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VARIABLE FEATURES OF DEVELOPMENT OF PSYCHIC FUNCTIONS IN PRESCHOOL CHILDREN WITH DISABILITIES

Abstract. The paper presents the results of a comparative study of mental processes that underlie successful mastery of graphic activity in senior preschool children with disorders of psychological development, visual impairments, and musculoskeletal system disorders and in their typically developing peers; it describes the general and specific features of graphic activity in these children. The level of development of mental processes serves as a criterion of a differentiated approach to the content and organization of rehabilitation process.

Key words: preschool children with various disabilities; psychic processes; graphic activity; variable features of graphic activity.

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Drawing on the works of T. S. Komarova, A. A. Venger, M. Yu. Rau, I. A. Groshenkov, R. K. Ul'yanov, S. E. Ignat'ev, E. A. Ekzhanova, G. V. Kuznetsova, A. N. Orlova [5; 1; 11; 2; 15; 4; 3; 6; 10] who studied various aspects of graphic activity of preschool children with typical and impaired development, we found it possible to look at graphic activity from the psychological point of view – as a complex function the level of development of which is defined by systemic interaction of different psychic processes: visual and spatial perception, visual-motor coordination, cognitive operations of analysis and synthesis, which finds its reflection in the level of formation of graphic skills and object drawing.

The Federal State Educational Standard of Preschool Education focuses attention on the formation of prerequisites to learning activity; that is why graphic activity may be considered to be the leading one for the successful development of learning skills.

We carried out a comparative study of graphic activity of senior preschool children with various developmental disorders (disorders of psychological development, visual impairments and musculoskeletal system disorders) and their typically developing peers with the purpose of revealing general and specific features of this kind of activity in non-typical development [9; 8].

In order to achieve this aim we worked out a diagnostic program including 12 tasks united into two blocs

which allowed us to detect both the level of mastery of the instrument (graphic skills) and the level of development of psychic functions regulating the development of these skills.

Each task allows evaluating several psychic functions and as long as results of different tasks with similar functions coincided in some points it is possible to argue that these psychic processes influence both the process of development of graphic activity and acquisition of learning skills.

Diagnostic tasks were selected in accordance with their possibilities to reveal the level of development of graphic skills, general intellectual skills and specificity of psychic functions, as well as single out those functions that reflect disorders of psychological development.

In the course of our study we worked out the criteria for the qualitative assessment of the level of formation of graphic skills, prerequisites to graphic activity, and created the scales of their quantitative evaluation. Elaboration of the scale and description of the criteria are based on the principles of psycho-pedagogical approach.

Bloc 1 – skills of instrument mastery ensuring high quality lines. The bloc includes the following tasks: drawing straight lines in various directions (from top to bottom, from left to right, etc.), drawing wavy and broken lines, drawing graphic sequences (patterns), Wechsler's geometric shapes, "Draw the whole".

Bloc 2 – skills reflecting spatial relations of objects and their parts. The following techniques were chosen

to study this level: putting together pictures cut into 3 (vertically-horizontally) or 4 (diagonally) parts; "Draw the whole"; visual gnosis (superimposing contours of 3 objects); Wechsler's geometric shapes; differentiating spatial notions (on the right – on the left); task on the whole perception of objects (analysis-synthesis); finishing picture (turn 6 circles into objects); drawing a human being.

In order to evaluate task completion we worked out a 4 point scale (from 0 to 3) each point of which reflects both the level of formation of psychic functions necessary for successful; graphic activity and the level of general intellectual skills (understanding the task situation and acceptance of help).

To make the analysis of the level of development of psychic functions revealed in the process of diagnostics more evident and reliable all tasks may be grouped into five semantic blocs reflecting both the level of development of psychic functions and the level of development of graphic skills (the technical aspect of graphic activity; see Table 1).

Scientific-practical findings of I. Yu. Levchenko, N. A. Kiselev; N. G. Salmina; A. V. Semenovich; E. A. Strebeleva [7; 12; 13; 14] served as sources of diagnostic tools.

102 preschool children ages 6-7 took part in the experiment; 29 of them had disorders of psychological development, 27 children had visual impairments, 21 children had cerebral palsy and 25 children had typical development.

Table 1

Correlation between psychic functions and the tasks revealing the level of their development

<i>Bloc</i>	<i>Task</i>
Visual perception	“Superimposing contours of 3 figures”
Whole nature of perception	“Analysis-synthesis”, “Cut pictures”, “Finish the picture”, “Draw a human being”
Visual-motor coordination	“Lines”, “Lines according to the model”, “Pattern”
Spatial perception	“Left-right”, “Differentiation of lines”, Wechsler’s geometric shapes, “Pattern”
Object drawing	“Finish the picture”, “Draw a human being”, “Draw the whole”

Based on the analysis of the data obtained we singled out characteristic features of difficulties in children with different disorders.

By the level of development of prerequisites to graphic activity children differ in the following way.

