

## CHANGING SCHOOL-BASED ANXIETY DURING PHYSICAL EDUCATION, TAKING THE INDIVIDUAL TYPOLOGICAL APPROACH INTO ACCOUNT

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### Abstract

**Purpose of the study:** The purpose of the study is to identify changes in school-based anxiety in children aged 12 – 13 during their physical education using a special Program for the individual typological approach implementation.

**Methodology:** Two groups had been formed: reference and experimental (25 people each); three methods were used (Method for studying individual typological peculiarities of middle-school children by A. Belov, Method of Kondash's anxiety scale (1973), and Method of identifying general physical education of students); diagnostic testing of physical fitness was conducted (long jump from the spot; lifting the body in 30 sec. (press); push-up (girls); pulling up on the crossbar (boys); running 30 meters, shuttle running 3x10; bending forward from a sitting position).

**Main Findings:** The results of the study have been statistically processed with Excel 2000 and STATISTICA 8.0, using the Student's t-test for dependent and independent samples. The M average has been found; the differences have been considered significant at  $p < 0.05$ .

**Applications of this study:** The Program for the individual typological approach implementation has been compiled with an emphasis on reducing school-based anxiety in children aged 12 – 13; its features, objectives, indicators, criteria, content, and forms of implementation have been substantiated; a set of general physical exercises has been developed for each type of temperament, which includes the exercises for some groups of muscles of the upper shoulder girdle, back muscles, abdomen, and hips.

**Novelty/Originality of this study:** The significant improvement in the physical fitness of students from the experimental group compared to the reference one identified during the term proves the efficiency of the implemented physical education program, taking into account the individual typological approach to the personality of adolescents with an emphasis on reducing their school-based anxiety. The results of the study have allowed formulating recommendations for improving the approaches to conducting physical education classes.

**Keywords:** *School-based Anxiety, Children Aged 12 – 13, Individual Typological Approach, Physical Education, Program.*

### INTRODUCTION

Physical education of students is a pedagogical system of physical improvement of a child. Physical education is a special education process that influences the biological, psychological and social nature of a child ([Dolgova et al., 2016](#); [Hajcak, McDonald, Simons, 2003](#); [Óscar, Celina, Jesús, 2018](#)).

At the present stage of the society development, the general tasks of physical education of students in their formulation and solution in the real educational process should be specified in accordance with the age peculiarities of students, the specific content of educational material, and stages of training and education.

Physical education is a major school subject, with its tasks including the development and improvement of the physical qualities of students. As a result of training, a child can acquire an impartial assessment of his or her own personal physical development and state during training. Adolescents are especially inclined to over represent themselves critically, but they also consider themselves to be the "center of the Universe". Such contradictions in self-perception do not allow them to adequately assess themselves and people around them. However, a person often has such feelings and emotions at this age that he or she cannot understand and is ashamed of, which results in the desire to invert and hide the inner world from others.

Students with a normal level of self-assessment anxiety have no psychological and emotional difficulties in self-introduction and self-disclosure. These children easily find contact with others, quickly start new acquaintances, their relationships are deeper and emotionally richer than of those who feel anxiety in this regard.

Due to this, it is relevant to take the individual typological features of the personality of children into account, implement an individual differentiated approach to education based on the application of innovative developments to the system of assessing the physical health of students, in order to understand and be aware of such a phenomenon as school-based anxiety ([Fyodorov, Erlikh, 2016](#); [Morrison et al., 2016](#); [Smith, Zambrano-Vazquez, Allen, 2016](#)). School-based anxiety can arise either from the student's real disadvantage in the most significant areas of activity and communication, or exist in spite of an objectively prosperous environment, resulting from certain personality conflicts and impairments in the

development of self-esteem. Students who study well and even perfectly, are responsible in studies, social life, and school discipline often feel high anxiety, and this seeming well-being costs them an unreasonably high price and is fraught with breakdowns, especially with sharp increase inactivity. Such students have expressed vegetative reactions, neurosis-like and psychosomatic disorders, as well as manifestations of interpersonal anxiety. Interpersonal anxiety arises as a result of the child's conflict with adults and especially with peers when the child feels rejected and lacks attention from other people. Besides, interpersonal anxiety may be associated with the personal features of the child, which caused difficulties in communicating with other people. Communication plays a major role in personality formation in adolescence. The lack of communication skills makes a teenager moody, grumbling, lag behind in studies and often conflict with adults and peers.

