



Leading sensory modality in physical education for schoolchildren with disabilities

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Abstract

Objective of the study is to investigate the leading modality of perception in schoolchildren with mental retardation and to develop methodological recommendations for organizing physical education classes, taking into account the leading type of perception of the students.

Methods and structure of the study. 20 schoolchildren of early adolescence with mental retardation were examined at Secondary School No. 8 in Ishim, Tyumen Oblast. The experimental study used observation, the 'Leading Modality' methodology developed by the authors, the 'Concept Exclusion' and 'Concept Relation' thinking study methodologies, the Raven's test, and 'Classification.'

Results and conclusions. The leading modalities of perception in adolescents with mental retardation have been identified, and a higher level of development of visual-figurative thinking than verbal-logical thinking has been established. The differences found are statistically significant. Student's t-test was used to assess the reliability of the differences. Methodological recommendations for organizing physical education classes taking into account the leading sensory modality of students were proposed.

Keywords: *mental retardation, primary school students, sensory modality, inclusive education.*

Introduction. The current requirements of the Federal State Educational Standards for primary general education for students with disabilities indicate the need to correlate the characteristics of psychophysical development and individual abilities of students with the development and implementation of adapted basic general education programs in an inclusive environment. Due to the dynamic changes currently taking place in education, it is becoming increasingly important to study the individual psychological characteristics of students with disabilities and to select the forms and methods that most fully correspond to the principles of personality-oriented education¹.

Today, more and more researchers are turning their attention to the problem of differentiating teaching according to the leading modality of perception. The authors study the influence of teaching that takes

into account the leading modalities of perception on the improvement of cognitive activity, the level of academic motivation and knowledge acquisition, and the development of cognitive functions. They develop methodological recommendations, methods, and pedagogical technologies for working with modalities [2, 6].

T.S. Afanasyeva and N.I. Grishakina analyzed the effectiveness of different methods of teaching university students and showed the influence of different types of representative systems on the effectiveness of information perception [1].

The theory of neurolinguistics programming develops the concept of a representational system (M. Grinder, L. Lloyd, H. Alder, et al.) [4, 7]. A representational system is understood as the preferred method (channel) of receiving, processing (encoding), and storing information coming from the outside world. Researchers adhere to the idea that the sense organ that provides the best assimilation of incoming information is the leading mode (modality) of perception, distinguishing between visual, auditory and kinesthetic

¹ Federal State Educational Standards for Primary General Education of Students (students with disabilities). Order of the Ministry of Education and Science of Russia No. 1598 of 19 December 2014. Revised version of the Order of the Ministry of Education of the Russian Federation dated 8 November 2022. URL: <https://fgos.ru/fgos/fgos-1598/> (data pf access 17 March 2025).



modalities of perception. Students with a leading auditory modality perceive information best by ear. Visual learners absorb information better in a visual form using graphs, diagrams, tables and drawings. Students with kinesthetic modality receive information in the process of performing practical actions with it. They need physical activity in their learning and are oriented towards tactile and motor sensations. In the process of communicative interaction with students who have a leading visual modality, the following marker words are used: observe, look, show. The following marker words are used with auditory learners: listen, repeat, explain, reason, discuss. For kinesthetic learners, the following marker words are used: feel, sense, perform, select.

In our opinion, the kinesthetic method of obtaining information is not equivalent to visual and auditory methods of perception. In the process of cognizing the surrounding reality, a person uses all their senses, but the main channels for obtaining information are one or two [3]. Kinesthetic sensations are closely related to all types of sensations coming from different senses, are part of a complex system of inter-sensory connections, and are necessary for the perception of objects in visual, auditory, and other modalities. The leading modalities of perception are visual, auditory, and mixed.

The kinesthetic channel of perception provides perceptual activity when solving visual and auditory tasks in preschool age. In a study by E.P. Shcherbakova and S.V. Vetrenko, it was noted that in the process of solving perceptual tasks, children with right-brain and left-brain interhemispheric asymmetry at the ages of 5 and 6 use kinesthetic more often than younger schoolchildren [3, 10].

The problem of developing perception in children with mental development delays is currently the subject of scientific work by I.Yu. Murashova, V.I. Nodelman, V.A. Bandurina, and K.V. Lytkina. I.Yu. Murashova and V.D. Nodelman analysed and summarised scientific ideas on the development of polymodal perception in children aged 6–11 with severe speech disorders and mental retardation [8, 9]. The authors point out that studies of polymodal perception in children with severe speech disorders and mental retardation have revealed negative manifestations in its structure. The development of polymodal perception in children with severe speech disorders and mental retardation is carried out using a technique based on a multisensory method of presenting information in a differenti-

ated learning environment. The multisensory method can also be used by all teachers and in all lessons in an inclusive environment. In this regard, there is growing interest in modern methodological support for differentiated education of students with disabilities in the same classroom as healthy children.

Objective of the study is to investigate the leading modality of perception in schoolchildren with mental retardation and to develop methodological recommendations for organizing physical education classes, taking into account the leading type of perception of the students.

Methods and structure of the study. The experimental study was conducted between October and December 2022 with junior high school students (n=20) from Secondary School No. 8 in Ishim, Tyumen Oblast, who had mental development delays. According to medical examination data, none of the subjects had significant pathologies of the visual, auditory, or tactile-kinesthetic analyzers.

