DOI 10.31489/2023Ped4/49-59

UDC371.7-053.2

Z.K. Zhumanbayeva[1]*, L.A. Shkutina[2], Jan Danek[3], Zh.A Karmanova[4]

[1,2,4] Karaganda Buketov University, Karaganda, Kazakhstan;
[3] Saint Cyril and Methodius University, Trnava, Slovakia

*(*Corresponding author's e-mail: sara_8@mail.ru)*

Neuropsychological approach in assessing the voluntary attention of younger schoolchildren with different levels of success in learning

This article discusses the features of the neuropsychological approach aimed at overcoming retardations in mental development, preventing and solving emerging difficulties in teaching children of primary school age and involving the construction of psychological and diagnostic work with a child, taking into account his individual typological neuropsychological characteristics: the state of higher mental functions, highlighting strengths and weaknesses, components of the development of higher mental functions. The article contains data on the features of the state of voluntary attention in younger students with different success in educational activities, provides information on the forms of attention, and describes the external manifestations of impaired voluntary attention. The article contains a description of a study conducted among second grade students aimed at assessing such properties of attention as work efficiency, degree of development and mental stability using the "Schulte Table" technique. A detailed comparative analysis of the characteristics of voluntary attention in 81 schoolchildren of 170 a general education school with different success in learning activities is described: successful in learning, with partial and complex learning difficulties. Significant differences were revealed in children of primary school age, depending on the success of education. The importance of timely neuropsychological diagnostics of second graders which helps to identify the neuropsychological causes of partial and complex learning difficulties of children, and also allows to outline ways of corrective and developmental assistance to younger students in order to optimize the state of HMF (higher mental functions) and accordingly, to overcome the educational problems of children of primary school age is actualized.

Keywords: junior school age; neuropsychological approach; voluntary attention, learning difficulties.

Introduction

Nowadays, in the context of globalization, informatization, such components as mobility, efficiency and productivity, as well as along with them, the competitiveness of the individual, are becoming particularly relevant. A person is formed in the process of living in society, and it is social institutions that act as the main driving mechanisms for instilling and forming a successful, highly adaptive personality to new changes.

One of the sensitive stages of human development occurs during the school years, where the school environment becomes the link in which the mental and moral potential of the child's personality is laid. The age of the primary level of secondary school falls on the leading activity of the child — educational, where many cognitive processes are developing, and with properly organized training, great positive results can be achieved in the student. But at the same time, there is also a risk when, for various reasons, the training will not be of a developmental nature, will not form the foundation for further disclosure of the child's potential.
There are many factors that can objectively lead to different degrees of lagging children in certain school subjects. At the same time, the problem of increasing cognitive difficulties of children is becoming more urgent. Turning to literary sources, we see a different interpretation of these difficulties.

According to Aremu, academic failure is the detection of a student's failure to meet certain standards that are supposed to be obtained in the learning process. Poor academic performance, according to the author, also has consequences, which in the future are expressed in a shortage of personnel. It should be noted that the researchers Fuchs L.S., D. Fuchs and D.L. Speece define learning difficulties as a lack of success in academic learning, as well as difficulties in achieving general educational goals. To solve these problems, according to the authors, an individual approach and adaptation of the teaching methodology as a whole is necessary [1-2].

Masten and Coatsworth presented a group of skills that are predictors of good student performance, they are expressed in certain skills, which include cognitive and metacognitive, as well as social and self-management skills. Nile identifies the causes of low academic performance associated with reading and writ-

ing difficulties. Naimi in his study aimed at identifying poor students, came to the conclusion that the reason for this is the low educational and economic level of students [3–5].

Scholars Barakat and Harz Allah also cite several reasons that were identified in schoolchildren in the study of mathematics, these included the following: poor health; lack of motivation to study; student behavior problems as well as the lack of sufficient psychological and pedagogical experience and knowledge among the teachers themselves; lack of parental support. Tamimi found the following factors that are the cause of poor academic performance, the author refers to them as social, economic and political. The researcher also emphasized the importance of studying the problem of underachievement, due to the high growth of students with low academic performance at school [6-7].

Ahmed & Wias note in their study that the main problem of low academic achievement is the problems associated with the motivation to learn and the low interest of the parents themselves in the education of their students as a whole.

Researcher Almuammria emphasizes the importance of parental involvement, their interest in their child, as an important indicator of school support, and as one of the factors affecting the academic performance of students. He has done research on the impact of the environment on improving student achievement [8].

Mc Carney and Arthaud and Dhanda and Jagawat identify the most common academic learning difficulties as those that affect a person's ability to calculate, write, read, and communicate. Other associated difficulties are usually not indicated, although according to scientists, they may occur in parallel with other difficulties [9-10].

Elkins and Kird give an estimate of the prevalence of difficulties in reading and understanding the material read aloud and silently. Mwanamukubi has researched various factors that cause reading difficulties. Three categories of difficulties that students have in the learning process were identified: reading errors, misunderstanding of what was read, and incorrect identification of words [11].

Cecilia Vittorini, Coffini and Orio conducted a study of reading problems common among children attending school. Poor reading comprehension was noted, as well as poor reading speed in general. Hadi refers to the difficulties in writing: the inability to write correctly in one line, mixing similar letters, the wrong order of letters or words in a sentence, rearranging numbers and letters, the wrong shape and size of letters, spelling errors, mistakes when copying text from a board or book, poor font, lack of sufficient spacing between margins and letters, misuse of lines, and failure to accurately open one's thoughts [12].