The development of the human body is a result of the complex interaction of its organs and systems with each other and with the environment. Physical exercises play an important role in maintaining the constancy of the internal environment of the body, they balance the influence of various external and internal irritants. The laws of motion in the body and its parts are learned through exercises. Students learn to control their movements and acquire new motor skills and abilities when performing physical exercises. This, in turn, allows us to master more complex motor actions and learn the laws of motion in sports. The better the motor skills and abilities are, the easier the person adapts to environmental conditions, and the easier new forms of movement develop (Sokol, Serper, 2017; Gorelik, Belyaev, Filippova, Chumakov, 2018). Exercises often require the extraordinary manifestation of a range of personal qualities. A person develops valuable traits and character qualities (courage, perseverance, hard work, determination, etc.) by overcoming various difficulties and managing emotions when exercising (Oyserman, Destin, Novin, 2015; Tomljenović, Begić, Maštrović, 2016).

The most important components of any physical training technology based on individual typological features are the following (Dolgova et al., 2018a; Zhakupova et al., 2018a; Zhakupova et al., 2018b)

1. Indicators and criteria by which students can be divided into specific groups for subsequent efficient impact; and
2. Content and orientation of the set of physical exercises.

The purpose of the study is to identify changes in school-based anxiety in children aged 12 – 13 during their physical education using a special program for the individual typological approach implementation.

## METHODS

The study was conducted on the basis of school 103 in Chelyabinsk. 50 students of the 7th grade participated in it: 26 boys and 24 girls (13 – 14 years old), with two groups, formed: the reference group and the experimental group (25 people each). All students participating in the study were healthy and admitted to physical training in the general medical group. During the school term, students from the reference group followed the basic general physical education program.

Physical education classes in secondary schools are held 3 times a week, 40 – 45 minutes each. They are mainly focused on motor activity.

Each physical education class consists of three functionally related parts: warming-up, main, and final. The sequence of these parts reflects the patterns of changes in the body's performance under the influence of physical exertion. At the beginning of the load, the body overcomes the inertia of rest due to a gradual increase in the functional performance of its organs and systems. This is called a warming-up phase, which corresponds to the warming-up part of the class. Then, the achieved level of functional performance is maintained for a certain time with small fluctuations towards its increase and decrease. This is called a sustainable performance phase, which corresponds to the main part of the class. As the functional reserves of the working organs and body systems (cardiovascular, respiratory, muscle, etc.) are used, the working capacity of a student is gradually reduced. This is called an exhaustion or fatigue phase, which corresponds to the final part of the class.

Three methods have been used in the study (Zabrodin, Pakhalyan, 2015; Zagvyazinsky, 2008).

1. Method of studying the individual typological features of middle-school children by A. Belov. During the test, the score is found by the number of "+" got for each type of temperament separately. Questions of the first block describe a phlegmatic person; the second block describes a melancholic; the third block describes a choleric, and the fourth block describes a sanguine.
2. Method of Kondash's scale of anxiety (1973). This type of scales is used to evaluate not the presence or absence of any feelings or anxiety symptoms, but rather the situation itself and the degree of anxiety it can cause. The first advantage of scales of this type is that they allow revealing areas of reality and objects that are the main sources of anxiety for a student, and the second advantage is that they are less dependent on the characteristics of the introspection development in students than other types of questionnaires. The method includes situations of three types: 1) situations related to school and communication with teachers; 2) situations that actualize self-introduction; and 3) communication situations. The types of anxiety revealed by this scale are school-based, self-assessing, and interpersonal.

- Method of identifying the general physical fitness of students. The implementation of the educational program for general physical education provides for diagnostic testing of the physical fitness of students. The set of tests for indicators of the physical fitness includes a long jump from the spot; lifting the body in 30 sec. (press); push-ups (girls); pull up on the handlebar (boys); running 30 meters, shuttle running 3x10, and bending forward from a sitting position.

The generally accepted methods of mathematical statistics described in the special literature (Sidorenko, 2003) were used to process the obtained experimental material. The results of the study were statistically processed with Excel 2000 and STATISTICA 8.0, using the Student's t-test for dependent and independent samples. M average was found, the differences were considered significant at  $p < 0.05$ .

## RESULTS AND DISCUSSION

The Program for the individual typological approach implementation with an emphasis on reducing school-based anxiety in children aged 12 – 13 has been developed following the results of the ascertaining experiment.

The Program for the individual typological approach implementation should have allowed for more efficient implementation of the pedagogical process in physical education. The program included a set of exercises for each type of temperament, focused on strengthening the body and nervous system of students.