- The tasks aimed at the study of visual perception, spatial relations and graphic skills (“Draw the whole”) turned out to be the most difficult ones among the tasks on revealing prerequisites to graphic activity of children with visual impairments. The children of this group also demonstrated the lowest results among all other groups in the tasks “Visual gnosis” and “Picture of a human being”. While regarding pictures with 3 superimposed objects (“Visual gnosis”) it was difficult for them to concentrate on one picture; they skipped about from one picture to another trying to see the whole space of the sheet at once, losing the concrete image of each object instead. Thus, children with visual impairments often “misread” the concrete images. In contrast to children

with visual impairments, children with cerebral palsy and with disorders of psychological development showed approximately the same results in recognizing 3 superimposed objects. But children with disorders of psychological development, as different from children with cerebral palsy often made the task easier by tracing the contours of objects with their fingers.

- Children with cerebral palsy found it especially difficult to complete the tasks reflecting the level of development of spatial relations and the whole nature of perception (“Cut pictures” and “Draw the whole”) and the level of visual perception and visual-motor coordination (“Pattern” and “Lines according to the model”). The indicators for these tasks were the lowest among all other groups of children (average values – 0.8; 0.7; 0.6 on the scale from 0 to 3 points).

- Both children with visual impairments and children with cerebral palsy showed lower results in the task aimed at the study of cognitive operations of analysis and synthesis (“Analysis-synthesis”) than children

with disorders of intellectual development. Children with visual impairments and children with cerebral palsy could hardly find an object built of the suggested geometric shapes. Such difficulties are connected with the fact that, on the one hand, it was necessary to read the instruction several times as many children did not understand the task right away. On the other hand, such children needed clarifying and directing help; they needed to correlate each geometric shape with a similar shape in the object; it was only after such detailed analysis that the children recognized the object. Children with visual impairments saw the shapes separately (disconnected); it was difficult for them to “assemble” them in one whole object.

- The tasks aimed at revealing the level of development of spatial relations and graphic skills (“Draw the whole”) and the level of development of object drawing and graphic skills (“Picture of a human being”) turned out to be the most difficult ones for children with disorders of psychological development.

If we compare the indicators in all tasks in the groups under observation with different kinds of disorders we will find that the indicators of development of spatial relations and graphic skills (“Draw the whole”) and the level of development of object drawing and graphic skills (“Picture of a human being”).

We have also analyzed deficiencies in the development of graphic skills and the level of formation of graphic activity of the experiment

participants.

- The indicators of development of graphic activity of children with visual impairments and cerebral palsy were significantly lower than the indicators of children with disorders of psychological development in the tasks which demanded both spatial perception (catching and holding the whole image) and graphic skills for the reproduction of visual image. Manipulative capabilities of the hands of children with cerebral palsy serve as an essential limitation; for children with visual impairments it was more difficult to catch and hold the whole visual image.

- The lowest results in the development of object drawing (the task “Picture of a human being”) were shown by children with visual impairments. They often got images of head-foots with distorted proportions of the parts of the body and the size of the image itself.

- The lowest results in the task “Finish the picture” reflecting the level of development of productive imagination were demonstrated by children with visual impairments and cerebral palsy. It was difficult for the majority of such children to construct images (turn circles into objects); they could not understand the instruction after the first presentation and the drawn objects looked much the same. Many children with cerebral palsy could not perform the task at all.

- In the group of exercises aimed at revealing the level of development of graphic skills, children with disorders of psychological development showed the lowest results in the tasks

“Finish the picture” and “Picture of a human being”.

•Children with visual impairments had more problems with object drawing (“Picture of a human being”) and reproduction of a visual image by means of graphic skills.

Children with cerebral palsy demonstrated the lowest results of development of graphic skills, object drawing and productive imagination.

It turned out very difficult for them to hold the visual image for a certain time (“Draw the whole” and Wechsler’s geometric shapes) and represent it adequately enough. It was also difficult for children with cerebral palsy to precisely indicate special relations between objects and their parts and place them correctly of a sheet of paper in reference to each other.

Table 2

Results of diagnostic observation of senior preschool children with disorders of psychological development, visual impairments and motor disorders and their peers from a typical kindergarten

Bloc	Visual impairments	Cerebral palsy	Disorders of psychological development	Typical development
Visual perception	0.75	0.9	1.8	2.0
Whole nature of perception	1.5	1.0	2.0	2.2
Spatial perception	1.7	1.2	2.0	2.0
Visual-motor coordination	1.4	0.8	1.7	1.7
Object drawing	0.7	0.7	1.5	1.6

On the basis of the undertaken qualitative-quantitative analysis of the summative experiment results and the level-based approach, we distinguished three groups of pupils among children with developmental disorders according to the level of formation of prerequisites to graphic activity and the level of development of graphic skills.

Group 1 – children with a *low level* of formation of graphic activity scoring the sum total of points in the range from 0 to 12. This group included 3% of children with disorders of psychological development, 21% of children with visual impairments, 48% of children with cerebral palsy and 4% of normally developing chil-

dren. These children did not show interest in the tasks, in the majority of cases did not understand the instruction at first presentation; they needed additional explanation and organization support. In some cases, the task could not be completed even with visual and manual help. They got quickly tired, and hardly concentrate attention even for a short time; they were bored with their activity at the very start of the exercise. The children of this group demonstrated a low level of self-regulation and needed specially organized help in simpler tasks with their gradual complication.

