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CREATIVITY OF PRESCHOOL CHILDREN WITH VARIED
ABILITY TO DETECT CONTRADICTIONS

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Abstract

How do creativity indicators differ among preschool children with different levels of development of the ability to detect contradictions? Is there a correlation between creativity indicators and ability to detect contradictions among preschool children? The researcher assumes that the ability to detect contradictions is the starting point that triggers thinking. The detection of contradictions also includes the creative component, which manifests itself in a diverse range of possible solutions. The purpose of this research was to study the creativity of preschool children with different levels of development of the ability to detect contradictions and to study their correlations. Torrance (1980) and Klochko and Galazhinskiy (2000)'s methods were used for determining the ability to detect contradictions. The research was conducted with use of diagnostic techniques to study logical thinking. Three groups of children in terms of the level of development of the ability to detect contradictions were identified at high, medium and low levels. Preschoolers with the highest level of development of the ability to detect contradictions are ahead of other children in terms of creativity and logical thinking. There are significant differences according to Kruskal-Wallis criterion in terms of indicators - logical thinking, creativity - originality, flexibility, degree of development. The dynamics of the development of ability to detect contradictions among preschool children has been established as one of the components of giftedness as it indicates the moment of initiation of thinking, which underlies the cognitive component of giftedness, i.e., aspirations to solve problems and transform the world by developing oneself. The creativity of the child and characteristics of logical thinking and the ability to detect contradictions develop in parallel, indicate the dominance of creative, proactive components of the preschooler's thinking.

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Keywords: Creativity, ability to detect contradictions, thinking, giftedness, pre-schoolers.



1. Introduction

The ability of a person to detect contradictions, or sensitivity to problems, has been studied quite intensively in foreign and Russian national psychology (Bogoyavlensky, 2002; Dunker, 2008; Guilford, 1967; Klochko & Galazhinskiy, 2000; Krasnoryadtseva, 2012; Peterson & Marrie, 2012; Piaget, 1999; Torrance, 1980; Veraksa, 2006; Woolley & Ghossainy, 2013).

Piaget (1999) was one of the first to study the issue of detecting contradictions by preschool children. He singled out contradictions due to forgetfulness and contradictions due to concentration (surdetermination). Studying the development of dialectical thinking of preschool children, Veraksa (2006) identifies contradiction as one of the key structural components. The researcher suggested that contradictory problematic situations act as conditions that stimulate the reflexive thinking activity of a preschooler. These contradictory problematic situations are divided into reproductive, currently important and anticipatory. According to Poddyakov (1985), the preschooler's thinking includes two processes: a movement from ignorance to knowledge, from obscure, indistinct to clear; and the opposite process - from clear, distinct, to incomprehensible, indefinite. Thus, the thinking of preschoolers, on the one hand, is based on certain knowledge reflecting the facts that are logically established and assimilated by the child, reflecting objects in various aspects, but, on the other hand, new knowledge is associated with the child's desire to create new, and it includes contradictory, implicit moments.

The ability to detect contradictions by primary school age children was considered in the studies of Glass, Holyoak, and Kossan (1977). As experimental material, the authors used verbal statements that included semantic contradictions. It was assumed that the incompatibility of the object and predicate and the semantic contradictions were based on the inclusion of false statements between the subject and predicate (For example, "All fruits are vegetables"). The authors singled out three kinds of sentences with contradictions: with high and low frequency of production, as well as anomalous sentences, which are characterized by the presence of an abstract connection between the subject and predicate. The results showed that children could distinguish anomalous sentences best of all.

Woolley and Ghossainy (2013) consider the ability of children to distinguish between fantasy and reality in their understanding of the world around them.

Doebel, Rowell, and Koenig (2016) in their research tried to study the role of social communication in presenting inconsistencies to four and five years old children. The study used two models: the first model - inconsistencies were presented in conditions of communicating with people; the second model - inconsistencies were presented in conditions of reading books. Studies have shown that children show the best results of detecting inconsistencies in conditions of social communication. The next important conclusion of the author is the assertion that children under the age of 6 can detect inconsistencies. The authors suggest that the ability to detect inconsistencies is based on performing functions and working memory, helping children memorize information and navigate in it, as well as verbal knowledge. The social context is also a factor that influences a better understanding of inconsistencies.