*Peculiarities of the proposed Program for reducing school-based anxiety that takes the individual typological approach implementation into account, are as follows:*

- Representatives of each type of temperament are offered physical activities that most correspond to the psychological potential of the students;
- Individual and group method of training or the method of circuit training are used;
- Goals of the proposed program include the development a value-added attitude in students towards their health and lifestyle based on the transfer of knowledge necessary for the development of health saving thinking and a focus on a healthy lifestyle;
- The proposed program contributes to the formation of important social skills in students, which contribute to successful social adaptation and prevention of harmful habits and deviant behaviors.

*Objectives of the program of forming a valuable attitude to physical education, taking the individual typological approach implementation into account, are as follows:*

- The popularization of mass sports via extracurricular activities,
- Encouragement of participation of students and their parents in sports events of various levels,
- Formation of the need for independent physical education,
- Individual typological approach implementation in the teaching of physical culture among students,
- Integrated development and improvement of the physical qualities in students, and
- Prevention of emotional stress and anxiety in adolescents.

Forms of the Program implementation are as follows: as part of education; during extracurricular activities; after classes; Terms of implementation are the following ones: during the school term.

A set of general physical exercises was developed for each type of temperament, which was further improved with the subsequent exercises. The set included exercises on some muscle groups: upper shoulder girdle, back muscles, abdomen, and hips.

The distribution of educational material in exercises as part of education is as follows (Table 1).

**Table 1:** Approximate distribution of educational material in exercises

No.	Type of the program material	Term I	Term II	Term III	Term IV	Total hours
1.	Athletics	14			14	28
2.	Ski training			20		20
3.	Sport games	13	21			34
4.	Gymnastics			10	10	20
5.	Total	27	21	30	24	102

The following results were obtained in the study of *individual typological peculiarities of students from the studied groups*: 4 choleric students, 5 phlegmatic students, 11 sanguine students, and 5 melancholic students were detected in the

reference group. Temperament types in the experimental group were distributed as follows: 3 choleric, 4 phlegmatics, 12 sanguine, and 6 melancholic students.

The students from the experimental group, depending on the types of temperament, were offered sets of exercises that they performed in physical education classes, as well as after school.

Twelve adolescents in each group had a high level on the School-based Anxiety scale, which was 48 % of the total number of testees, at the beginning of the school term. 40 % of the students (10 people) in the reference group and 16 % (4 people) in the experimental group had a high level on the School-based Anxiety scale by the end of the school term.

Eight adolescents in the reference group, which was 32 % of the total number of testees, and 7 people in the experimental group (28 % of all students) had a slightly increased level on the School-based Anxiety scale at the beginning of the term. 36 % of the students (9 people) in the reference group and 28 % (7 people) in the experimental group had a slightly increased level on the School-based Anxiety scale by the end of the school term. These figures indicate that these children tend to feel the anxiety of varying degrees of intensity while in school (during studies, tests and knowledge evaluation, while communicating and interacting with teachers and peers).

Five adolescents in the reference group, which was 20 % of the total number of testees, and 6 people in the experimental group (24 % of the total number of students in the class) had a normal level on the School-based Anxiety scale at the beginning of the term. 24 % of the students (6 people) in the reference group and 56 % (14 people) in the experimental group had a normal level on the School-based Anxiety scale by the end of the school term. The authors believe that school, its requirements, and difficulties are not traumatic for these children, which creates conditions for normal child functioning and development during studies, establishing friendly contacts and relationships.

Nine adolescents in the reference group, which was 36 % of the total number of testees, and 8 people in the experimental group (32 % of all students) had a high level on the Interpersonal Anxiety scale at the beginning of the term. 32 % of the students (8 people) in the reference group and 20 % (5 people) in the experimental group had a high level on the Interpersonal Anxiety scale by the end of the school term. This suggests that their interpersonal anxiety is associated with the relationship of a child with other people: peers and adults.

Nine adolescents in each group, representing 36 % of the total number of testees, had a slightly increased level on the Interpersonal Anxiety scale at the beginning of the term. 32 % of the students (8 people) in the reference group and 20 % (5 people) in the experimental group had a slightly increased level on the Interpersonal Anxiety scale by the end of the school term. The obtained results indicate that the emotional state of children from the reference group, in which their social contacts develop, is intense and negatively colored throughout the school term. As such, the prerequisites arise for the emergence and development of anxiety as a result of interpersonal stress ([Dolgova et al., 2018b](#); [Isaev, Khusaynova, Erlich, Epishe, 2013](#)).

Seven adolescents in the reference group, which was 28 % of the total number of testees, and 8 people in the experimental group (32 % of the total number of students) had a normal level on the Interpersonal Anxiety scale at the beginning of the term. The number of students with a normal level on the Interpersonal Anxiety Scale increased by the end of the school term: by 2 people in the reference group and by 7 people in the experimental group.

