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The Psychological Nature of Generalizations

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The article analyzes the fundamental problem, known in philosophy as the problem of universals, and in psychology as the problem of the essence and types of generalizations. The authors point to the internal inconsistency and lack of persuasiveness of the traditional interpretation of the nature of generalizations proposed by Aristotle. All modern psychology, as indicated in the article, remains a prisoner of the empirical way of generating the general, imposed by the Stagirite. The authors see ways to solve the problem of generalizations in the paradoxical formula proposed by L.S. Vygotsky, who argued that generalization and communication are two sides of the same time. According to this formula, as we communicate, so we generalize, and vice versa.

Guided by the most important principle of the cultural-historical approach – the principle of historicism, the authors consider the origin and essence of generalizations in ontogeny. The article highlights and discusses six types of sequentially emerging generalizations. The very first generalization that appears in young children, which can be called primary, sheds light on the inner nature and essence of generalizations, which are a folded program of actions to achieve the goal generated by the child. The next type and level of generalizations can be named after L.S. Vygotsky, worldly concepts and ideas. They differ significantly from the empirical generalizations imposed on children by existing educational methods and programs. According to the authors, the child's mastery of certain levels and types of generalizations is a natural process of development of the psyche and consciousness. At the turn of preschool and primary school age, children develop theoretical thinking with a predominant focus on the mode of action; in the middle grades, they master functional generalizations and a functional style of thinking. In older adolescence and youthful age, opportunities open up for them to familiarize themselves with the scientific and philosophical level of thinking, thanks to the scientific and philosophical types of generalizations. The development of generalizations in the cultural-historical theory is an internal, and, therefore, an essential characteristic of the development of human consciousness.

Keywords: cultural-historical approach, the problem of types of generalizations and the nature of universals, theory of activity, developmental education, consciousness, meaning, significance, methodology of non-classical psychology.

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Психологическая природа обобщений

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В статье анализируется фундаментальная проблема, известная в философии как проблема универсалий, а в психологии — как проблема сущности и видов обобщений. Авторы указывают на внутреннюю противоречивость и неубедительность традиционной трактовки природы обобщений, предложенной еще Аристотелем. Авторы видят пути решения проблемы обобщений в парадоксальной формуле, предложенной Л.С. Выготским, утверждавшим, что обобщение и общение это две стороны одной медали. Согласно этой формуле, как мы общаемся, так мы и обобщаем, и наоборот.

В статье выделяется и рассматривается шесть видов последовательно возникающих обобщений. Самое первое обобщение, появляющееся у детей раннего возраста, которое может быть названо первичным, проливает свет на внутреннюю природу и сущность обобщений, являющихся свернутой программой действий по достижению порожденной ребенком цели. Следующий вид и уровень обобщений может быть назван, вслед за Л.С. Выготским, житейскими понятиями и представлениями. Они существенно отличаются от эмпирических обобщений, навязываемых детям существующими образовательными методами и программами. На рубеже дошкольного и младшего школьного возраста у детей появляется теоретическое мышление с преимущественной ориентацией на способ действия, в средних классах они овладевают функциональными обобщениями и функциональным стилем мышления. В старшем подростковом и юношеском возрасте, благодаря научному и философскому видам обобщений, перед ними открываются возможности приобщения к научному и философскому уровню мышления. Развитие обобщений в культурно-исторической теории — это и есть внутренняя, а, значит, существенная характеристика развития сознания человека.

Ключевые слова: культурно-исторический подход, проблема видов обобщений и природы универсалий, теория деятельности, развивающее обучение, сознание, смысл, значение, методология неклассической психологии.

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Generalizations are typically interpreted in ways consistent with the historical tradition established by Aristotle. Almost all academics and practitioners, both in Western civilization and in Russia, came under the hypnotic influence of this tradition. Aristotle had to devise a convincing method to contrast his philosophy with that of Plato while deriving the common from the singular elements of the world around. All in all, it was obvious that the challenge was insurmountable. It is impossible to use the singular “modes of substance” to derive what belongs to the ideal world — generalizations. As we know, René Descartes asserted that there are two substances, one of which has extension as its primary quality while the other has conceivability. Baruch Spinoza, a student and adherent of Descartes as he insisted upon calling himself, states in the very first pages of his *Ethics*, written geo-

metrically: “Proposition 2. Two substances, whose attributes are different, have nothing in common.” And then: “Proposition 3. Things which have nothing in common cannot be one the cause of the other.” [14, p. 4].