To some extent, the results obtained are consistent with the researcher's previous studies (Belousova, Kozhukhar, & Ryumshina (2015); Belousova & Muratova (2014); Belousova and Pavlova

(2013)) that communication and collaborative activity of children with adults are factors that influence the child's development, his speech and thinking.

2. Problem Statement

In the works of Guilford (1967) and Torrance (1980), factors that characterize creativity were identified: flexibility, fluency, originality and elaboration. Many researchers such as Veraksa (2006) and Piaget (1999) also emphasize the relationship of creativity with the ability to detect contradictions.

3. Research Questions

How do creativity indicators differ among preschool children with different levels of development of the ability to detect contradictions? Is there a correlation between creativity rates and the ability to detect contradictions in pre-school children?

4. Purpose of the Study

It is assumed that the ability to detect contradictions is the starting point that triggers thinking. The detection of contradictions also includes the creative component, which is manifested in a diverse range of possible solutions. The purpose of this research was to study the creativity of preschool children with different levels of development of the ability to detect contradictions and to study their correlation.

5. Research Methods

In order to study the correlations between the ability to detect contradictions and the development of logical and creative thinking, a research was conducted on preschool children. The sample consisted of 60 preschool children from the kindergarten in the village of Zimovniki, Rostov region in Russia, divided into two groups: age 4-5 (30 children) and age 5-6 (30 children). The groups were homogeneous by age and gender (girls, boys).

Torrance's method to determine the characteristics of creative thinking was used which involved determining between "Which one is odd?" and "Classification by a given principle" and to study logical thinking, Klochko and Galazhinskiy's (2000) method was used to determine the ability to detect contradictions. Their method is a set of cards with pictures containing contradictions. The child was offered the following instruction: "Look carefully at the pictures. Do you see anything strange? Do you see any contradictory places? What are these places?" The search for alternative answers was stimulated. The results of the study were recorded in the protocol and scoring was carried out as follows: 1 point - if the child did not find a contradiction; 2 points - found, but with difficulty, with the help of leading questions of the researcher; 3 points - found the contradiction immediately upon presentation of the card, explained its contents. If the sum of points is from 25 to 30, this indicates a high level of awareness of the contradictions after viewing the pictures. If the sum of points is from 20 to 25, this indicates a medium level of awareness of contradictions, beyond the full extent. If the score is less than 20, this indicates a low level of awareness of the contradictions.

For quantitative data processing, Kruskal-Wallis H test and Pearson's linear correlation were used.

6. Findings

As a result of the study, three groups of children were identified according to the level of development of the ability to detect contradictions. The first group - children with a high level of development of the ability to detect contradictions (X mean = 28.338) - 21 children, accounted for 35% of the total number of children. At the same time, 14 of them (67%) are of senior preschool age and 7 children (33%) - of the middle preschool age.

The second group - children with medium level of development of the ability to detect contradictions (X mean = 22.969) - 32 children, accounted for 53% (32 children) of the total number of children surveyed. The number of children of senior and middle preschool age in this group is the same and equal to 16.

The third group - children with a low level of development of the ability to detect contradictions (X mean = 19.000) - 7 children - 12% of the total number of subjects. In this case, all children are of middle preschool age.

The results of the diagnostics of logical and creative thinking, ability to detect contradictions, and the study of the significance of the differences according to Kruskal-Wallis H test are presented in Table 01.

