

# Methodology for Testing Cognitive Processes in Children with Motor Alalia At the Age Of 5-6

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**Abstract:** The article examines the assessment of cognitive processes in children aged 5–6 with motor alalia. Diagnostic methods aimed at evaluating attention, memory, thinking, sensory development, and spatial representations are systematized. The specific features of cognitive processes in children with motor alalia and their impact on speech development are analyzed. It is shown that a comprehensive study of cognitive functions plays a significant role in determining the level of mental development and improving the effectiveness of corrective and pedagogical interventions.

**Keywords:** Motor alalia, cognitive processes, attention, memory, thinking, sensory development, spatial representations, diagnostics, preschool age.

**Introduction:** Speech development in preschool children is an integral indicator of general mental development, which is formed in close connection with cognitive processes - attention, memory, thinking, sensory perception and spatial imagination. Modern speech therapy and neuropsychological studies show that these mental functions are involved as the main functional mechanisms in the child's perception of the environment, reception, processing of information and its expression in speech. In conditions of motor alalia, speech development defects are also reflected in various components of the cognitive sphere and are characterized by insufficient formation of attention stability and mobility, verbal and nonverbal memory capacity, logical-operational thinking processes, sensory integration and spatial orientation.

In particular, the period of 5–6 years is of particular importance as a stage of intensive development of cognitive functions, and a comprehensive diagnostic assessment of their condition during this period is scientifically and practically important. From this point of view, there is a need to systematically study cognitive processes in children with motor alalia, in

particular, to substantiate methodological approaches aimed at examining attention, memory, thinking, sensory development and spatial imagination. This approach, along with determining the level of mental development of children, allows for the scientific planning of subsequent correctional and pedagogical influences and provides a logical transition to the system of diagnostic methods used in the subsequent stages of research.

Attention is the ability to direct and concentrate mental activity on a specific object. In children with motor alalia, the characteristics of attention - stability, distribution, mobility - may be impaired (Semenovich A.V., 2018 [8]). This directly negatively affects the processes of perception and formation of speech. The task of checking attention is to assess the stability, distribution and mobility of the child's attention.

Particular attention is paid to checking the stability of attention. In this process, the "Erasing Symbols" method is used, requiring the testee to find and mark the exact symbols from the given symbols for a certain period of time. This method serves to determine the ability to concentrate attention on one object for a long

time. Also, the testee's level of visual attention is studied through the task of finding the same pictures, that is, he needs to identify similar ones among a series of images. In addition, the stability and consistency of attention are tested using the "Labyrinth" method, in which the testee needs to find the right path through a complex system of lines.

In order to determine the distribution of attention, tasks are given based on the simultaneous performance of two activities. For example, the testee is engaged in drawing on one hand, while listening to the given countdown on the other. This demonstrates his ability to distribute attention between several activities. The distribution of attention is also assessed using the "Finding Exceptions" method. In this task, the testee must identify an element from a group of images that is logically redundant or does not correspond to a common sign. In the test of attentional flexibility, the testee's ability to quickly and efficiently switch from one activity to another is studied. In this process, the "Cubes" method is used, in which the testee is required to place cubes in a certain order. This task shows the degree of quick redirection of attention and adaptation to a new task. The "Continuing the Sequence" method is also used to determine attentional flexibility. For example, by continuing the sequence of given colors or symbols, the subject demonstrates the ability to switch his attention from one system to another.

Based on the results obtained, the level of attention development is assessed according to several criteria. At a high level, the subject's attention stability, distribution and transferability are fully developed in accordance with his age. In this case, he performs tasks with concentration for a long time and can easily and quickly switch from one activity to another.

At a medium level, attention properties are partially developed, and the subject experiences certain difficulties in maintaining attention for a long time. There are also some inconveniences in the process of distributing and transferring attention.

At a low level, attention properties are not sufficiently formed. The subject is easily distracted, cannot concentrate on one point for a long time, and has significant difficulties in performing several activities at the same time and transferring attention.

At a very low level, attention is almost not developed,

and the subject's attention stability is extremely weak. He is often distracted, cannot consistently complete tasks, and has severely limited ability to divide and shift attention.

Memory - the ability to remember, store and retrieve information. In children with motor alalia, all types of memory, especially verbal (speech) memory, may be underdeveloped (Vizel T.G., 2018 [4]). This directly affects the process of speech formation, vocabulary expansion, and the acquisition of grammatical structures. The task of testing memory is to assess the child's verbal and nonverbal memory, short-term and long-term memory.