It is reasonable to assume that the man who developed the formal logical apparatus, to which all sciences are still subject, was aware that the general cannot, in principle, be deduced from the singular. Therefore, in an effort to balance his logical constructs, he opted for a blatant concept substitution. He used the idea of the same properties in a certain group of things to substitute the concept of the common, traditionally understood as a verbal representation of the essence of this or that thing. Giving such a group a singular name results in a typical empirical generalization that is still in wide use today and is regarded as the only kind that can be made,

with the possible exception of Vasilii Davydov's theoretical generalization.

The main philosophical issue at hand includes the problem of generalizations, known as the problem of universals in the Middle Ages. With his paradoxical claim that generalization and communication are the same thing, Lev Vygotskiy was able to shake off the centuries-old dust from this issue and bring it up correctly. In other words, how we communicate is how we generalize, and vice versa; the two are the sides of the same coin. This, in our opinion, is the only accurate formulation of the philosophical problem of universals, yet to be resolved.

In accordance with the fundamental tenet of the cultural-historical approach, stated in its very name, and known as the principle of historicism, which insists that the subject of our study must be taken into account as a part of the history of its natural emergence, formation, and development, we will attempt to start studying generalizations' nature and essence in their most basic, one might even say, embryonic, state. It would seem that this type of psychological research requires not complex experimental methods, but rather simple observation of mundane events, with psychological analysis and due reflexion.

One family's newly-taught-to-walk granddaughter approached her grandfather lounging on the kitchen couch, took his thumb, and started to pull it, inviting him to get up and come with her to the next room. The grandfather, of course, gave in to this request. The family's next room was designated as the library because it had glass-doored cabinets lined with bookshelves. Many different figurines, including glass angels, porcelain animals, oriental beauties, and more, could be found on the shelves as well. When the grandfather arrived at a specific cabinet, the girl pulled the door handle while pointing at him and exclaimed firmly, "Ku-ka." The grandfather was aware that she used to refer to dolls ("kukla" in Russian) in that way, but at that moment, it could very well mean any other kind of figurine. The grandfather opened the cabinet door as the granddaughter was not yet tall enough to reach on her own and began offering her the figurines standing there, one by one. However, the girl stretched her arm out again and again, shaking her head, and kept demanding, "Ku-ka." A porcelain figurine of Przewalski's horse was finally placed in her hands. The girl, overjoyed, immediately ran off to play with the figurine, leaving her grandfather be.

Every family has probably experienced a similar scenario: a young child draws an adult's attention in a bid to enlist the adult's help in achieving a goal. It would appear that the child is manipulating the adult; however, this is merely how things look on the surface. In actuality, this relationship between the child and the adult is something altogether different. It all comes

down to the adult being the one person actually close to the child. Therefore, the adult cannot be used as a tool for manipulation or as a means to achieve the child's goal. There is no boundary between the consciousnesses of the child and the adult close to him. They share a "proto-we" type of consciousness, which Lev Vygotskiy described as the primary new psychological formation of the first year of a child's life. In the case mentioned above, the grandfather was just as happy with how his granddaughter and he conducted their "business" communication as she was when she finally got her hands on the coveted porcelain horse.

Vygotskiy observed that at the autonomous speech stage, children communicate with close adults in a way that fosters mutual understanding, largely through gestures; the peculiar "words" they utter only serve to supplement their gestures, enriching the semantic context of communication. This gesture to word ratio is reversed over time. Adults only use gestures to emphasize the emotional and semantic aspects of speech; the word takes center stage. The girl's gesture — her hand reaching out toward the cabinet door, along with her turned head and the demanding gaze at the adult, took center stage in the above scenario. However, there was also what might be called a primary meaning to the word "Ku-ka" that accompanied these movements. It was obvious from the context that it essentially meant, "Give me a figurine of a living creature that stands on a shelf." A word is a sign, according to Lev Vygotskiy; a sign is a sign because it has meaning; and meaning is a generalization. He then asserts, somewhat unexpectedly, that communication and generalization are two sides of the same coin. From our perspective, this is the key to resolving the age-old problem of universals, also known as the problem of generalizations in the modern era.

