’s search, and that was his true merit.

El método instrumental en la obra de Vygotsky: entre avances y obstáculos en la investigación del desarrollo cultural de los niños

RESUMEN

Vygotsky fue un gran crítico de los psicólogos que ignoraban la importancia de la cultura para el desarrollo infantil. Fue a partir del método instrumental que identificó el papel de los instrumentos culturales para el desarrollo de funciones psicológicas superiores durante la ontogénesis. Presentaremos los antecedentes de este método y destacaremos que es el resultado de varias influencias. Discutiremos cómo se utilizó para la investigación empírica centrada en la génesis del comportamiento cultural de los niños. Finalmente, argumentaremos que fue el reconocimiento de las limitaciones del método instrumental lo que guió a Vygotsky a desarrollar un nuevo programa de investigación, iniciado por el autor recién en los últimos años de su vida.

Palabras clave: Vygotsky. Método Instrumental. Desarrollo Infantil.

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