Tasks are given to determine the level of verbal (verbal) memory. At this stage, the testee is presented with 5–7 simple words (for example: school, apple, rabbit, table, pencil, flower), which are required to be remembered and retold after a certain time. This method assesses the ability to perceive, store and reproduce verbal material. The testee is also asked to read simple sentences consisting of 3–4 words and check the level of their memorization. This serves to determine the ability to remember and reproduce speech units logically. In addition, the testee is given the task of memorizing short poems consisting of 2–4 lines, which studies the rhythmic and semantic memory of the testee, that is, the ability to remember the text systematically. At the next stage, the characteristics of nonverbal memory are tested. In this process, the testee is shown 5–7 different pictures and the degree of their memorization is determined. This method assesses the level of perception of visual images and their retention in memory. Also, the ability to reproduce abstract visual information is determined by the task of memorizing 3–5 geometric shapes. In addition, a sequence of 3–4 simple actions is shown and the subject is asked to repeat them. This allows you to study kinesthetic memory, that is, the nature of memorization through actions.

In order to determine the time-dependent properties of memory, short-term and long-term memory are tested separately. Initially, the subject is asked to immediately recall the presented material, which indicates the level of immediate memorization. Then, after 10–15 minutes, they are asked to recall it again, and the state of short-term memory is determined. At the final stage, after 2–3 days, the level of

memorization of the previously presented material is checked, and the level of long-term memory development is assessed.

Based on the results obtained, the level of memory development is assessed according to several criteria. At a high level, the verbal and nonverbal memory of the test subject is well developed, he can fully remember 5–7 words or images and reproduce them in the correct sequence. In such individuals, long-term memory also works effectively, and information is stored for a long time.

At a medium level, memory is partially developed. The test subject usually remembers 3–4 elements, but may omit some words or images or change their order. Partial losses are also observed in long-term memory.

At a low level, memory is not sufficiently formed. The test subject usually remembers 1–2 elements, forgets most of the information or reproduces it incorrectly. There are significant losses in long-term memory.

At a very low level, memory is almost undeveloped, and the test subject has great difficulty remembering words or images or may remember only one element. In this case, long-term memory is almost unformed and information is not stored stably.

Thinking is the highest form of reflection of being, with the help of which a person establishes relationships and connections, draws conclusions, and generalizes.

In children with motor alalia, the processes of thinking - analysis, synthesis, comparison, generalization, and formation of concepts - may be impaired (Levina R.Ye., 2005 [7]). Speech and thinking are interconnected, and speech disorders also have a negative impact on thinking processes. The task of testing thinking is to assess the child's abilities to analyze, synthesize, compare, generalize, and form concepts.

Tasks are given to determine the level of demonstrative-motor thinking. This type of thinking expresses the ability to solve problems by directly interacting with objects. Using the “Cubes” methodology, the examinee is required to build a certain shape from cubes according to a given sample. This task serves to determine the child's processes of analysis and synthesis, as well as spatial imagination. The “Labyrinth” method requires finding a way out of a complex system of lines, and through this, attention, consistency, and motor thinking processes are

assessed. The “Building a Whole from Parts” method studies the testee’s ability to understand the general structure of the subject and restore it by reassembling a picture that has been divided into pieces. At the next stage, the characteristics of visual-figurative thinking are tested. This type of thinking is associated with thinking through images, that is, identifying logical connections based on visual material. The “What’s Missing?” method requires the testee to identify an element that is missing in the picture, but is logically necessary. This task assesses his observation and ability to visualize. The “Find Similarities” method is aimed at identifying similar features among different pictures, and in this process, the processes of comparison and generalization are studied. Also, the “Logical Sequence” methodology requires the correct arrangement of the sequence of events based on a series of pictures, which allows you to understand cause-and-effect relationships and determine the ability to think in terms of time.

The verbal-logical thinking test is aimed at studying higher-level thinking processes, in which thinking through language plays a key role. At this stage, the examinee’s ability to compare, that is, to identify the similarities and differences between two objects or phenomena, is tested (for example, comparing an apple and a pear). To determine the ability to generalize, a group of objects is asked to combine them based on a common sign (for example, apples, pears, grapes are fruits). The ability to form concepts is assessed by understanding the essence of objects and explaining their function (for example, what is a table, what is a pen for). Also, to assess the ability to make logical inferences, tasks are given to draw conclusions based on simple logical judgments (for example, "If it rains, the ground will be wet. The ground is wet. Therefore, it rained").