The mundane situation under discussion contains many psychologically relevant elements. It is important that children can already set goals at this age and work toward those goals using any means necessary. Their behavior is built around such goals. They plan out a series of behavioral acts that will help him get closer to the end goal he set himself. However, the very phenomenon of being able to lock on the goal shows that the child is now living in a future-oriented space. He transformed into an entirely new being with a purpose and increased self-awareness. Whereas as an infant, he was entirely at the mercy of the circumstances at hand, he has now broken the confines of the current environment and, as some philosophers say, transcended into another dimension. He now lives in a future that he himself created. It is still unknown in its entirety why and under what conditions a child develops the capacity for proactive goal-setting. However, this is a key turning point that separates children into those who

live primarily in the present at hand and those who live in the future from an early age. Children fall into these two categories by the age of three, according to some experimental data. The quality and nature of communication between parents and their children is where we can see the root of this division. Our findings indicate that children lack proactive goal-setting and transcendence into the realm of the future if they have not fully and completely gone through the stage of living together with close adults where “proto-we” consciousness rules. For instance, children from these two groups with qualitatively different mental development have different speech utterance construction styles. In some, they are focused on the future, while in others, they are restricted to the here and now [11, pp. 88–97].

The word the girl used in this situation had the meaning of a condensed intrasubject action program that resulted in the accomplishment of a goal. It is interesting to note that, bringing an adult to the bookcase and making him concerned about her goal, the girl did not consider any specific strategy to reach this goal. The adult simply started to offer her the figurines that were there, one by one. This is the first aspect of the girl’s words communication function. The girl was able to imagine for the adult the same goal that she had and to outline the broad contours of how to reach it, which is the second aspect of this generalizing function of words and gestures. Therefore, the earliest generalizations that emerge in young children during the period of vivid autonomous speech manifestation are condensed behavioral programs intended to accomplish a child-set goal.

The critical period Lev Vygotsky described in his article, “Crisis of Three Years,” is known to exist between the early age and preschool age. The child whom the adult used to lead by hand now pulls the hand away, both literally and figuratively. The slogan and essence of this crisis is “I can do it myself!”. Quite often, as noted by Vygotskiy, the child insists on getting their way not even because he wants it so much, but simply to make a point. For parents, this time in their life with their child is not an easy one. Nevertheless, it is a very important and meaningful period in a child’s development. Our data show that children who, for whatever reason, do not go through the crisis of three years are indeed troubled children [12].

The child experiences a qualitative shift in the development of their psyche, consciousness, and personality during the crisis of three years, which, according to Vygotskiy, can last up to a year. A qualitatively higher level of self-awareness develops in the child. Many child psychologists hold the opinion that we can only begin to talk about the child’s personality from this age, and with good reason. After going through the three-year crisis, a child establishes their own place in the system

of their relationship with adults and adopts a stable, proactive goal-setting approach as opposed to situational and episodic. Furthermore, at this age, the system of interfunctional relations undergoes a very significant restructuring. The imagination, which we believe children have in some capacity at all ages, assumes a central role during this time and stage, serving as the primary new psychological formation that defines preschoolers’ entire developmental trajectory. Children’s play, which Lev Vygotskiy called the dominant activity of the preschool age period, is produced by imagination, a volitional function of the psyche. Only in play can a child do things he is unable to do as part of any other activity because play is imagination in action [2].

The aforementioned developmental leaps and accomplishments of post-crisis children entering the preschool stage are a crucial psychological requirement and condition for the emergence of generalizations that are more advanced than the early age’s primary generalizations. We can better comprehend the essence and nature of these generalizations by drawing an analogy with the emergence of primary generalizations at an early age, when generalizations were linked to the manifestations of autonomous speech. Primary generalizations were found in words that had neither an accepted pronunciation nor meaning. A peculiar “whyer” stage during the preschool years, in our opinion, plays roughly the same role as early autonomous speech.