Ozsoy Kuruer and Chakiroglu analyzed the relationship between students' reading skills and their ability to solve mathematical problems. The authors came to the conclusion that the level of reading of schoolchildren had a tangible relationship with the solution of mathematical problems [13].

Thus, the authors identify external and intrapersonal causes of learning difficulties in children, the first include the experience of teachers, support from teachers and their parents, and generally social, demographic and political processes. The second, and most of them, is a weakness in mastering those skills that are necessary in the process of learning new things at school, namely writing, reading, mathematical skills.

In the presence of various difficulties in teaching children, it is important to identify the root cause of the lag, and not to solve its consequences, as unfortunately sometimes or often these gaps are solved.

The currently existing neuropsychological approach includes many functions that can objectively be used to solve problems in the cognitive development of the student's personality. At the same time, the use of knowledge of neuropsychology involves the competent construction of psycho-diagnostics, with further determination of all deficient functions in the development of the child, and further construction of a corrective line of work taking into account the received diagnostic analysis. Here we see a definitely different approach from the existing ones in school practice, when teachers try to work out the existing gaps and shortcomings with the help of repetition, based on the development of a skill. The neuropsychological approach takes into account one of the main principles of pedagogy about its naturalness, in which, according to the natural process of development, knowledge of the norms of age-related development, there is an effective impact on those areas only where for some reason there was a “hitch”, immaturity of development functions.

Literature review

Currently, during the modernization of the educational system of school education, neuropsychology of childhood is being increasingly introduced, the theoretical basis of which are the principles developed by L.S. Vygotsky and A.R. Luria. Particular importance is obtained by the studies aimed at discovering the objective causes of learning difficulties in younger schoolchildren. From the point of view of the neuropsycho-

logical approach, the problem of difficulties in teaching children is considered as an integrative interaction of the brain, physiological, psychological and social levels. The role of neuropsychology lies in taking into account the relationship of higher, mental functions with certain parts of the brain, as well as the fact that if one part of the brain is damaged, several forms of mental activity may be impaired (both oral speech, and writing, and reading, and counting), and all they will be violated for one reason, since one common factor enters into their structure. And vice versa, the same function can be impaired when different parts of the brain are affected, since it is complex in structure, and its different links are realized by different areas of the brain. Therefore, if a student has difficulties in forming a letter then it is necessary to conduct a qualified neuropsychological analysis of the difficulties in order to find the cause of the defect. Thus, neuropsychology, on the one hand, allows us to find out which functional systems turned out to be impaired or unformed in due time, and thereby approach the cause of the difficulties experienced by the student in learning, and on the other hand, it has special teaching methods that can help in overcoming these difficulties [14].

Luriev's concept of three functional blocks of the brain has great explanatory power in understanding the structure and features of disorders of higher mental functions of a child.

The first (energy) block, its functional significance is to provide a general activation background on which all mental functions are realized, as well as to maintain the general tone of the central nervous system and the balance of excitation and inhibition necessary for any activity. This block is directly related to the processes of attention — general, non-selective and selective, as well as consciousness in general.

The second functional block of the brain — the block of reception, processing and storage of extraceptive (external) information — includes the main analyzer systems: visual, auditory, skin-kinesthetic. The work of this block provides modal-specific processes, as well as complex integrative forms of processing of extraceptive information necessary for the implementation of higher mental functions.

The third functional block of the brain — the block of programming, regulation and control from the point of view of neurophysiology and neuropsychology (A.R. Luria) is responsible for the formation of arbitrary human regulation. Here the main role is played by the frontal parts of the brain. The motto of this level: “I have to”. It is obvious that the ability to concentrate one's attention for a long time is formed in a person as they grow up and depend on the environment [15].

According to T.V. Akhutina, a number of stages are distinguished in the formation of the programming, regulation and control unit, but the most significant restructuring is noted at the age of 7, and this stage ends in adolescence. Arbitrariness and the ability to regulate one's own activity is a necessary condition for the success of a child during the beginning of school. According to T.V. Akhutina, the arbitrary attention necessary for a child to assimilate educational material can be developed and formed [16].

A.R. Luria defines attention as a factor that ensures selectivity, selectivity of any mental processes, both cognitive and affective-volitional. There are several forms of attention, according to the processes in which this factor is realized: 1) sensory (visual, auditory, tactile, etc.); 2) motor, manifested in motor processes; 3) emotional, attracted by emotionally significant stimuli; 4) intellectual, manifested in intellectual activity (attention to the subject of reflection, to intellectual operations, through which the thinking process itself is realized) [15].

As noted by B.G. Ananiev, an important condition for any mental activity is attention. Productivity, quality and accuracy of mental work, speed of perception, memory, speed and accuracy in the formation of skills depend on the degree of the consciousness centered upon object.

According to D.B. Elkonin, an ability to listen carefully is one of the necessary preconditions for a child's readiness for school [17].

K.D. Ushinsky noted: “Attention is exactly that door through which passes everything that going into the soul from the outside world”

The essays of N.F. Dobrynin dealt with problem of the development of voluntary attention and for the use of organizational forms of activity as characteristic of attention which play a large role in the upbringing of personality.

P.Ya. Galperin considered attention within the framework of the theory of gradual formation of mental actions. Substantiating his theory, the scientist points out that attention is one of the moments of orienting research activity. It is a “psychological action aimed at the content of an image, thought or other phenomenon that exists at a given moment in the human psyche”.