Table 01. Indicators of the mean values of the logical and creative thinking of children with different levels of development of the ability to detect contradictions

Group	Logical thinking	Ability to detect contradictions	Creative thinking			
			Originality	Fluency	Flexibility	Elaboration
Group 1	8.429	28.338	9.190	7.857	7.809	9.395
Group 2	6.813	22.969	8.656	7.594	7.719	9.075
Group 3	4.428	19.000	6.143	6.143	5.429	7.143
Kruskal-Wallis	25.177	46.950	11.200	5.332	8.689	9.270
Asymp. Sig. (2-tailed)	0.000	0.000	0.004	0.070	0.013	0.026

Group 1 - preschool children with a high level of development of the ability to detect contradictions - is characterized by sensitivity to the contradictions of the intellectual problem, the ability to easily see the hidden meaning of the situation and facts of life. The majority of children in this group have a high level of development of logical thinking (19 children - 90%). Some children have a medium level of development of logical thinking (2 children - 10%). During the study of creative thinking, it was found that the originality indicator for children of this group is above the medium and corresponds to a high level in accordance with Torrance's standards. With the indicators of originality above the medium, children are characterized by non-standard thinking, deviation from what is generally accepted. The indicator of the elaboration among most children is high and above the medium level. Indicators of fluency and flexibility only for some children of this group correspond to a high level, most children have medium level for these indicators.

Group 2 - children with medium level of development of the ability to detect contradictions have medium level of development of logical thinking (17 children - 53%). Children with a high level of development of logical thinking are well represented in this group (13 children - 41%). Children with a low level of development of logical thinking constitute a small percentage (2 children - 6%) in this group. In accordance with Torrance's standards, the originality indicator more often corresponds to the medium level for the children from this group. Children are usually characterized by intellectual activity and nonconformity with the mean values of this indicator. Indicators of fluency and flexibility are above the medium level only for some children, most children have medium level for these indicators. The medium level of fluency shows the determination of children, the average motivation of activity. Children have medium level of awareness and intellectual potential with the mean indicator of flexibility. The indicator of the elaboration is high and above the medium level for most children. Children are characterized as being enthusiastic and talented with high values of this indicator.

Group 3 - children with a low level of development of the ability to detect contradictions. In this group, 5 children (71%) have medium level of development of logical thinking and 2 children (29%) - low level. A low, often complete lack of sensitivity to contradictions is characteristic for them. The imaginative representations of the children from this group about the surrounding world and the logical connections and relationships existing between certain objects of this world are elementary. The study of creative thinking showed that the indicators of originality, fluency and elaboration of children from this group correspond to the medium level in accordance with Torrance's standards. The indicator of flexibility for only a small part of children in this group corresponds to the medium level, most children have lower than medium level for this indicator.

The study revealed that, according to the Kruskal-Wallis criterion, there are significant differences in the ability to detect contradictions between the identified groups of children ($X = 46.950$ with $p = 0.000$). According to the results of the study, children with the highest level of development of the ability to detect contradictions are ahead of other groups in terms of the development of logical and creative thinking: there are significant differences according to Kruskal-Wallis criterion in terms of indicators - logical thinking ($X = 25.177$ with $p = 0.000$); in terms of creative thinking: originality ($X = 11.200$ for $p = 0.004$), flexibility ($X = 8.689$ for $p = 0.013$), elaboration ($X = 9.270$ for $p = 0.026$).

Pearson linear correlation procedure was used to determine the correlation between indicators of logical thinking, indicators of creative thinking and the ability to detect contradictions among preschool children. Correlation analysis showed that there are correlation relationships between indicators of logical thinking and indicators of creative thinking: originality ($r = 0.600$; $p = 0.01$); fluency ($r = 0.446$, $p = 0.01$); flexibility ($r = 0.402$, $p = 0.01$); elaboration $r = 0.435$; $p = 0.01$).

The data obtained concur with Torrance (1980) and Guilford (1967) that showed that the higher the level of intelligence, the greater the probability that the child will have indicators on creativity tests, although one may have low indicators of creativity with high intelligence. At the same time, with low intelligence, there is no high divergent productivity.