Children who have gained some experience and gone through the “whyer” stage start learning the semantic underpinnings of normative human interactions and relationships on their own through play. Children’s play is fundamentally a creative activity, which is its most important characteristic. The play is immediately ruined by anything that restricts creativity. In turn, creativity in play implies that the child is surpassing himself; in other words, he “reaches up,” exerting voluntary effort. Play also has the notable quality of not producing anything. A valid question is then raised: why do children play, and what do they play for? It may look as though they played a bit and went their separate ways, while things remained as they always were. Play, however, is a very appealing activity for children. Just mentioning the mere opportunity to play to children is sufficient to get their attention and get them actively demonstrating how eager they are to participate. This draws us to the heretical conclusion that play activity, as it is typically understood in the activity-oriented approach and others besides it, is not even an activity at all.

According to Aleksey Leontyev’s theory of activity, the motive, or the object toward which a given activity is directed, is what defines this distinctive activity. The closest basis and criterion for differentiating between activities is motive. Many eminent child psychologists

have tried to pinpoint the motive behind play. From our perspective, the fact that all of these esteemed psychologists were confined to the activity-oriented approach was the primary cause of these attempts' failure. Play lacks a motivation in the form of an activity object because it is not an activity in and of itself but rather a reflexion manifesting as an activity [13].

Reflexion, in its broadest sense, is the focus of consciousness on oneself. An essential component of human consciousness is self-awareness. William James asserts, for instance, that no matter what a person does, he is always aware that he is doing it [8] in the opening paragraphs of the personality-focused tenth chapter of his *Psychology*. The authoritative philosophical teachings of Oriental cultures prioritize internal consciousness over external consciousness. In Western civilization, however, during the New Age, the action-oriented mindset took over philosophy and popular culture. Karl Marx, for instance, asserts this attitude in his *Theses on Feuerbach*. Governmentalized Marxism provided the activity-oriented approach in the Soviet Union with very strong ideological armor.

Returning to the topic of play activity motivation, we shall cite Daniil Elkonin's remarkable statement that play is not preceded by or stimulated by any motives. Play is motivated solely by intrinsic factors that are created during the play process. The question, however, stands: why do children find play to be so appealing? After all, for them, play means not rest and relaxation but rather the highest possible level of concentration and volitional effort [16].

From our perspective, the sweet word "freedom" should be considered as the answer. In pedagogy, children's play falls in the free activities category, and for good reason. Children truly exercise their free will when they play.

Upon studying the various forms and characteristics of human emotions, Baruch Spinoza came to the conclusion that anything that broadens the scope for free action is followed by positive emotions, while anything that limits our freedom is followed by negative ones. From this angle, it is easy to understand why playing children enjoy the satisfaction of overcoming challenges, the joy of creativity, and the satisfaction of rising to a higher level of subjective existence through volitional effort. Lev Vygotsky defined play as a "school of emotions"; a person cannot have a fully developed, substantial, adult (according to Aleksey Losev) personality without a cultivated system of refined feelings and sensations.

Sometime after turning six, some older preschoolers have either entered or already emerged from the notorious crisis of seven years. Numerous of these kids have what Elkonin called a theoretical attitude toward a task situation, based on our experimentally collected data. A

predominant orientation to the way of action was what he called "theoretical attitude." This is the very theoretical generalization, in our opinion, that characterizes the consciousness of younger schoolchildren. Following Vygotskiy, if preschoolers' generalizations can be referred to as mundane concepts, then the next age stage in a child's development of consciousness is indicated by their capacity for theoretical thought [4].

