The Use of Symbols by Elementary Schoolchildren and Adolescents with Learning Disabilities as Tools of Awareness of Subjective Reality

Alexey M. Polyakov

Belarusian State University, Minsk, Belarus
E-mail: polyakov.bsu@gmail.com
ORCID: https://orcid.org/0000-0003-2089-1093

Abstract
Schoolchildren with learning disabilities have difficulties in communication and interaction with other people and this is related to their awareness of other's subjective reality. A symbol is a "mental tool" for awareness of subjective reality. The symbol is a cultural presentation of subjective reality, mediating the relationship and interaction of two or more agents. The purpose of this study, based on cultural-historical methodology, is to identify and experimentally verify the use of symbols to understand this agent's subjective reality by younger schoolchildren and adolescents with learning disabilities. The experimental method is based on identifying the dominant attitudes to the awareness of the agent's subjective reality, as well as how it is interpreted and evaluated by the child. The study involved 80 students of secondary schools: 40 with normal development and 40 with learning disabilities (9-12 and 14-16 years old). It showed difficulties in understanding agent's subjective reality and the predominance of a stable objective attitude to symbols and other people, with significant differences in the Mann-Whitney U test for the experimental group of participants of both ages. This feature is considered as an obstacle in the construction of interpersonal relationships and cooperation by children and adolescents and can serve as a target for psychological assistance.
Keywords: agent, interpersonal relationship, consciousness, social understanding, symbol, schoolchildren, adolescents, learning disabilities

Применение символов как средства осознания субъектной реальности младшими школьниками и подростками с задержкой психического развития

Алексей М. Поляков

Белорусский государственный университет, Минск, Беларусь
E-mail: polyakov.bsu@gmail.com
ORCID: https://orcid.org/ 0000-0003-2089-1093

Аннотация
Способность к осознанию субъектной реальности связывается с продуктивностью построения субъект-субъектных отношений и сотрудничества с другими людьми. У школьников с задержкой психического развития (ЗПР) отмечается множество трудностей в коммуникации и взаимодействии с другими людьми. «Психологическим орудием» осознания субъектной реальности выступает символ. Символ понимается как культурная форма презентации субъектной реальности, опосредующая отношения и взаимодействие двух или более субъектов. Цель исследования – определить и экспериментально проверить специфику использо-

вания символов для осознания субъектной реальности младшими школьниками и подростками с ЗПР. Исследование базируется на методологии культурно-исторической психологии. Оригинальная экспериментальная методика изучения осознания символически представленной субъектной реальности основана на выявлении доминирующих установок к осознанию символической реальности, а также преобладающих способов интерпретации и оценки субъектной реальности у испытуемых. В исследовании приняли участие 80 учащихся средних школ 9-12 и 14-16 лет: 40 – с нормотипическим развитием и 40 – с ЗПР. У школьников с ЗПР обеих возрастных групп выявлены трудности осознания субъектной реальности и преобладание устойчиво объектного типа отношения к символам и другим людям (значимые различия по U-критерию Манна-Уитни с контрольной группой у испытуемых обоих возрастов). Данная характеристика рассматривается как препятствие в построении детьми и подростками субъект-субъектных отношений и сотрудничества с другими людьми. Она может служить целью психологической коррекции.

Ключевые слова: субъект, субъект-субъектные отношения, сознание, социальное понимание, символ, школьники, подростки, задержка психического развития.

Introduction

In children with learning disabilities there are minor deviations in the development of mechanical memory, spatial representations and perception, in the mastering of complex motor programs, reducing mental performance, etc. (Slepovich, & Polyakov, 2012). However, the most serious difficulties are found precisely in the field of the formation of higher mental functions, that is, functions mediated by sign-symbolic forms and, as a rule, arbitrarily regulated – logical memory, verbal thinking, speech, voluntary attention, voluntary movements, goal-forming and planning, etc. (Korobeinikov, 2002; Polyakov, 2006; Slepovich, & Polyakov, 2012). In addition, such children exhibit problems of socialization and social adaptation, in particular, the limited understanding of social situations, the lack of moral regulation of behavior and distortion in the moral assessment of human actions, antisocial behavior, unformed overall self-esteem, difficulties in interacting with other children, high anxiety towards an adult (Korobeinikov, 2002; Polyakov, 2006, 2014, 2016; Slepovich, & Polyakov, 2012; Triger, 2008). Is the underdevelopment of higher mental functions connected with the problems of social interaction and adaptation of children with learning disabilities? And what is the psychological mechanism underlying this connection?