Based on the results obtained, the level of development of thinking is assessed according to several criteria. At a high level, the testee's thinking processes are fully developed in accordance with their age. They can independently and correctly perform such mental operations as analysis, synthesis, comparison and generalization, clearly express concepts and draw logical conclusions.

At an average level, thinking processes are partially developed, and the testee has difficulties in completing

some tasks. They cannot provide complete accuracy in comparison and generalization, and logical thinking is not sufficiently formed.

At a low level, thinking processes are poorly developed. The testee has significant difficulties in completing tasks, has difficulty understanding the connections between objects and phenomena, and has a weak ability to generalize and draw conclusions.

At a very low level, thinking processes are almost unformed. The testee cannot answer tasks or gives incorrect answers, does not understand logical connections, and has serious difficulties in performing mental operations.

For example, in a comparison task, a child with a high level of development, when asked the question "How are apples and pears similar and different?", clearly and completely describes their common features (both are fruits, grow on trees, are edible) and their differences (shape, color, taste). A child with an average level of development, on the other hand, lists only some of the features. A child with a low level of development is limited to more external features or cannot give a complete answer. At a very low level, the child does not answer the question or gives an empty answer.

Sensory development is the ability to perceive the environment through the senses. In children with motor alalia, the integration of sensory processes, processing and organization of perceived information may be impaired (Semenovich A.V., 2018 [8]). Sensory development is closely related to speech development, and sensory disorders have a negative impact on speech formation. The task of testing sensory development is to assess the child's visual, auditory, tactile perception, as well as the level of mastery of sensory standards.

Sensory perception is an important basis for understanding the environment, which plays an important role in the development of the child's subsequent cognitive processes - thinking, speech and memory. Therefore, in the research process, each of the sensory systems is studied separately and comprehensively.

Tasks are given to test visual perception. At this stage, the child's ability to distinguish and name colors is determined. The test taker is required to be able to distinguish between primary colors (red, blue, yellow,

green) and intermediate colors and correctly name them. Also, the child's geometric imagination is tested through the task of distinguishing and naming shapes. This assesses the ability to distinguish between shapes such as a circle, square, triangle and rectangle and correctly name them. In addition, the child's level of understanding of quantitative signs of objects is studied through the separation of sizes (big-small, long-short, high-low). The "Hidden Pictures" methodology requires identifying hidden elements within complex visual material, thereby assessing attention, observation, and visual analysis skills.

At the next stage, the characteristics of auditory perception are tested. In this process, the child's ability to distinguish different sounds is determined. For example, sounds characteristic of domestic animals, wild animals and vehicles are heard and they are required to distinguish them. Also, the child's ability to determine the direction in space by hearing is studied through the task of determining the source of sound, that is, he must determine where the sound is coming from. In addition, auditory memory, the ability to perceive rhythm and restore it are assessed through the tasks of distinguishing and repeating rhythmic structures. The test of tactile perception is aimed at determining the level of perception of objects through the senses. At this stage, the testee is given various objects with his eyes closed and is given the task of identifying them only by feeling. This method determines the child's ability to distinguish the shape, structure and other properties of objects through tactile sensations. Also, the child's level of sensitivity is tested through the task of feeling a finger moving on the surface. In addition, the subtleties of tactile sensitivity are studied by distinguishing signs such as hard-soft, hot-cold, smooth-rough-rough.

Based on the results obtained, the level of sensory development is assessed according to certain criteria. At a high level, the child's sensory development is fully consistent with his age. He correctly distinguishes and names all primary and intermediate colors, clearly distinguishes geometric shapes, and correctly determines sizes. Also, auditory perception is well developed, he easily distinguishes sounds and can determine their source. Tactile perception is also at a high level, and the child can accurately identify objects by feeling.

At an average level, some shortcomings are observed in sensory development. Although the child can distinguish primary colors, he may confuse intermediate colors. He also has difficulty distinguishing some shapes (for example, a square and a rectangle). Some inaccuracies are also observed in auditory and tactile perception.

At a low level, sensory development is not sufficiently developed. The child can distinguish only a few basic colors, has significant difficulties in distinguishing shapes, and has difficulty determining the source of sound. Tactile perception is also poorly developed, and makes mistakes in identifying objects by touch.