The function of attention represents a control over the content of human activity. At the same time, attention improves performance. An attention controlled by criterion of measure and a sample, which creates the possibility of comparing the results of an action and its clarification as indicated by P.Ya. Galperin [18].

Scientists also point out that attention is more a function of interest. Therefore, it is connected with the needs of the individual, with her aspirations and desires, also with her general orientation, as well as with the goals that she sets to herself. Both emotional and intellectual moments are combined in the interests leading the attention. What is directly connected with interest acquires an emotional coloring due to this connection; in turn, what is connected with our emotions, with feelings may therefore acquire an interest. Emotional moments have a significant impact on the direction of our attention. But interest always includes not only emotional, but also intellectual moments. It is the unity and interpenetration of intellectual, cognitive and emotional moments that determine the essence of interest [19].

Referring to P. Anderson, attention refers to a complex cognitive function and includes such processes as selective attention to certain stimuli, prolonged concentration of attention on a certain object, as well as regulation and control of actions [20].

Scientists M.I. Posner, and M.K. Rothbart assume that attention underlies our awareness of the world and the arbitrary regulation of our thoughts and feelings. Such components of attention as regulation and control are the basic functions of attention, which precedes higher-level cognitive abilities, such as memory [21].

E.G. Spira, and J.E. Fischel in their research pay attention on the assessment of the functional state of attention of children, since according to psychologists, this diagnostic work is important because of its impact on learning, academic performance and social functioning in general [22].

Researchers Lai Yi-Jung and Kang-Ming Chang believe that due to its selective properties, attention constantly filters various information coming from the outside world. This fact about attention, according to the authors, gives reason to be crucial for human learning and development. The influence is also influenced by subconscious activities, such as reflexes and activities regulated by autonomic nerves. Therefore, according to the authors, there are two ways to improve the attention index: one is by teaching external behavior, such as completing tasks, games; the second is working with internal mental energy [23].

E. Nasiri, M. Khalilzad, Z. Hakimzadeh suppose that attention is the process of comparing data from the environment with human needs, as well as determining the level of the most important incoming signal. The authors distinguish the following components of attention: 1. tonic alertness (the process of internal arousal or arousal), phase alertness (the process of rapid change of attention with a short contact of the stimulus), as well as the selectivity of attention and its stability [24].

J. Slattery Eadaoin, O'Callaghan Eoin, Ryan Patrick, G. Fortune Donal, P. McAvinue Laura suggest and evaluate the effectiveness of strategies to increase the concentration of attention of schoolchildren, these include the following components: cognitive attention training, meditation and physical activity. According to the results of the study, mindfulness training had a fairly consistent positive effect on selective attention [25].

B. Bruya and Y-Y Tang turn their attention to its kind, such as post-spontaneous attention and its significance in the practice of pedagogical psychology. Psychologists suggest that it is post-spontaneous attention that is the mechanism to be investigated, as well as to organize training taking into account its activation, since it activates motivational and social networks of the brain and contributes to more successful research and application of the internal connection between attention and learning [26].

The analysis of literary sources has shown that scientists have sufficiently described the features of the structure of attention, types and its forms. Psychologists and neuropsychologists have devoted a lot of their research to describing how to improve children's attention. They also emphasize the importance of the cognitive process of attention itself and its impact on life in general. However, along with the development of the topic of attention, a lot of studies, there are no empirical developments showing statistically the relationship of the influence of the state of attention on the success of teaching mass school students.

Neuropsychological study of attention disorders in younger schoolchildren can give an idea of the peculiarities of the state of the attention process, the deficit state of which becomes an obstacle in the assimilation and mastering of the primary school curriculum and determines a certain level of learning success.

Experimental

We have organized a neuropsychological study aimed at assessing the state of individual properties of younger school children attention. The comprehensive diagnostic study was attended by students of the second grades of secondary school in the number of 81 people.

When determining the sample of students, the main criterion was the age of children, which assumed a range from 7 to 8 years, that is, second grade students, this age is optimal for the properties of attention we are studying, since in comparison with the first grade, when the attention of schoolchildren only becomes

arbitrary, it is in second grade students that we can check in full there are separate characteristics of the already formed arbitrary attention, since the tasks according to the proposed methodology are directed attention that is called from outside.

To conduct a study in a secondary school, we received a special permit from the City of Karaganda Department of Education, as well as written agreements of parents to receive and process data. We did not select the students who will undergo the study ourselves, the school administration identified exactly those classes that can participate in the study, in our case they were all students of the parallel 2 classes, noting once again that the main criterion in the selection of students was their age, and not the presence of any other components, gender in the ranking category was not included, and boys and girls participated in the experiment. The children were divided into 3 groups based on the level of learning success (based on expert pedagogical analysis of the results of the assessment of final control papers in the main school subjects, in other words, to determine the groups, we used the analysis of student performance in the following school subjects, namely mathematics, writing, reading, when the average value of semester grades was 3 — this group was defined by us as the third, that is, students with low academic performance, if the average score was 4, then we assigned such children to the second group, and the final score is 5, these children made up 1 group. Thus it turned out that group 1 — 25 % of second graders who successfully assimilate and master primary school teaching materials in all major school subjects; group 2 — 43 % of students with partial learning difficulties (have difficulties in mastering individual school subjects); Group 3 — 32 % of children with complex learning difficulties who have systematic errors when performing various school assignments.