Purpose and objectives of the study

The purpose of the study is to identify and experimentally verify the peculiarity of using symbols to understand agent's subjective reality by younger schoolchildren and adolescents with learning disabilities.

Literature review

The combination of problems related to cooperation and building relationships with other people, on the one hand, and the under-development of higher mental functions on the other, in children with learning disabilities is not accidental. According to Vygotsky (1984), the initial form of development of higher functions is the child's cooperation with another person. Only at the next stage of development the function is carried out by the child independently. By virtue of this idea of internalization, it should be assumed that the development of forms of cooperation, compatibility and the ability to build relationships with other people will also contribute to the development of higher functions. It is no accident that Vygotsky (1984), as the starting point of the child's mental development at a certain age, considered the social development situation as a system of relations, developing with other people in a given period. On this subject Smirnova (1994) says the following: "The internalization form is its own – someone else's voice (according to

M. Bakhtin, our commentary), which then becomes his own. But for someone else's word to enter consciousness as 'one's own,' it is necessary that in this consciousness there is a 'place' for the other, openness to it, a readiness to meet with another voice and hear it. This is possible only if the other already lives in consciousness if it is not an external perceived object, but an internal content of consciousness. It can be assumed that the relationship 'I and you' is a necessary prerequisite for the development of individual consciousness" (Smirnova, 1994, p.11). Thus, the reality of interpersonal relationship for a child precedes the mastery of higher forms of behavior and mental activity. El'konin (1989) expressed a similar idea, noting that the child already at the earliest stages of development lives an adult, the internal interaction with which can help to understand the inner logic of development. Similar considerations can be found in Backhurst (2007), who considers the problem of mediation in Vygotsky's theory: "... the emergence and development of the subjectivity of the child is mediated by the experience of the child's interaction with the subjectivity of other people. At the very core of the dialogical essence of 'I' lies the fact that 'I' originally appears as 'I-for-other'" (p. 65).

The ability to recognize the inner reality of an agent associated with the productivity of interpersonal relationships and cooperation with other people (Bruner, 1986; Carpendale & Lewis, 2004; Dimitrova, 2013; Fernyhough, 2009; Perre-Clermont, 1991; Polyakov, 2014, 2016; Tomasello et al., 2005). One of the most important conditions for the formation of interpersonal relationship is the ability of a person to recognize the manifestations of the subjective activity of another person (his relations, intentions, desires, feelings, etc.) and his own while discovering the points of their intersection or overlap.

In both developmental and special (abnormal child) psychology the question of how the child's relationships with other people are built up and a shared reality is formed remains open. How does someone else's consciousness become their own and their own consciousness become shared with another person? How does the 'shared-with-someone' subjective space appear? It is the awareness of the differences of the other 'I' from one's own, and also the connection between them, that allows you to go beyond your own subjectivity, overcome original solipsism and develop self-awareness.

In order to understand the mechanism of presentation in the human mind of the reality of interpersonal relationships, it is necessary to discover a cultural form that, firstly, in a sensory image expresses the reality of human relations (thus invisible relationships become accessible to consciousness). Secondly, it allows us to combine the semantic positions of different (at least two) agents. And, thirdly, denying itself, this form draws attention not to its external characteristics (as, for example, the perceptual image), but to the content expressed in it (relations of agents, their positions, intentions, etc.). In our opinion, the form, which satisfies all the above requirements, is a symbol. Thus, as a mechanism for understanding the shared subjectivities, the reality of interpersonal relationship, is that person should consider their expression and understanding through symbolic forms. The ability to symbolically mediated interpersonal relationships allows the solving of this task. The problem of assimilation of children with learning disabilities of the agent's subjective reality represented in symbols is particularly acute. This is due to the above-mentioned problems of such children in understanding and building human relations, understanding the senses and contexts of social situations and events, orientation in moral and social norms and others. The study of the features of awareness of the agent's reality represented in the symbols will help to find 'weak spots' and identify targets for psychological correction, which, in turn, will help to socialize children of this category.