At a very low level, sensory development is severely impaired. The child cannot distinguish colors, does not understand the difference between shapes, cannot determine the source of sound, and has great difficulty perceiving objects through tactile sensations.

For example, a child with a high level correctly distinguishes all colors, names them clearly, easily distinguishes shapes, and immediately determines where the sound is coming from. A child with an average level can distinguish basic colors, but confuses more complex colors and confuses some shapes. A child with a low level distinguishes only 2–3 colors, almost does not distinguish shapes, and has difficulty determining the source of sound. At a very low level, the child cannot distinguish colors and shapes, does not pay enough attention to sounds, and sensory perception processes are almost undeveloped.

Spatial imagination - the ability to understand the location of objects in space, their relationships. In children with motor alalia, spatial imagination is underdeveloped, which negatively affects not only speech, but also the development of motor, graphomotor skills (Semenovich A.V., 2018 [1]). The task of testing spatial imagination is to assess the child's ability to determine directions in his own body, in the surrounding space and on a plane (on paper).

Spatial perception and imagination play an important role in the child's cognitive activity, especially in the development of writing, reading, arithmetic and general thinking. Therefore, this area is tested in three main stages.

First of all, the child's ability to determine directions in his own body is studied. At this stage, the test subject

is asked to show the right and left hand, leg, eye and ear. This task serves to determine the degree of formation of the child's body scheme. Also, more complex tasks - for example, showing the left ear with the right hand - assess the child's ability to determine directions without confusion. In addition, the child is given the task of determining directions through the reflection in the mirror, and the child is checked for his ability to correctly perceive his reflection and understand the right-left relationship in it. This is one of the important indicators of spatial thinking. At the next stage, the child's ability to determine directions in the surrounding space is studied. In this process, the child's understanding of the spatial location of objects is important. For example, tasks are given to determine whether the object is above, below, in front of, behind, to the right or to the left. The relative location of objects is also checked, that is, the child must be able to correctly express connections such as "pen on the book", "book on the table". In addition, the child's ability to orient in space is assessed through tasks to determine the direction of movement in space. For example, it is required to correctly follow instructions such as "go forward", "turn left", "go back".

At the third stage, the child's ability to determine directions on a plane, that is, on the surface of a piece of paper, is tested. This stage is especially important in terms of preparation for school. The child must be able to determine the corners (top, bottom, right, left) and edges of the sheet. The child's ability to draw based on heard instructions is studied through the "Geometric dictation" method, which shows the harmony of his spatial imagination and auditory perception. Also, the child's level of understanding of spatial relationships in a plane is assessed through the task of determining the location of objects in the picture.

Based on the results obtained, the level of development of spatial imagination is assessed based on certain criteria. At a high level, a child's spatial imagination is well developed, he can clearly and reliably determine the directions in his own body, in the surrounding space and on the plane. Such a child does not confuse right and left, correctly represents the location relationships between objects and accurately follows the instructions given in space. At a medium level, spatial imagination is partially developed. Although the child can determine the directions in his

own body, he has certain difficulties in determining the directions in the surrounding space and especially on the plane. He may sometimes confuse right and left or not be able to fully represent the location of objects.

At a low level, spatial representations are poorly developed. The child has difficulty determining directions in his own body, confuses right and left, and cannot correctly understand the location of objects in the surrounding space. Significant difficulties are also observed in completing tasks on the plane.

At a very low level, spatial representations are almost unformed. The child cannot determine directions in his own body or in the environment, and has serious difficulties in understanding and completing the tasks given.

For example, a child at a high level clearly shows his right and left hands and gives a complete and clear answer to the question "Where is the book?" such as "The book is on the table, to the left of the pen." A child at an average level is limited to a general answer such as "The book is on the table." Even if a child at a low level understands the question, he has difficulty answering or answers incorrectly. At a very low level, the child does not understand directions at all and cannot answer questions.

## **CONCLUSION**

In conclusion, it can be said that the use of the proposed methodology allows for the differential diagnosis of motor alalia, the identification of deficiencies in the child's speech and cognitive development, and the effective planning of correctional and speech therapy work. As a result, systematic and targeted work is carried out to eliminate the speech and cognitive functions of children with motor alalia, which contributes to the social adaptation of children and their successful preparation for school education.

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