To consider the features of second graders' state of attention, depending on the success in educational activities, the method of "Schulte Tables" was applied; this test is included in a comprehensive neuropsychological diagnosis proposed by a team of authors led by T.V. Akhutina and is aimed at studying the rate of sensorimotor reactions, the distribution and stability of attention. This test was chosen based on several important considerations: firstly, it is high reliability, validity; secondly, the objective simplicity of the instruction for students, where the only limitation is the child's knowledge of numbers from 1 to 25; thirdly, the test does not test the abstract concept of the state of attention, but specific performance indicators, such as the degree of work-ability and its stability, in other words, how easily and quickly the child gets involved in the work, understands the essence of the task, and how much he manages to keep his attention on the object, its arbitrariness, which are very important for successful learning; fourth, the sample of the "Schulte Table" meets the purpose of the study, where we want to study the features of arbitrary attention in children with different levels of learning, that is, to find out whether there is a relationship between the indicators of attention and the level of educational success [27].

Statistical data processing was carried out using descriptive statistics and using one-factor analysis of variance ANOVA. Data processing was carried out using the SPSS 27 for Windows software package.

Results and discussion

Quantitative and qualitative neuropsychological analysis of the results of the study made it possible to obtain differentiated information, which includes the following components of the attention of younger schoolchildren: work efficiency (WE), the degree of workability (DW) and mental stability (MS) and presented on Table 1.

Table 1

Productivity results of the "Schulte Tables" methodology

Indicators	Groups of younger schoolchildren			Levels of difference (comparison across the groups)		
	1 group	2 group	3 group	1-2	2-3	1-3
The effectiveness of work	3,7	2,7	1,9	1,014*		1,775*
The degree of workability	0,9	1,2	1,7			0,717*
Mental stability	1	1,4	2		0,632*	0,965*

According to the first criterion for evaluating the effectiveness of work on concentration of attention and concentration on stimulus material, the following results were obtained: second graders who are successful in educational activities spend on average from 66–75 seconds to complete the task, children with partial learning difficulties — 76–85 seconds, students with complex learning difficulties — more than 86 seconds. It is statistically confirmed that the ability of younger schoolchildren from the first group to perform tasks

more quickly and accurately is significantly better than that of second graders from the second group (p=1,014), and more successful than that of children from the third group (p =1,775).

The highest results (4 points), reflecting the stability of attention and performance in dynamics, are inherent in 45 % of younger schoolchildren who assimilate the educational material well, while for second graders with partial learning difficulties, significant indicators of overall performance (3 points) were 42 % of the children tested, and 31 % of students scored the highest score for younger schoolchildren with complex learning difficulties, as shown on Table 2.

Table 2

Productivity results by the effectiveness of work (in %)

Points	1 group	2 group	3 group
1	0 %	11 %	31 %
2	5 %	28 %	47 %
3	30 %	42 %	19 %
4	45 %	17 %	3 %
5	20 %	2 %	0 %

Such results may have been obtained by students from the fact that the very property of attention, as concentration, directly depends on the type of attention, namely arbitrary attention. Where arbitrary attention is a conscious focus on an object, in our case it was presented stimulus material in the form of tables with numbers from 1 to 25. There is also a conscious switching of attention (concentration on the task). By itself, arbitrary attention is quite energy-consuming, since it includes desire, willpower, as well as intentional concentration. And the most important problem of arbitrary attention is its limitations, since external stimuli and the need to constantly switch attention greatly deplete the nervous system and lead to rapid fatigue. Now, from the above, it can be imagined that children who already have difficulties of studying, and therefore have inertia in the development of the cognitive sphere, it is logical that the indicators for this criterion will be worse.

According to the second criterion — the degree of workability in the work of younger schoolchildren, a statistically significant difference was revealed between groups 1 and 3 of students (p=0.717), where schoolchildren from the first group need less time to engage in activities and prepare for their main work in comparison with students from the group experiencing significant difficulties in completing tasks. According to the data obtained, 55 % of students were identified in the first group according to indicators of good attention stability, 48 % of students in the second group, while only 19 % in the third group, as shown on Table 3.

Table 3

Productivity results by the degree of workability (in %)

The degree of workability	Group 1	Group 2	Group 3
Good workability	70 %	57 %	42 %
Bad workability	30 %	43 %	58 %

Indicators of the degree of work-ability show how quickly the child is involved in the work, that is, the speed of thought processes and other cognitive functions contribute to this work. We cannot take into account separately the degree of work-ability in the work without taking into account all the work that occurs during these actions. The results obtained only confirm the general knowledge of neuropsychological research, which is expressed in the fact that weaker students, definitely with their developmental deficits, cope worse with this condition, whereas academically more successful students, due to their working capacity, strength, are much faster included in the task.

The coefficient of mental stability provides diagnostic information about the length of time during which the student can maintain his attention on the object. Mental stability is especially needed in conditions of homogeneous and monotonous work, when complex but similar actions are performed for a long time. According to statistical analysis, a significant difference was revealed between the second and third groups (p=0.632), as well as between the first and third (p=0.965), which confirms the condition of dependence of the degree of mental stability of attention on the success of students in mastering the school curriculum. Indicators of good mental stability (the data in the study were < 1) were revealed during the study in the first

group — 55 % of students, in the second — 48 % and in the third — 1.9 % of schoolchildren, as represented on Table 4.

Table 4

Productivity results by the mental stability (in %)

The mental stability	Group 1	Group 2	Group 3
Good stability	55 %	48 %	19 %
Bad stability	45 %	52 %	81 %

These quantitative indicators can be interpreted as confirmation of knowledge about the strength and stability of the nervous system in those students who do not experience difficulties in learning, and on the other hand, in children who have difficulties or deficiency in the development of a particular cognitive function. In fact, the obtained quantitative data can be a marker for further work with students who have low indicators according to the criterion of attention stability, that is, their inability to keep attention on the object for a long time.

