



## The Effect of Coordination Training on Switching the Attention of Schoolchildren with Different Typologies

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### ABSTRACT

**Background:** The differentiated coordination training of children (7-8 years) improves the results not only of coordination abilities but also indicators of switching the attention of children who were training with the type of nervous system. **Aim of the study:** To identify the effect of coordination training on the development of coordination abilities of younger school children in physical education classes and to determine its impact on the ability to switching attention in children with different strengths of the nervous system. **Subjects and methods:** In total, 60 children aged 7-8 years participated in the study. The level of development of the ability to switching attention was determined by the "numbers" test. The strength of the nervous system was determined according to the method of "Tapping-test". The mathematical and statistical processing of the results was carried out with the help of the T-Student. **Results:** After 7 months of the pedagogical experiment, new results were obtained. Children from KG have improved their performance in the ability to switching attention to 2.1 s, ( $p > 0.05$ ), at the same time, the indicators in the test "Shuttle run 3 × 10 m" deteriorated from  $10.3 \pm 0.6$  s. to  $10.4 \pm 0.6$  s. ( $p > 0.05$ ). Children from EG-1 improved the performance in the test "Shuttle run 3 × 10 m" on 0.2 s. ( $p > 0.05$ ). At the same time, the indicators of switching attention also improved from  $48.7 \pm 4.1$  s. to  $45.4 \pm 3.9$  s. ( $p > 0.05$ ). **Conclusion and recommendations:** If in physical education class school children are trained in motor coordination, then the indicators in the development of coordination abilities will improve and the indicators of ability to shift attention will increase, especially those who are engaged in a differentiated method based on the strength of the nervous system.

**Keywords:** Coordination abilities, Switching attention, Strength of the nervous system, Differentiated approach, School children

### INTRODUCTION

The abilities that a person possesses can be differentiated as follows: strength, speed, endurance, flexibility and coordination abilities [1]. Of course, there are other classifications. If you look at the term ability, then you can understand that there are several [2,3]. They are always developing in the complex. Under the coordination abilities, as a rule, understand the ability of a person to solve complex motor tasks, arising unexpectedly, in the most rational way. The significance of such abilities is difficult to overestimate in everyday life, as well as in sports activities [4,5].

A sensitive period for the development of coordination abilities is a younger school age of 6-10 years [6,7]. However, most authors recommend the development of general coordination capability, and then specific ones.

Coordination capabilities, without a doubt, are connected with human mental processes. Some studies have suggested the study of the influence of physical qualities on mental processes [8,9].

One of the most important psychic processes in man is the switching of the attention-the possibility of a quick transition from one activity to another. Of great importance is the switching attention in the educational process of children. The need to switching the attention of school children is due to the peculiarities of the process itself: the change of various subjects during the day, the sequence of stages of studying the material in the classes, which involves changing the types and forms of activity [10,11].

Unfortunately, we did not succeed in finding research that determines the effectiveness of the coordination workout on the switching ability of children 7-8 years.

In the educational and training process of children, as a rule, until the age of 17-18 years, a pedagogical differentiated approach is used [12,13]. Children were differentiated into groups according to different characteristics, such as physical development, age, body type, and others [14-16]. One of these criteria is the typological features of the manifestation of the properties of the nervous system [17,18].

The aim of the study is to identify the effect of coordination training on the development of coordination abilities of younger school children in physical education classes and to determine its impact on the ability to switching attention in children with different strengths of the nervous system.

The hypothesis of the study-differentiated coordination training is expected to increase the level of development of coordination skills of junior school children and will improve their switching attention rates. Children who practice physical culture using typological features will achieve better results than those who do not develop coordinating abilities or are differentiated but without regard to the type of nervous system.

## MATERIALS AND METHODS

### Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

In the pedagogical experiment, children 7-8 years old, pupils of the 1<sup>st</sup> form, the ordinary school took part. Boys and girls were healthy and admitted to physical education classes. The duration of the physical education session was 45 minutes, 2 times a week, 59 classes were conducted. All participants in the experiment were differentiated into 3 identical groups of 20 people [19].