In connection with the problems of socialization and social adaptation of children with learning disabilities (Korobeinikov, 2002; Triger, 2008), we can assume that they

have difficulties understanding the agent's subjective reality using symbols that are expressed in an objective (in contrast to agentive) relation to other people and inability to isolate the agentive reality, the semantic content of the symbol (Polyakov, 2014).

Methodology

Experimental base of the research

A total of 80 students from secondary schools in Minsk, Belarus (No. 42, 81, 160) took part in the research, 40 of whom attended the regular program (students of the 4th and 9th grades, at ages of 9-10 and 14-15), and 40 – according to the program for children with learning disabilities (3-4 and 8-9 grades, at ages of 9-12 and 14-16).

Research Methods and Techniques

The study is based on cultural-historical methodology. The research methodology developed is based on revealing the dominant attitudes towards the awareness of symbolic reality, as well as the prevailing ways of interpreting and assessing agentive reality in subjects. The study was carried out using two methods. The first experimental method reveals the stability of the awareness of symbol's subjective content to the subjects, the second – the degree of its expression and differentiation. The first technique involves identifying the dominant attitudes towards the awareness of symbolic reality (Polyakov, 2014). Following Asmolov (1979), three types of attitudes can be distinguished: situational, objective and social (personal). These types differ in the degree of stability and out-of-context. In the experiment, the situational attitude was set by an incentive material of symbolic sense. As a stimulus material, reproductions of paintings by various authors, 'Hannah's Pitcher' by Timothy Tyler and 'The Girl with a Violin' by Thomas Baker, were used. They depict girls who formally have a lot in common: they are about the same age, both are sitting and holding an object (one is a pitcher and the other is a violin). The paintings of different authors were taken deliberately to exclude the possibility of the identity of their symbolic sense.

The intentional attitude was set by changing the instruction. In the first case, it assumed the actualization of the object relation to the symbol in connection with the search for generalizations and similarities between the paintings and sounded as follows: "Look at these pictures and find in them as much as possible in common, thinking out loud. Try to find the main similarity between them". In the second case, the instruction actualized the agentive relation to the symbol due to the search for differences, the unique specificity of each of the characters in the paintings: "Look at these pictures and find among them as many differences as possible, thinking out loud. Try to find the main difference between them".

The predominance of the personal, most stable attitude was revealed by determining the dependence/independence of the subjects' responses on the content of the stimulus material and the change in the instructions. In other words, with a stable objective attitude type in all the answers of the subject, the utterances with objective, formal meaning predominated, while with a stable agentive attitude type then predominated the utterances with agentive, symbolic sense. This experiment also used the method of reasoning aloud, proposed by Dunker (1981) for the actualization of the content of consciousness. The key criterion for differentiating the objective and agentive relationships was those attributes or properties that the subject discovered when comparing the stimuli. In the first case, these were formal external features or properties of compared objects. In the second, the symbolic sense of the compared stimuluses and agent's manifestations of the characters. When analyzing the data (Table 1), the type of subject attitude and the corresponding score were set out as follows:

0 points – the object attitude – there was no agent's content of the statement;

1 point – situational attitude:

a. agent's subjective characteristics were distinguished when searching for similarities between pictures, and when searching for differences – no;

b. when searching for similarities were specified the objective characteristics, and in finding the differences in random pictures comparison – agent's subjective;

c. agent's subjective characteristics were also referred to when looking for similarities, and when looking for differences in the random comparison of pictures;

2 points – intentional attitude – when searching for similarities were specified the objective characteristics, and in finding the differences, by specifying the main difference – agent's subjective;

3 points – personal attitude – agent's subjective characteristics were also specified when searching for similarities (random comparison or highlighting of the main one), and when searching for differences by specifying the main difference between the pictures.