Thus, the conducted research allowed us to experimentally see the defining characteristics that the neuropsychology of childhood uses. So, these include:

1. Since neuropsychology is the science of factors, of individual units of mental activity, its tools are precisely aimed at studying these units. Here in our study we tried to study the features of the state of attention as one of the units of the psyche.

2. The neuropsychological approach really occupies a special place in a number of scientific disciplines that address the problem of onto-genesis in norm and pathology. Only it allows us to evaluate and describe those system-dynamic rearrangements that accompany the mental development of a child from the point of view of his brain support. Again, we can trace this confirmation based on those results and understanding of the connection between the failure of the test performed with the existing problems in the development of children.

3. One of the possible reasons for school failure may be the insufficient formation of certain mental structures (L.S. Tsvetkova, N.K. Korsakova, Yu.V. Mikadze, E.Y. Balashova, etc.). In our study, this is a pronounced dependence of the state of attention on academic success.

4. An early neuropsychological examination of a child makes it possible to establish the level of formation of his mental functions and readiness for school, to make an accurate diagnosis based on scientific data and thereby prevent or reduce the difficulties of teaching a child in a comprehensive school.

During the experiment, the features of the neuropsychological approach within the framework of school underachievement of younger schoolchildren were described, which made it possible to identify individual links in the structure of higher mental functions in second grade students, namely the state of individual properties of voluntary attention in second graders with different levels of learning. The obtained results are confirmed in the research of N.M. Pylaeva, who highlighted problems with attention instability as one of the most common difficulties faced by younger schoolchildren in the learning process [17].

The properties of attention are directly related to its essence, i.e. with the relation of the individual to the object of reality. Attention is characterized by such properties as volume, switching, distribution, concentration, stability and selectivity.

In working with younger schoolchildren the problem of attention is the most relevant. The parishioners emphasize that the attention of a younger schoolchildren is poorly organized, has a small volume and unstable. Well-developed properties of attention and its organization are factors that directly determine the success of learning. The authors note that the inattention of modern schoolchildren in the present period is one of the most common reasons for the decline in academic performance.

Thereby, attention is a very important mental process, which manifests itself in the ability of a person to focus on a stimulus or several stimuli, separating them from the entire stream of stimuli that acts every minute on the human nervous system [18].

Thus, the following conclusions can be drawn from the study:

1. Statistically, on a large number of children, a significant dependence and influence of the state of attention of schoolchildren on their academic performance was revealed, that is, students with high academic performance objectively have significantly better indicators of attention, in comparison with those children who had difficulties in learning.

2. The analysis carried out shows the importance of organizing and conducting a psychodiagnostic study of the personality of students, as it will allow us to determine the underdeveloped individual parts of the mental manifestations of students.

3. Such a cognitive process as attention is an important structural link in neuropsychological research, as it includes such complex components as psychological stability, its arbitrariness, and the speed of involvement in work.

The practical value of the study is that the experimentally proven influence of the degree of concentration and stability of attention on the academic success of students makes it relevant to create correction programs for low-performing children, with an emphasis on the development of the cognitive sphere of students. Since often in correctional programs the emphasis is on simulators, where the main principle is the multiple repetition of tasks of the same type, in order to gain the skill to solve typical tasks, but the individual characteristics of children are not taken into account.

As recommendations for further research, we suppose that scientists can take more samples and significantly expand the field of cognitive processes being studied (not only attention, but also the memory of schoolchildren, especially thinking, speech, imagination, and so on). Also, the methodology that we took to study the attention of younger schoolchildren can be used by practical psychologists and even teachers as a tool for assessing how productive the conducted correctional lessons are.

Conclusions

So, summarizing the general idea of attention, we can conclude the following. Attention itself acts as the ability to single out things, objects or phenomena of reality that are most relevant in this particular situation.

Attention is presented as an integral part in any mental process — both emotional-volitional and cognitive (thinking). Without attention, the full implementation of any mental function is impossible.

The function of attention, like most other higher mental functions, acts on two main levels — voluntary and involuntary. Voluntary attention is an important condition for successful schooling. Violations and lack of its formation can lead to persistent learning difficulties.

Thus, the analysis of the conducted experiment aimed at assessing the strength of concentration of younger schoolchildren allows us to describe the features of the attention of second graders depending on their success in learning. That is, an organized study helped to trace the peculiarity of the neuropsychological approach, which indicates the uneven development of higher mental functions. Learning difficulties are caused by partial weakness of individual mental functions or their components. In children of the norm group, their relatively weak processes appeared when they felt tired, in children with learning difficulties, the unevenness of functions is more pronounced, the child cannot compensate for his weaknesses at the expense of his strengths, he begins not to conform to the social norm. We see from the results that all three studied attention criteria: work efficiency, degree of workability and mental stability, and the results obtained during testing have a direct relationship with their academic performance, that is, the more successful the child is in school, the higher his results in the test for attention. At the same time, it should be noted that here we also see the implementation of the principle of the neuropsychological approach, which is built on the basis of the individual characteristics of each child.

The importance of timely neuropsychological diagnostics of second graders is actualized, which contributes to the identification of neuropsychological causes of partial and complex difficulties of teaching children, and also allows us to outline ways of correctional and developmental assistance to younger schoolchildren in order to optimize the state of HMF (higher mental functions) and accordingly, to overcome the educational problems of primary school children.