- KG: School children who were engaged in the standard methodology for school children who study in class 1 [20]
- EG-1: School children who were engaged in the same method, but after warm-up for 12-15 minutes, they performed physical exercises for the development of coordination abilities [1]
- EG-2: School children who performed coordinating exercises with different load. For schoolchildren with a weak nervous system, the load was voluminous, and for schoolchildren with strong nervous system-intense. The intensity of the load was increased by increasing the number of exercises and reducing the rest time. The volume of loading increased due to the increase in the number of repetitions of an exercise and an increase in rest time [18,21-24]

Means of development of coordination abilities were simple physical exercises with objects: balls, ropes, hoops and without objects: running, jumping, whipping and many others.

The methods of exercising were: a repeat method (learning a new exercise), a variation method (period good use of exercise), a game and a competition method (possession of the exercise in perfection).

One of the most important criteria for fulfilling physical exercises to develop coordination abilities is the difficulty of completing an exercise. The difficulty was raised by changing the weight and height of the objects, their location, using physical exercises in a combination of running and jumping, catching objects and others [1].

Before and after a pedagogical study, all children passed tests. The level of development of coordination abilities was determined on the test "Shuttle to run 3 × 10 m". The level of development of the ability to switching attention was determined by the "numbers" test. The strength of the nervous system was determined in EG-2 by the methodic of "Tapping-test".

### Shuttle Run 3 × 10 m

On the floor 2 lines "start" and "finish" are shown. The distance between the lines is 10 meters. By command "GO" the school children run from start to finish, touches the hand of the line, performs a jerk back and touch the start line again, after which performs the last jerk toward the finish and finishing [20].

## Numbers

The test is used for children of elementary school age. The form consists of 2 tables in the form of a square that has 16 cells each (Table 1). Inside cells are numbers from 1 to 16 [10].

**Table 1 Example of a blank in the “numbers” test**

4	9	14	11		15	14	2	7
16	1	2	6		3	5	8	10
13	8	15	3		12	9	13	16
5	12	7	10		1	11	6	4

**The essence of the methodic:** On the “GO” command, the school children alternates the numbers from 1 to 16 in ascending order first in the left square, then in the right. The assignment ends when the child crosses the number 16 in the right square.

**Result:** Time spent on the job was 0.1 s.

## Tapping-Test

On a horizontal sheet of paper, format A4, 6 squares are depicted.

**The essence of the methodic:** With maximum intensity, put points with a pencil in each square. Time for 1 square was 5 sec. The transition from one square to another is carried out on the command “Crossed”. After 6 squares the exercise ends. After the points in each square are counted, a graph is plotted on which the strength of the nervous system is determined [25].

Mathematical and statistical analysis was performed using T-Student. The result was considered significant at  $p < 0.05$ . Correlation analysis was carried out with the help of Biostatistics-2009 program [26,27].

## RESULTS

Before the beginning of the pedagogical experiment, all children were differentiated into 3 groups in such a way that the average indicators of coordination abilities in the test “Shuttle run  $3 \times 10$  m” were not significantly different ( $p > 0.05$ ). The results that were obtained before and after the experiment are presented in Table 2.

**Table 2 Indicators of coordination abilities and ability to switching the attention of schoolchildren (M ± m)**

Indicators	Group	Before	After	p-value
Shuttle run $3 \times 10$ m (s)	KG	$10.3 \pm 0.6$	$10.4 \pm 0.6$	$p > 0.05$
	EG-1	$10.3 \pm 0.6$	$10.1 \pm 0.5$	$p > 0.05$
	EG-2	$10.3 \pm 0.6$	$9.7 \pm 0.5$	$p < 0.05$
Numbers (s)	KG	$54.2 \pm 3.5$	$52.1 \pm 3.2$	$p > 0.05$
	EG-1	$48.7 \pm 4.1$	$45.4 \pm 3.9$	$p > 0.05$
	EG-2	$52.3 \pm 3.8$	$38.9 \pm 3.3$	$p < 0.05$

The results in Table 2 indicate that changes in the period of pedagogical research occurred in all indicators. Improving the switching of attention in all groups is likely to indicate the biological maturity of mental processes at this age. However, indicators in different groups have changed in different ways. Children from KG, who undertook the standard physical education method for the first class, improved their performance in the ability to switching attention to 2.1 s. ( $p > 0.05$ ), at the same time, the indicators in the test “Shuttle run  $3 \times 10$  m” deteriorated from  $10.3 \pm 0.6$  s. to  $10.4 \pm 0.6$  s. ( $p > 0.05$ ).