At the first stage, we studied auditory, visual, and kinesthetic ways of perceiving information and determined the leading sensory modality. To this end, observation was used with behavioral indicators of the leading modality developed in NLP theory, the author's methodology 'Leading Modality' (a modified version of the methodology for determining the leading modality and sensory activity of each modality in primary school children by I.Yu. Ladokhina) [5].

In the second stage of the study, visual-figurative and verbal-logical thinking was studied using the 'Exclusion of Concepts,' 'Relationship of Concepts,' Raven's Test, and 'Classification' techniques. When evaluating the results, the number of correct answers, the number of errors, and the predominant characteristics (external, functional, class-generic relationships, etc.) were noted. In each series, the average value was calculated using the methods used. The third stage of the study consists of developing methodological recommendations for organizing physical education for adolescents with mental retardation, taking into account their leading sensory modality.

Results of the study and discussion. The results of studying the leading modality of perception in adolescents with mental retardation are shown in Fig. 1. As the diagnosis showed, 75% of adolescents most often use visual perception, while 25% use auditory perception. Kinesthetic modality manifests itself in both auditory and visual modes of perception.

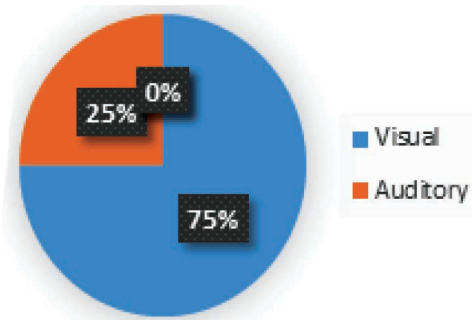


Fig. 1. Study of the leading modality of perception

Thus, most adolescents with mental retardation have a leading visual modality of perception.

The results of studying verbal-logical and visual-figurative thinking in adolescents with mental retardation are presented in Fig. 2. A low level of verbal-logical thinking was found in 35% of students, an average level in 65% of adolescents, and no high level was identified. A low level of visual-imaginative thinking was found in 15% of adolescents, an average level in 55%, and a high level in 30%.

Thus, adolescents with mental retardation showed a higher level of visual-figurative thinking than verbal-logical thinking. The differences found are statistically significant according to Student's criterion ($p < 0.05$). It is well known that children with mental retardation have specific characteristics in the development of their cognitive functions. Without visual support, adolescents find it more difficult to perform verbal tasks, probably because, according to modality theory, incoming information from the auditory modality must be translated (translated) into the leading visual modality, which takes time and leads to a partial loss of information.

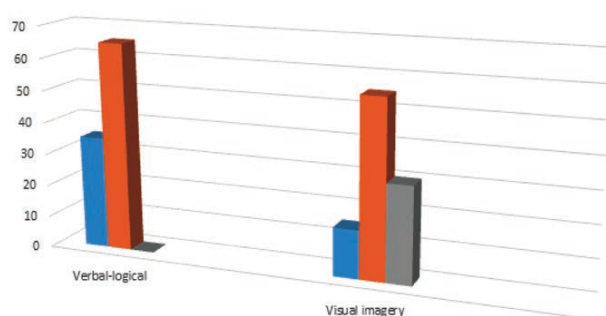


Fig. 2. Studying the level of cognitive development

In his scientific works, Russian neuropsychologist A.R. Luria [7] developed a theory about the interconnected, polymodal work of different types of perception and proposed the principle of relying on

polymodal afferents. The principle of relying on polymodal afferents underlies the multisensory method of presenting educational information, allowing the development of polymodal perception in students with disabilities. From the perspective of a multisensory approach, teaching methods and techniques are used that do not focus on only one channel of perception, while taking into account the specifics of the leading modality of perception: tasks that involve each mode of perception (sight, hearing, movement dynamics). This method is used in individual and frontal teaching methods.

In the process of communicative and verbal interaction, words addressed to the leading sensory modality are used. The teacher needs to combine the explanation of the learning material with a visual demonstration. Students with a leading visual modality absorb information in a visual form, using logical diagrams, graphs, charts, and tables. For auditory learners, it is important to hear the teacher's explanation and engage in dialogue in order to understand the learning material.

The use of modern information technologies, digital services, and multimedia teaching tools (electronic textbooks, presentations, video and audio materials) that combine text, sound, and images also allows information to be received and processed through any channel of perception, engaging several senses. During the lesson, the teacher needs to take into account the low cognitive activity of adolescents with mental retardation, which is combined with rapid fatigue. Rapid fatigue leads to a decrease in performance, which manifests itself in difficulties in assimilating the learning material.

Conclusions. Most of the adolescents with mental retardation who were examined have a leading visual modality of perception and a higher level of development of visual-figurative thinking than verbal-logical thinking. The data from the study indicate the effectiveness of various forms, methods, and techniques for teaching schoolchildren with mental retardation that are used in inclusive education.

Polymodal perception is considered important in the cognitive and speech development of students with disabilities. The development of polymodal perception is facilitated by the method of multisensory presentation of educational material. The introduction of new technologies and methodological approaches in the joint education of children with disabilities and normally developing children occurs with the special



methodological training of teachers implementing inclusive education to create optimal conditions for their education, upbringing and socialization.

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