References

1 Aremu A.O. Multi — causal evaluation of Academic performance of Nigerian learners: Issues and Implications for national development / A.O. Aremu & B.O. Sokan // Education this Millenium: Innovation in Theory and Practice. Macmillan Nig Ltd. — 2003. — 11. — P. 365–375.

2 Fuchs L.S. Treatment validity as a unifying construct for identifying learning disabilities / L.S. Fuchs, D. Fuchs and D.L. Speece // *Learning Disability Quarterly.* — 2002. — 25(1). — P. 33–45.

3 Masten A. The Development of Competence in Favorable and Unfavorable Environments: Lessons from research on successful children / A. Masten, J. Coatsworth // American Psychologist. — 1998. — 53. — P. 205-220.

4 Nile A. Linguistic Weakness, Diagnosis and Treatment / A. Nile // Cairo, Dar Alwafa. — 2006. — 32 (1). — P. 90-93.

5 Naimi A. Low Academic Achiever Students in the Schools of the United Arab Emirates Emirates / A. Naimi // Al Ittihad Newspaper. — 2010. — 5. — P. 28-31.

6 Barakat Z. The Reasons for the Low Level of Academic Achievement in Mathematics at Elementary Level at Tulkarem schools / Z. Barakat, H. Harz Allah // Al Queds Open University. — 2010. — 8 (2). — P. 58-75.

7 Tamimi A. The weakness in the Academic Performance of Students / A. Tamimi // Baghdad University, College of Education, Ibn Rushd. — 2012. — 26(1). — P. 356-368.

8 Almuammria M. The impact of the environment in enhancing the academic achievement of students / M. Almuammria // Scientific Library, Beirut. — 2015. — 5. — P. 286-289.

9 Mc Carney S. Learning Disability Evaluation Scale — Renormed (LDES-R2)) / S. Mc Carney, T. Arthaud // second ed. Hawthorne Educational Services, Inc. — 2007. — P. 243-248.

10 Dhanda A. Prevalence and pattern of learning disabilities in school children / A. Dhanda, T. Jagawat // Delhi Psychiat. J. — 2013. — 16(2). — P. 386–390.

11 Mwanamukubi L. Reading Difficulties in Grade 6 Learners and Challenges Faced by Teachers in Teaching reading: A Case Of Chadiza And Chipata Districts / L. Mwanamukubi // Humanities and Social Science. — 2013. — 2. — P. 20-25.

12 Cecilia Vittorini. The prevalence of reading difficulties among children in scholar age / Cecilia Vittorini, Cecilia Coffini and Orio // Styles Commun. — 2014. — 6 (1). — P. 18-30.

13 Ozsoy Kuruer. Evaluation of students' mathematical problem solving skills in relation to their reading levels / Kuruer Ozsoy and Özsoy Chakiroglu // International Electronic J. Elem. Educ. — 2015. — 8 (1). — P. 113-132.

14 Цветков А.В. Нейропедагогика для учителей: как обучать по законам работы мозга / А.В. Цветков. — М.: Изд-во «Спорт и культура–2000», 2017. — 128 с.

15 Хомская Е.Д. Нейропсихология: хрест. / Е.Д. Хомская. — СПб.: Питер, 2011. — 992 с.

16 Bodrova E. When everything new is well-forgotten old: Vygotsky/Luria insights in the development of executive functions / E. Bodrova, D. Leong, T. Akhutina // New Directions For Child And Adolescent Development. — 2011. — No 133. — P. 11-28.

17 Пережигина Н.В. Онтогенез внимания: Текст лекций по курсу нейропсихологии детского возраста / Н.В. Пережигина. — Ярославль: Ярослав. гос. ун-т, 2002. — 100 с.

18 Глозман Ж.М. Нейропсихология детского возраста / Ж.М. Глозман. — М.: Академия, 2009. — 272 с.

19 Цветкова Л.С. Методика нейропсихологической диагностики детей / Л.С. Цветкова. — М.: Российское педагогическое агентство; Когито-центр, 1998. — 128 с.

20 Anderson P. / P. Anderson // Assessment and development of executive function (EF) during childhood. Child Neuropsychol. — 2002. — 8. — 71–82.

21 Posner M.I. Research on attention networks as a model for the integration of psychological science / M.I. Posner, M.K. Rothbart // Annu. Rev. Psychol. — 2007. — 58. — 1–23.

22 Spira E.G. The impact of preschool inattention, hyperactivity, and impulsivity on social and academic development: a review / E.G. Spira, and J.E. Fischel // J. Child Psychol. Psychiatry. — 2005. — 46. — 755–773.

23 Lai Yi-Jung. Improvement of Attention in Elementary School Students through Fixation Focus Training Activity / Yi-Jung Lai, Chang Kang-Ming // International Journal of Environmental Research and Public Health. — 2020. — 17(13). — 47 — 80. https://doi.org/10.3390/ijerph17134780

24 Nasiri E. A comprehensive review of attention tests: can we assess what we exactly do not understand? / E. Nasiri, M. Khalilzad, Z. Hakimzadeh et. al. // Egypt J Neurol Psychiatry Neurosurg. — 2023. — 59(26). — 4-15.

25 Eadaoin J. Slattery. Popular interventions to enhance sustained attention in children and adolescents: A critical systematic review / J. Slattery Eadaoin, O'Callaghan Eoin, Ryan Patrick, G. Fortune Donal, P. McAvinue Laura // Neuroscience & Biobehavioral Reviews. — 2022. — 137. — 101-115.