Analysis of indicators of this group suggests considerable limitation of the manipulative function of

hands which is manifested in incorrect writing posture, poor finger dexterity and impairment of motor coordination. The children of this group demonstrated a dramatically low level of development of graphic skills which was reflected in inability to regulate the pencil pressure, absence of exact connection of lines, and considerable deviation from the contour while hatching the image of an object. The levels of performance of object drawing and development of imagination are rather low. Scrawls or schemes constitute the main type of imaging. The form, structure and proportions of images were often distorted. The picture was randomly shifted from the center of the sheet. The children of this group could hardly recreate the whole image from cuts of picture by randomly trying variants and accidentally putting the parts together; they also made mistakes in reproducing the pattern or a series of vertical or horizontal lines according to the model even with the help of the psychologist. The children recognized only one of the 3 superimposed contours of objects; they seldom recognized two of them, often with mistakes. All this suggests considerable impairments of visual-spatial perception, low level of development of visual gnosis, visual-motor coordination and graphic activity. The obtained results demonstrate the necessity of working out a special rehabilitation program in the framework of development of psychic functions (prerequisites to graphic activity) for this group of children.

Group 2 – children with a me-

dium level of formation of graphic activity scoring the sum total of points in the range from 13 to 24. This group included 62% of children with disorders of psychological development, 75% of children with visual impairments, 41% of children with cerebral palsy and 48% of normally developing children. These children completed tasks under guidance or visual or manual help. They demonstrated quickly petering out working capacity, unstable attention, and low level self-regulation and self-criticism in their own evaluation of their activity. The children of this group demonstrated poorly formed visual gnosis (they made mistakes in recognizing superimposed images and/or needed more time for their recognition) and the whole nature of perception which manifested itself in distortions of the form, structure or proportions of images. The level of development of graphic skills was low which was reflected in inadequate drawing contours of objects, inability to finish the movement at the necessary point, and considerable deviation from the contour while hatching the image of an object. They demonstrated poor finger dexterity and problems with regulating pencil pressure. The level of development of object drawing and imagination was medium. The created images a stereotyped and monotonous.

The children of this group lag behind the developmental norm which speaks for the necessity of working out a special rehabilitation program for them.

Group 3 – children with a high

level of formation of prerequisites to graphic activity scoring the sum total of points in all 12 tasks in the range from 25 to 36. This group included 24% of children with disorders of psychological development, 8% of children with visual impairments, 11% of children with cerebral palsy and 48% of normally developing children. These children independently coped with all tasks, had a high level of volitional attention, working capacity and self-regulation. In the majority of cases we observed high level of understanding and accepting tasks. Sometimes, stimulating help was necessary. Visual perception was well developed, which manifested itself in prompt and exact recognition of superimposed images. The cut pictures were assembled independently and quickly by visual correlation, which indicated a well-formed level of visual-spatial perception. The children of this group properly regulated pencil pressure and movement amplitude, stopped movement at the necessary point and hatched accurately without going beyond the contours of images. The spatial characteristics of objects (form, proportions and volume) were rendered correctly. The picture was placed in the middle of the sheet. These children thought up a great number of images quickly and independently. All this makes it possible to speak of a high level of development of graphic skills and graphic activity. The given group of children does not need rehabilitation.

The distinction of the three groups of experiment participants allows taking into account individual

features and qualitative peculiarities of graphic activity in the process of organization of rehabilitation work.

Thus, the results of our research in accordance with the chosen methods convincingly show that children with developmental disorders do not possess properly formed prerequisites to graphic activity. The tasks in visual-spatial perception, visual-motor coordination and object drawing turned out to be the most difficult ones. The optimal level of development of object drawing and graphic skills was demonstrated by not more than 4% of children; high indicators of the level of development of visual-motor coordination was found in only 4% of children, and of the level of spatial perception – in 17% of children.

Nevertheless, many typically developing children do not demonstrate the optimal (corresponding to developmental norm) indicators, and by a number of criteria even have low developmental indicators. Special attention should be paid to the fact that equally low indicators of the tasks “Draw the whole”, “Picture of a human being” and “Pattern” are displayed both by typically developing children and by children with various disorders. Such low indicators in comparison with other results show that spatial perception, visual gnosis and object drawing are poorly formed in both typically developing children and in children with various disorders, which needs optimization of the rehabilitation program (or additional psychological help) with the purpose of developing these functions.

All these data demand the intro-

duction of rehabilitation activity or optimization of the existing rehabilitation programs in order to form the psychological foundations of graphic activity: *visual gnosis, spatial perception and visual-motor coordination*, as well as development of object drawing and improvement of graphomotor skills.

The results of our research make it possible to refer the children of groups 1 and 2 to the group-at-risk in their level of preparation to successful acquisition of the general school program, which is corroborated by their lagging behind in a number of indicators in comparison to typically developing children; they also show qualitative specificity of development of graphic activity and peculiar features of basic psychic functions lying at the foundation of successful acquisition of this activity.

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