The presence of positive correlation links between the logical thinking of preschool children and the indicators of creative thinking confirms the provisions of Poddyakov (1985) that the basis of the creative activity of preschoolers is a special structure of knowledge and mental actions that ensures the

multifaceted interaction of newly formed knowledge with the knowledge available in the child's past experience. This leads to significant restructuring of both newly formed and already existing in the past experience of child's knowledge.

The correlation between the indicators of logical thinking, the indicators of creative thinking and the ability to detect contradictions of preschool children was identified: the ability to detect contradictions has direct links to the indicator of logical thinking ($r = 0.692$ at $p = 0.01$); with indicators of creative thinking: originality ($r = 0.519$ at $p = 0.01$); an indicator of fluency ($r = 0.516$ at $p = 0.05$); index of flexibility ($r = 0.576$ at $p = 0.01$); the indicator of elaboration ($r = 0.346$ at $p = 0.01$). These indicators show a link between the ability to detect contradictions of preschool children and logical thinking, which correlates with studies of preschool children's thinking by Poddyakov (1985). Indeed, the child's acquisition of a system of knowledge reflecting an object in various, often contradictory aspects, provides flexibility and liveliness of children's thinking, brings to life complex thought processes (analysis, generalization, comparison), the possibility of obtaining new knowledge and methods of mental activity.

Veraksa (2006) also noted that contradictory situations with hidden essential characteristics have the greatest prospect in the development of creative and logical thinking of preschool children. Their transformation is accompanied by self-motion of preschoolers' thinking, cognitive activity acquires a pronounced reflective character.

There are also positive correlation links between the ability to detect the contradictions among preschool children and the indicators of creative thinking: originality, fluency, flexibility and elaboration. Positive correlations between the detection of contradictions by children and the creative position were obtained in a study by Kozyreva (2007). She concluded that the resolution of a contradictory situation is the main psychological condition for the formation of a preschooler's creative position.

The study also showed a direct relationship between age and logical thinking of preschoolers ($r = 0.471$, $p = 0.01$), the ability to detect contradictions ($r = 0.682$, $p = 0.01$), as well as indicators of creative thinking: originality ($r = 0.669$, $p = 0.01$); fluency ($r = 0.859$, $p = 0.01$); flexibility ($r = 0.899$, $p = 0.01$); elaboration ($r = 0.571$, $p = 0.01$).

The obtained interrelations reflect the dependence of the indicators of creative and logical thinking, as well as the ability to detect contradictions on age. When a preschool child moves from one age stage to another, the level of development of the presented characteristics increases, and their qualitative improvement takes place.

7. Conclusion

The conducted empirical research allows for the following conclusions to be drawn:

i) In the middle and senior preschool age, there are differences in the development of logical, creative thinking, as well as in the ability to detect contradictions. The level of development of logical and creative thinking, as well as the ability to detect contradictions of 5 years old children is higher than 4 years old children.

ii) There are differences in the development of thinking of preschool children with different levels of ability to detect contradictions: in terms of indicators of logical thinking and creative thinking, they significantly differ statistically, more in terms of originality and degree of development. Preschoolers

with the highest level of development of the ability to detect contradictions are ahead of other children in terms of indicators of creativity and logical thinking: there are significant differences according to Kruskal-Wallis criterion in terms of indicators - logical thinking, creativity - originality, flexibility, elaboration.

iii) The thinking of the medium (4) and senior (5) preschoolers is related to the characteristics of development of the ability to detect contradictions. There are significant correlation links between the ability to detect contradictions of middle and senior preschoolers and indicators of logical and creative thinking. The ability to detect contradictions has direct links with the indicator of logical thinking, with indicators of creativity - originality, fluency, flexibility, and elaboration.

iv) The dynamics of development of the ability to detect contradictions of preschool children is shown as one of the components of giftedness. The ability to detect contradictions is considered as the moment of initiation of thinking, which underlies the cognitive component of giftedness, i.e. aspirations to solve problems and transform the world by developing oneself. Creativity of the child and characteristics of logical thinking, the ability to detect contradictions develop in parallel, which indicates the dominance of creative, proactive components of the preschooler's thinking.

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