26 Bruya B. Fluid Attention in Education: Conceptual and Neurobiological Framework / B. Bruya and Y-Y. Tang // Front. Psychol. — 2021. — 12. — 139–145.

27 Бизюк А.П. Компендиум методов нейропсихологического исследования / А.П. Бизюк. — СПб.: Речь, 2005. — 400 с.

З.К. Жуманбаева, Л.А. Шкутина, Ян Данек, Ж.А. Карманова

Табысты білім алу кезіндегі әр түрлі деңгейдегі төменгі мектеп оқушыларының ерікті зейінін бағалаудағы нейропсихологиялық тәсіл

Мақалада психикалық дамудағы кемшіліктерді жеңуге, бастауыш мектеп жасындағы балаларды оқытуда туындайтын қиындықтарды болдырмауға және шешуге бағытталған және оның жеке типологиялық нейропсихологиялық ерекшеліктерін ескере отырып, баламен психологиялық– диагностикалық жұмысты құруды көздейтін нейропсихологиялық тәсілдің ерекшеліктері қарастырылған; яғни жоғары психикалық функциялардың жай-күйі, күшті және әлсіз жақтарды бөлу, жоғары психикалық фун-

кциялардың даму компоненттері. Сондай-ақ, мақалада оқу іс-әрекетінде әр түрлі жетістіктері бар төменгі мектеп оқушыларының ерікті зейін күйінің ерекшеліктері туралы мәліметтер келтірілген, зейіннің түрлері туралы ақпарат берілген және ерікті зейіннің сыртқы көріністері сипатталған. Мақалада «Шульте Кестесі» әдісін қолдана отырып, жұмыс тиімділігі, жұмыс деңгейі және психикалық тұрақтылық сияқты зейіннің қасиеттерін бағалауға бағытталған екінші сынып оқушылары арасында жүргізілген зерттеу сипаттамасы берілген. Оқу іс-әрекетінде әр түрлі жетістіктері бар жалпы білім беретін мектептің 81 оқушысының ерікті зейінінің ерекшеліктерін егжей-тегжейлі салыстырмалы талдау сипатталған: яғни: оқудағы сәттіліктері, оқу кезіндегі ішінара және кешенді қиындықтары. Төменгі мектеп жасындағы балаларда оқу жетістіктеріне байланысты елеулі айырмашылықтар анықталды. Екінші сынып оқушыларының уақтылы нейропсихологиялық диагностикасының маңыздылығы өзекті, бұл балаларды оқытудағы ішінара және күрделі қиындықтардың нейропсихологиялық себептерін анықтауға көмектеседі, сонымен қатар бастауыш сынып оқушыларына ЖПФ (жоғары психикалық функциялар) жағдайын оңтайландыру және сәйкесінше бастауыш мектеп жасындағы балалардың оқу мәселелерін жеңу үшін түзету және дамыту көмегін көрсетуге мүмкіндік береді.

Кілт сөздер: төменгі сынып оқушылары, нейропсихологиялық тәсіл, ерікті зейін, оқу қиындықтары.

З.К. Жуманбаева, Л.А. Шкутина, Ян Данек, Ж.А. Карманова

Нейропсихологический подход в оценке произвольного внимания младших школьников с разным уровнем успешности в обучении

В статье рассмотрены особенности нейропсихологического подхода, направленного на преодоление отставаний в психическом развитии, профилактику и решение возникающих трудностей в обучении детей младшего школьного возраста и предполагающего построение психолого-диагностической работы с ребенком с учетом его индивидуально-типологических нейропсихологических особенностей: состояния высших психических функций, выделения сильных и слабых сторон, компонентов развития высших психических функций. Также в статье содержатся данные об особенностях состояния произвольного внимания у младших школьников с разной успешностью в учебной деятельности, приводится информация о формах внимания, и описываются внешние проявления нарушения произвольного внимания. Статья содержит описание проведенного исследования среди учащихся вторых классов, направленного на оценку таких свойств внимания, как эффективность работы, степень врабатываемости и психическая устойчивость при помощи методики «Таблицы Шульте». Описан подробный сравнительный анализ особенностей произвольного внимания у 81 школьника общеобразовательной школы с разной успешностью в учебной деятельности: успешных в обучении, с парциальными и комплексными трудностями учения. Выявлены существенные различия у детей младшего школьного возраста в зависимости от успешности обучения. Актуализируется значимость своевременной нейропсихологической диагностики второклассников, которая способствует выявлению нейропсихологических причин парциальных и комплексных трудностей учения детей, в также позволяет наметить пути коррекционно-развивающей помощи младшим школьникам с целью оптимизации состояния ВПФ (высших психических функций) и, соответственно, преодоления учебных проблем детей младшего школьного возраста.

Ключевые слова: младший школьный возраст, нейропсихологический подход, произвольное внимание, трудности обучения.

References

1 Aremu, A.O. & Sokan, B.O. (2003). Multi — causal evaluation of Academic performance of Nigerian learners: Issues and Implications for national development. *Education this Millenium: Innovation in Theory and Practice. Macmillan Nig Ltd*, 11, 365–375.

2 Fuchs, L.S., Fuchs, D., & Speece, D.L. (2002). Treatment validity as a unifying construct for identifying learning disabilities. *Learning Disability Quarterly*, *25*(1), 33–45.