According to Lucia Bertzfai's research, carried out under the supervision of Daniil Elkonin, typical preschoolers are "practitioners" in the sense that they are focused on achieving the set goal, whereas fully developed schoolchildren are able to push the goal to the side, as if on the periphery of their consciousness, and focus on determining the best course of action to take in order to solve the given task. Elkonin labeled them "theorists." Vasily Davydov describes Bertzfai's methodology in his monograph, *Theory of Developmental Teaching* [7, p.187–192], as it was used to assess the third-grade students' level of theoretical thinking. According to Davydov, schoolchildren only develop theoretical generalizations and theoretical thinking while engaged in learning activities under the guidance of their teachers. However, our research has shown that many older preschoolers are fully capable of understanding theoretical generalizations. It was demonstrated that some older preschoolers are quite capable of sustained attention focus on the way of action in the dissertation paper by Batdelger Jamerandorjiin, intended to study the personality-related readiness of children to school. Daniil Elkonin claims that this type of reflexion on the way of action is a theoretical attitude to a problem situation [9].

According to Yuliya Bogatyonkova's master's thesis from 2022, there is a conditioning link between children's ability to sustainably understand the way of performing actions and their going through the crisis of seven years. Therefore, there is strong evidence to support the claim that the development of theoretical generalizations in children occurs naturally as a result of the child's general mental and personal development throughout full-fledged child ontogenesis rather than as a result of the child taking in information from the teacher [1].

The emergence of functional generalizations in young children marks the next stage of age-related development of consciousness. Felix Klein, a mathematician, made the logical case that there is a functional way of thinking. Functional generalization and thinking are just as significant from our perspective as theoretical generalization and thinking. The basic idea behind functional generalization is monitoring and making use of the dynamic interaction between the dependent and independent variables.

All students are familiar with the application of the law of kinematics, expressed by the formula $s=v*t$, in

typical school problems involving motion from point A to point B. We will either be dealing with a direct or an inverse proportional relationship, that is, with a specific type of functional relation, depending on the circumstances of the problem and on which of these three interrelated values is sought. Though schoolchildren start solving all kinds of motion problems in fourth grade, modern educational programs maintain that the concept of functions should only be introduced in the seventh grade. This equals putting the cart before the horse. As a result, students must use their wit and ingenuity to solve motion problems when acting in situations where there is an insufficient indicative basis for actions, as defined by Pyotr Galperin [5]. Meanwhile, as far back as in 1977, on Vasiliy Davydov's request, one of the authors of this article carried out a dissertation study which demonstrated through experiment that fourth-graders were quite successful at mastering the mathematical concept of functions. However, mainstream schools never adopted the approach developed as part of this study for introducing the concept of functions to fourth-grade students. Our educational system appears to be resistant to psychological advancements [6].

It stands to reason that students who have mastered functional generalizations and a functional way of thinking are free to enter the realm ruled by scientific consciousness and thought and explore the system of scientific concepts. The scientific method, built around the corresponding theory that is based on its explanatory principle, is the cornerstone of scientific generalization and scientific thinking. All statements and implications of the expanded theory can be inferred from the explanatory principle; vice versa, all facts and statements that a given theory purports to explain can also be reduced to this explanatory principle. Any mathematical theory can therefore be derived from a suitable system of axioms and rules of inference from them. A theory's corresponding law serves as its explanatory principle in the natural sciences. One can easily ascertain what occurs in any area of an electrical circuit where direct current flows by applying Ohm's law, for instance. In psychology, however, the explanatory principle that satisfies certain methodological requirements is the central idea, as Lev Vygotskiy noted in his methodological study, *The Historical Meaning of the Psychological Crisis* [3, pp. 292–436].

The aforementioned kinematics explanatory principle, known to students as the law represented by the formula $s=v*t$, can serve as the starting point on the path that leads them into the world of scientific consciousness and thinking in scientific concepts. The relationship between the three parameters, which can also be thought of as a relationship between the three variables, is indicated by this formula. However, in order to use this law

of mechanics practically to solve any given motion problem, it must first be converted into a certain mathematical function that matches the problem's conditions. The above law of kinematics is transformed into a direct proportional dependence function, wherein distance is the dependent variable and the other two parts of the formula are transformed into an independent variable and coefficient, if the sought value is the distance traveled. If motion velocity or travel time is the sought value, the law of kinematics' formula must be transformed into a function of inverse proportional dependence, where the dependent variable, or the function itself, will be either velocity or time. The dynamic relationship between the three-variable law and the particular work function it generates — which is exactly a scientific generalization — is what enables one to think in terms of the scientific concept system.