Here are examples of answers of participants with objective and agent's subjective content.

Answers with objective content, reflecting only formal external features, properties of compared objects, were: "One girl holds a violin, and the other a pitcher, one girl has a hat, but the other does not, one has long hair, the other has short, and the dresses are different, too"; "Well, there are two girls here, their faces are the same in form"; "Two girls, they sit still, their arms are bent, they hold something in their hands, both in dresses"; "One has a hat, but the other does not. This (points to the painting 'Hannah's Pitcher') holds a vessel, and this one a musical instrument (points to the picture 'Girl with a violin). This girl's clothes are dark, but those of the other are light".

Answers of the agent's subjective content revealed the inner qualities of the characters: "the main similarity: two pensive faces, and the second, and this is not so important, but both are girls"; "The pensiveness is different. This one remembers that something happened, it made her sad. And the other girl is happy. Pensiveness causes the difference. There are two reflections here, but if you see from other points, then one girl is sad and the other is happy"; "This one (shows the painting 'Hannah's Pitcher') looks serious, and this one (shows the picture 'Girl with a violin') – dreamy, smiling at something. The main difference is their mood"; "Here are girls of the same age who are thinking about something".

Table 1. Distribution of scores in accordance with the identification of the agent's subjective characteristics of experimental stimuli

Type of attitude	Objective	Situational	Intentional	Personal
Score	0	1	2	3

The second technique is aimed at the detecting the prevailing methods of interpretation and evaluation of the agent's subjective reality. It allows us to reveal the degree of expression and differentiation of the subjective attitude to the symbolic reality of the agent. Technically, the basis of the task was the method of semantic estimation modified by Artemieva (1999). In accordance with the concept of subjective semantics by Artemieva, it is assumed that the semantic assessments are a trace of the experience of emotional states accompanying the action. Revealing the behavior of subjective interpretations of scales makes it possible to understand the semantic context in which non-semantic objects are included by a person. The type of preferential choice of such a reality is an essential characteristic of the agent, revealing the individual structures of subjective experience by the way and depth of the reality mapping. To determine the

type of assessment of agentive reality, we used the semantic differential method in the modification by Artemieva (1999), consisting of 16 scales. The choice of this modification of the method was based on the fact that it contains scales, thanks to which it is possible to isolate both the objective and agentive symbolic content of the evaluated stimulus. In addition, a small number of scales makes the procedure available to children with learning disabilities.

According to the method, participants were asked to evaluate their friend in accordance with the differential scales. The participants were asked to supplement their answer with free-form descriptions in which they explained their choice. This was done in order to understand what kind of sense the participants put on the chosen property.

The instruction sounded as follows: "Now I will tell you the opposite characteristics. Please rate your best friend. Is he kind or unkind? Why?" Interpretation of the data obtained was carried out in accordance with the stated goal of the study – to reveal the type of attitude prevailing of the participant to the agent's subjective reality. In its extreme expressions, the objective attitude type excluded by the participant the awareness of the agent's characteristics of the person (friend), the agentive type, on the contrary, assumed their isolation. However, the real answers of the participants turned out to be more diverse. Based on their analysis, we identified 8 types of answers.   The participant received a corresponding score for each of the 16 scales of the differential. Generalized types of answers are reflected in Table 2.

Table 2. Distribution of scores and characteristics based on the analysis of participants' answers on the semantic differential

2 points	1 point	0 point
– agent's subjective attitude; – mixed attitude	– agentive-egocentric attitude; – agent's activity attitude;	– objective attitude; – formal characteristics of the activity; – tautology, substitution of concepts; – repetition, specification; – uncertain answers

The agent's subjective attitude was understood as the awareness of the agent's subjective characteristics of a friend, highlighted by the participant. For example: "Soft, because he is sentimental." "Bold, because if someone else gets into trouble, he can help break the deadlock." "Firm, because he is responsible." The mixed attitude was noted in the case when the participant singled out agentive and objective characteristics simultaneously. For example: "Light, because he is small, growth is low, and easy in behavior". Here, the participant initially explains the meaning from a formal point of view, the objective, and then proceeds to agentive characteristics - reports the characterization of the behavior of the described person.