3 Masten, A. & Coatsworth, J. (1998). The Development of Competence in Favorable and Unfavorable Environments: Lessons from research on successful children. *American Psychologist*, 53, 205-220.

4 Nile, A. (2006). Linguistic Weakness, Diagnosis and Treatment. *Cairo, Dar Alwafa, 32* (1), 90-93.

5 Naimi, A. (2010). Low Academic Achiever Students in the Schools of the United Arab Emirates Emirates. *Al Ittihad Newspaper*, 5, 28-31.

6 Barakat, Z. & Harz Allah, H. (2010). The Reasons for the Low Level of Academic Achievement in Mathematics at Elementary Level at Tulkarem schools. *Al Queds Open University*, *8*(2), 58-75.

7 Tamimi, A. (2012). The weakness in the Academic Performance of Students. *Baghdad University, College of Education, Ibn Rushd, 26* (1), 356-368.

8 Almuammria, M. (2015). The impact of the environment in enhancing the academic achievement of students. *Scientific Library, Beirut,* 5, 286-289.

9 Mc Carney, S. & Arthaud, T. (2007). Second ed. Hawthorne Educational Services, Inc; *Learning Disability Evaluation Scale* — Renormed (LDES-R2)), 243-248.

10 Dhanda, A. & Jagawat, T. (2013). Prevalence and pattern of learning disabilities in school children. *Delhi Psychiat. J*., *16*(2), 386–390.

11 Mwanamukubi, L. (2013). Reading Difficulties in Grade 6 Learners and Challenges Faced by Teachers in Teaching reading: A Case Of Chadiza And Chipata Districts. *Humanities and Social Science,* 2, 20-25.

12 Cecilia, Vittorini, Cecilia Coffini, & Orio (2014). The prevalence of reading difficulties among children in scholar age. *Styles Commun*., *6* (1), 18-30.

13 Ozsoy, Kuruer & Chakiroglu, Özsoy (2015). Evaluation of students' mathematical problem solving skills in relation to their reading levels. *International Electronic J. Elem. Educ.*, *8* (1), 113-132.

14 Cvetkov, A.V. (2017). *Neiropedagogika dlia uchitelei: kak obuchat po zakonam raboty mozga [Neuropedagogy for teachers: how to teach according to the laws of the brain*]. Moscow: Izdatelstvo «Sport i kultura–2000» [in Russian].

15 Homskaja, E.D. (2011). *Neiropsikhologiia: khrestomatiia [Neuropsychology: Chrestomathy]*. Saint Petersburg: Piter [in Russian].

16 Bodrova, E., Leong, D., & Akhutina, T. (2011). When everything new is well-forgotten old: Vygotsky/Luria insights in the development of executive functions. *New Directions For Child And Adolescent Development*, 133, 11-28.

17 Perezhigina, N.V. (2002). Ontogenez vnimaniia: Tekst lektsii po kursu neiropsikhologii detskogo vozrasta [Ontogenesis of attention: The text of the lectures on the course of neuropsychology of childhood]. Yaroslavl: Yaroslavskii gosudatstvennui universitet [in Russian].

18 Glozman, Zh.M. (2009). *Neiropsikhologiia detskogo vozrasta [Neuropsychology of childhood*]. Moscow: Akademiia [in Russian].

19 Cvetkova, L.S. (1998). *Metodika neiropsikhologicheskoi diagnostiki detei [Methods of neuropsychological diagnostics of children*]. Moscow: Rossiiskoe pedagogicheskoe agentstvo; Kogito-tsentr [in Russian].

20 Anderson P. (2002). Assessment and development of executive function (EF) during childhood. Child Neuropsychol, 8, 71–82. doi: 10.1076/chin.8.2.71.8724.

21 Posner, M. I. & Rothbart, M.K. (2007). Research on attention networks as a model for the integration of psychological science. *Annu. Rev. Psychol*, *58, 1–23*. doi: 10.1146/annurev.psych.58.110405.085516

22 Spira E.G. & Fischel J.E. (2005). The impact of preschool inattention, hyperactivity, and impulsivity on social and academic development: a review. *J. Child Psychol. Psychiatry*, *46*, 755–773. doi: 10.1111/j.1469-7610.2005.01466.x

23 Lai, Yi-Jung & Kang-Ming, Chang (2020). Improvement of Attention in Elementary School Students through Fixation Focus Training Activity. *International Journal of Environmental Research and Public Health*, *17*(13), 47–80. https://doi.org/10.3390/ijerph17134780

24 Nasiri, E., Khalilzad, M., Hakimzadeh, Z. et al. (2023). A comprehensive review of attention tests: can we assess what we exactly do not understand? *Egypt J Neurol Psychiatry Neurosurg*, *59*(26), 4-15. https://doi.org/10.1186/s41983-023-00628-4

25 Eadaoin, J. Slattery, Eoin, O'Callaghan, Patrick, Ryan, Donal, G. Fortune, Laura, & P. McAvinue (2022). Popular interventions to enhance sustained attention in children and adolescents: A critical systematic review. *Neuroscience & Biobehavioral Reviews, 137,* 101-115.

26 Bruya, B. & Tang, Y-Y. (2021). Fluid Attention in Education: Conceptual and Neurobiological Framework. *Front. Psychol, 12,* 139–145. doi: 10.3389/fpsyg.2021.704443

27 Bizjuk, A.P. (2005). *Kompendium metodov neiropsikhologicheskogo issledovaniia [Compendium of methods of neuropsychological research]*. Saint Petersburg: Rech [in Russian].