Children from EG-1, who were employed according to the standard methodic, performed coordination exercises after warm-up, improved their performance in the test “Shuttle run  $3 \times 10$  m” by 0.2 s. ( $p > 0.05$ ). At the same time, the indicators of switching attention also improved from  $48.7 \pm 4.1$  s. to  $45.4 \pm 3.9$  s. ( $p > 0.05$ ).

Children from EG-2, who performed physical exercises to develop coordination abilities, while using a differentiated approach based on the strength of the nervous system, significantly improved their performance in both tests. In the “numbers” test, the rates have improved from  $52.3 \pm 3.8$  s. to  $38.9 \pm 3.3$  s. ( $p < 0.05$ ). In the test “Shuttle run  $3 \times 10$  m”, the rates have improved from  $10.3 \pm 0.6$  s. to  $9.7 \pm 0.5$  s. ( $p < 0.05$ ).

Undoubtedly, the results of the new study indicate the effectiveness of using a differentiated approach based on the typological features of the properties of the nervous system of children, namely, the strength of their nervous system.

#### DISCUSSION

Of all the physical qualities and abilities of a person should be separately identified as coordination ability. Despite their diversity, they always develop in a complex way. They contribute to the efficient performance of work operations with the ever-increasing demands in the process of work; increase the ability of a person to manage their movements. Coordination capabilities ensure the economical spending of energy resources of children, affecting the amount of their use. Well-developed coordination abilities are necessary prerequisites for successful training of physical exercises. They influence the pace of mastering sports indicators [3-5].

The results obtained during the study (improvement of the indicators in the groups where classes were held for the development of coordination abilities) are confirmed by the opinion of the authors that the favorable period for the development of general coordination abilities is the younger school age [6,7].

The results of the study also confirm the authors' opinion that there is a correlation between physical qualities (coordination abilities) and mental processes [8,9,28]. The property of switching attention was chosen not by chance. This is a process that allows you to consciously move attention from one object to another or from one activity to another, which is not unimportant in the training and preparation of school children [10,11].

Despite the fact that we were unable to find out the effect of the coordination of the movement on the properties of children's attention, but for the first time, we managed to establish the effect of coordination training on the ability to switch the attention of school children 7-8 years.

There is no doubt about the effectiveness of using a differentiated approach in working with children [12,13]. Moreover, the criteria for differentiating children into groups and subgroups can be varied, for example, the type of physique, the position on the field, the age, and sex of the children [14-16].

Once again, the effectiveness of the typological criterion is proved, namely, the use of differentiated load for children with different strength of the nervous system. For school children with a strong nervous system, the load will be more intense and the volume load will be suitable for children with a weak nervous system. These data are confirmed by previous studies [18,21-24].

It is important to note that a person who has a weak nervous system is not weak in principle. This means that when performing physical exercises, he needs another load, as well as for a person with a strong nervous system. People with a weak nervous system are not inferior to people with a strong system and in some parameters even surpass them.

Thus, for the first time, a study was conducted on the effect of coordination training on indicators of the ability to switching the attention of children 7-8 years old who have different strengths of the nervous system. The purpose of the study was achieved, and the hypothesis was solved and confirmed by the results that were obtained after the pedagogical experiment. Children who were engaged in physical education using typological features achieved better results than those who did not develop coordination abilities or were engaged in differentiated, but without regard to the strength of the nervous system.

#### CONCLUSION

The results of the study make it possible to determine several conclusions. First of all, it is necessary to develop coordination capacities in physical education classes with children. Secondly, the systematic implementation of coordination exercises improves not only the indicators of coordination abilities but also improves the ability to switch the attention of children. Third, the impact of coordination exercises will be higher if you use a differentiated approach based on the typology of school children.

Undoubtedly, the article is relevant for lecturers at the university, teachers in schools, trainers of sports schools. New results have been obtained; they are promising for the study of new relationships of psychic abilities and physical qualities of children.

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