As an agentive-egocentric attitude, we determined such a position of the participant when he singled out his attitude towards a friend, described his state, how he communicates with him, without distinguishing the agent's own characteristics. For example: "Pleasant, otherwise he would not be my best friend," "Easy, it's easy to communicate with, I tell him everything." It clearly shows the egocentric position of the respondent, the fixation on one's own experiences, which excludes the vision of the Other.

The agent's activity attitude was understood as the answers in which the participants described certain actions performed by the testing subjects and their characteristics. For example: "Active, because he loves sports and games, moves a lot," "Quick, does not drag out anything, does everything at once."

In the objective attitude, the participants distinguish only the objective characteristics of the testing subject, not focusing on the search for symbolic sense. For example: "Well-fed, because he eats a lot of pancakes with milk," "Young, well, he's 15 years old," "Dirty, he does not change clothes," "Heavy, because he is fat."

Zero points were awarded for answers, in which there was a tautology ("Slow, because he is slowly"), repetitions ("Clean, because he is clean"), substitution of concepts ("Active, because he is funny"), the specification of any properties of the person ("Pleasant, because he looks nice"), proposed in the methodology, highlighting the formal external characteristics of the activity ("fast, because he runs fast"), as well as uncertain answers (when the participants could not single out one property out of two or answered "I do not know").

The maximum score that the participants could score when performing this task was 32 points.

Statistical processing methods

Data from the empirical study were processed using the SPSS Statistica 21 program. The processing of the data was carried out using the nonparametric Mann-Whitney test and the rank correlation coefficient of the ρ-Spearman. Frequency analysis was also used.

Results

The adequacy of the methods used, in addition to the logic for constructing the experimental tasks, is confirmed indirectly by a pronounced correlation between the obtained data for both methods (n=80, ρSpearman 0.561, a<0.001).This correlation, on the one hand, indicates the relationship between the degree of expression and differentiation of the agentive attitude to the symbolic reality of the participant, the prevailing methods of assessing the agent's subjective reality, revealed using the semantic differential method, and the dominant attitudes towards the awareness of symbolic reality that reveal the degree of its stability and determined using the experimental task. On the other hand, the correlation found is not so strong as to claim that both methods measure the same psychological reality. This means that the methods used reveal relatively autonomous characteristics of the agent's consciousness.

Descriptive statistics of test subject's answers according to the two experimental methods are reflected in Table 3 and 4.

Table 3. Descriptive statistics: technic 1 (comparison of paintings)

Age	Group / Average values							
	Control (N=40)				Experimental (N=40)			
	M	St. dev.	Min.	Max.	M	St. dev.	Min.	Max.
younger schoolchildren	1.2	1/2	0	3	0.35	0.49	0	1
adolescents	1.9	1.25	0	3	0.7	1.03	0	3

Table 4. Descriptive statistics: technic 2 (the semantic differential method)

Age	Group / Average values							
	Control (N=40)				Experimental (N=40)			
	M	St. dev.	Min.	Max.	M	St. dev.	Min.	Max.
younger schoolchildren	9.1	5.78	3	25	5.05	3.27	1	13
adolescents	13.15	4.85	5	23	3.6	2.66	0	9

As a result of statistical processing of the data obtained using the two methods using the Mann- Whitney U test, the following features of the studied groups were found, depending on the age and type of development:

- Significant differences were determined between younger schoolchildren and adolescents from the control group by the semantic differential method (U=106,5; p = 0.01). According to the experimental method (comparison of paintings), the differences are insignificant (U=138; p = 0.096). Frequency analysis shows the predominance of the agentive relation to symbolic reality, both in terms of readiness to the isolation of agent's manifestations of man (40% in junior schoolchildren and 70% in adolescents; the stable objective attitude is noted in younger schoolchildren in 40% of cases and in adolescents it is noted in 25% of cases) and in terms of the depth of their comprehension (the agentive relation to symbolic reality is noted 38% in junior schoolchildren and 60% in adolescents). This means that in the transition from junior age to adolescence in normal development, the degree of severity and differentiation of the agentive attitude to symbolic reality increases, while its stability does not change much. Adolescents compared with younger students are capable of more diverse and 'see' the agent's subjective reality of the external manifestations of the human more deeply. However, personal predisposition to the realization of the world as symbolic reality does not undergo significant dynamics;

- Between younger schoolchildren and adolescents with learning disabilities there were no significant differences in the two methods, indicating that no significant changes with respect to the symbolic reality, both in terms of readiness to the isolation of agent's manifestations of man, and in terms of the depth of their comprehension. Frequency analysis shows the predominance of the objective relation to symbolic reality (65% in junior schoolchildren and 60% in adolescents; despite the fact that the agentive sense is not stable in younger schoolchildren, and in adolescents it is noted only in 10% of cases), i.e., the propensity to reduce a person's reality only to external formal characteristics;

- Significant differences were found between younger schoolchildren with normal development and younger schoolchildren with learning disabilities both in the semantic differential method (U=103,5; p = 0.008) and in the experimental procedure (U=122; p = 0.035). This indicates that in younger pupils with learning disabilities in comparison with normally developing ones, on the one hand, the objective attitude prevails to the agent's subjective reality, and on the other hand, the realization of agentive reality even if it occurs, is of an accidental, less stable character;

- Similarly, significant differences were found between adolescents with normal development and adolescents with learning disabilities using both methods – the semantic differential (U=15,5; p <0.001) and the experimental method (U=100; p = 0.006), which indicates both greater depth and differentiation and greater stability of awareness of the agent's subjective reality, detected by symbols in the adolescents of the testing group.

Discussion

The following should be noted in analyzing the results of the empirical study of the use of symbols as a means of understanding agent's subjective reality in schoolchildren with learning disabilities. The problem of the development of higher mental functions in special (abnormal child) psychology has been considered exclusively in a pragmatic context. They were studied exclusively as functions providing interaction with objective reality. The consequences of this were, firstly, the study of exclusively sign, and not symbolic, mediation of mental functions, and, secondly, the understanding of sign-symbolic forms as tools for regulating behavior and mental activity. Sign-symbolic forms in the cultural-historical psychology were not considered as tools of interpersonal interaction and relations. Meanwhile, understanding the symbol as a cultural form of

interpersonal interaction, as a means of expression and awareness of agent's subjective reality, allows the representation of the connection violations of social interaction with deviations in the development of higher psychological functions in children with developmental disorders at the empirical level of research. Previously, this connection was substantiated only theoretically (Vygotsky, 1984; Smirnova, 1994). In addition, this approach to understanding symbols connects the problem of the development of social understanding with the problem of the development of symbolic mediation in children (Bruner, 1986; Carpendale & Lewis, 2004; Dimitrova, 2013; Fernyhough et al., 2009; Polyakov, 2014, 2016; Tomasello et al., 2005). Analysis of understanding of symbols in the context of the problem of interpersonal interaction and relationships reveals a way to overcome violations of social adaptation in children and adolescents with learning disabilities.

Conclusion

The differences revealed within the age groups between children with normal development and learning disabilities indicate that the symbolic manifestations of the person the children of the studied group tend to be aware of as a self-sufficient objective reality and do not see behind them an animated agent, a living other 'I' with whom one can cooperate, join a relationship that can have their own desires, intentions, attitudes, inclinations, aspirations. All this makes it difficult to build interpersonal relationships with other people and restricts opportunities for cooperation with them. By virtue of this circumstance, it seems extremely important for the full socialization and mental development of this category of children to form in them the ability to comprehend the agent's subjective reality expressed through symbolic forms.

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