The sixth and the highest category of generalizations we have identified is referred to as philosophical generalizations. Adolescence is when people start to master this kind of generalization. Philosophical generalizations stand out for their internal flexibility and the acceptance of constructive contradictions, which would be impossible in the realm of scientific knowledge. Every term or symbol in traditional science has precisely one meaning. Words may have multiple meanings in common speech, but ambiguity is unacceptable in science. As a result, there is only one function value for each value of the argument. Similarly, contradictions are inconceivable in science. Science defines a contradiction as a deadlock which shows that either our reasoning was flawed from the start or that we made an error along the way.

One might say that contradictions are present everywhere in philosophy. Zeno's aporias, which remain logically unsolved, serve as an example of how we are unable to consistently model simple physical motion in concepts. Georg Hegel "overcame" this challenge by blatantly ignoring the fundamental rule of formal logic — the law of excluded middle — when confronted with this reality. He used Existence and Nothing, two concepts that are mutually exclusive, as the starting point for his logical constructs. As per certain logic experts, Hegel's dialectical logic as presented in his philosophy is not logic at all because it violates the law of excluded middle, which prohibits contradictions; this appears convincing in view of the above. We see the Hegelian dialectic as either empty verbal gymnastics or, at best, an intriguing heuristic tool for philosophical exploration and reflexion.

In his lectures on child psychology, Daniil Elkonin stated that the "individual-society" relationship, which manifests as the "child-mother" relationship in child psychology, is the starting point for building a psychological theory of a child's development [15]. This dyad/monad

is the one that has the capacity to develop through self-development. A child sees his mother as the entirety of society and all of humanity; not as an abstract idea but as a tangible reality. From this angle, it is clear what “proto-we” consciousness, the main age-related new psychological formation of the infant period, according to Vygotskiy, is. The child extends “proto-we” consciousness to other adults in his immediate social circle as he enters early age. With the grandfather and granddaughter and their relationship in the above case of Przewalski’s horse, there was complete understanding from the outset; using the word “Ku-ka,” the hand extended to the cabinet door, and the head turned toward the grandfather with the corresponding facial expression, she eventually succeeded in “transplanting” the desired action program from her own head to her grandfather’s. A child’s initial generalization is therefore an idea that contains a condensed mental action program geared toward a goal that the child has created.

The next category of generalizations, as per Lev Vygotskiy, can be categorized as mundane, and as has already been mentioned, children are most adept at this category at the “whyer” age. Children are fascinated by practically everything. In the world of things, questions like “What is it?” and “What is it for and who needs it?” as well as “What do you do with it?” are asked regarding the meaning and function of various objects. But ultimately, meaning is a generalization, in Vygotskiy’s view.

By the way, theoretical generalizations can also be referred to as spontaneous if they are viewed as a stable

reflexion on the way of action that naturally occurs in children at a particular developmental stage. However, if the term “theoretical” is interpreted in accordance with Vasily Davydov, then the teacher who set up a learning activity (whose subject matter is the fundamentals of science) that led to the development of theoretical generalizations and theoretical thinking in children should be commended [10]; in our opinion, this activity does not correspond at all to younger schoolchildren’s development level and abilities.

The modeling of dynamic relationships between variables is the main component of the next level of generalization, which we called functional. The presence of functional style of thinking in students is a crucial indicator of generalizations of this kind.

Scientific generalizations and thinking inherent to classical-type traditional science first appeared in mechanics, later spreading to other natural science branches. As we have already mentioned, the realization of the dynamic relationship between a scientific law with three interrelated parameters and a particular function with dependent and independent variables, as derived from this law, lies at the heart of these generalizations.

Philosophy and its categories represent the highest level of conscious knowledge and thinking that young people can access as they enter adolescence. Philosophical generalizations and concepts are tools for the reflexion on existence and the search for ways to obtain true knowledge.

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