Seven adolescents in the reference group, which was 28 % of the total number of testees, and 6 people in the experimental group (24 % of the total number in the group) had a high level on the Self-assessment Anxiety scale at the beginning of the term. 24 % of the students (6 people) in the reference group and 16 % (4 people) in the experimental group had a high level on the Self-assessment Anxiety scale by the end of the school term. This fact indicates that children in this category feel negative emotions in the situation of introducing themselves to others, in the process of self-disclosure.

Eight adolescents in each class had a slightly increased level on the Self-assessment Anxiety scale at the beginning of the term, which was 32 % of the total number of testees. 28 % of the students (7 people) in the reference group and 24 % (6 people) in the experimental group had a slightly increased level on the Self-assessment Anxiety scale by the end of the school term. Based on this fact, it can be assumed that the fear of self-assessment is present only in certain situations or with certain people in this case. It is also possible that this fear is not clearly expressed and does not dominate other emotions.

Ten adolescents in the reference group, which was 40 % of the total number of testees, and 11 in the experimental group had a normal level on the Self-assessment Anxiety scale at the beginning of the term. 48 % of the students (12 people) in the reference group and 60 % (15 people) in the experimental group had a normal level by the end of the school term.

The authors believe that the high level of anxiety in students during the school term can be caused by the following reasons: poor preparation for classes; fear of expressing their opportunities, as children believe that they will be evaluated lower than their peers demonstrating higher level of knowledge, low self-esteem, and the presentation of high requirements from teachers.

The general physical fitness of schoolchildren from the studied groups during the school term was evaluated by control tests (Table 2).

Following the results from Table 2, the girls in the experimental group showed a trend to improve the performance in the following tests by the end of the school term: running 30 meters – by 9.1 % ( $p < 0.05$ ); lifting the body (60 sec.) – by 8.9 % ( $p < 0.05$ ); push-ups – by 14.8 % ( $p < 0.01$ ); long jump – by 3.0 %; bending forward from a sitting position – by 7.8 % ( $p < 0.05$ ); and shuttle running 3x10 – by 3.3 %, compared with the reference group.

The exercises included in the proposed set make the muscles stronger, more elastic and enduring, as they are aimed at the uniform development of all muscle groups and physical qualities of students.

**Table 2:** Results of testing general physical fitness in girls of the studied groups

Test	Group			
	Reference group		Experimental group	
	September	May	September	May
Running 30 meters (sec.)	5.7 ± 0.3	5.5 ± 0.3 100 %	5.8 ± 0.2	5.0 ± 0.2* 90.9 %
Lifting the body (60 sec.)	23.2 ± 2.1	31.4 ± 2.3 100 %	24.1 ± 1.3	34.2 ± 2.2* 108.9 %
Push-ups (count)	11.2 ± 1.1	14.2 ± 2.4 100 %	11.9 ± 0.9	16.3 ± 2.2** 114.8 %
Long jump (cm)	159.5 ± 7.3	167.6 ± 4.2 100 %	160.5 ± 5.1	172.7 ± 5.3 103.0 %
Bending forward from a sitting position (cm)	12.3 ± 0.9	15.3 ± 2.3 100 %	12.5 ± 0.7	16.5 ± 1.8* 107.8 %
Shuttle running 3x10 (sec.)	9.2 ± 0.3	9.0 ± 0.2 100 %	9.1 ± 0.2	8.7 ± 0.2 96.7 %

Note: p is the reliability of differences in the results of the experimental group by the end of the year in relation to the reference group, found using the Student's t-test: \* –  $p < 0.05$ ; \*\* –  $p < 0.01$ .

The boys in the experimental group showed a trend to improve the performance in the following tests by the end of the school term: running 30 meters – by 10.9 % ( $p < 0.05$ ); lifting the body (60 sec.) – by 8.4 % ( $p < 0.05$ ); pull-ups – by 29.2 % ( $p < 0.01$ ); long jump – by 3.8 %; bending forward from a sitting position – by 24.7 % ( $p < 0.01$ ); and shuttle running 3x10 – by 3.6 %, compared with the reference group (Table 3).

**Table 3:** Results of testing general physical fitness in boys of the studied groups

Test	Group			
	Reference group		Experimental group	
	September	May	September	May
Running 30 meters (sec.)	5.6 ± 0.3	5.5 ± 0.3 100 %	5.4 ± 0.2	4.9 ± 0.3* 89.1 %
Lifting the body (60 sec.)	35.5 ± 1.3	39.4 ± 2.2 100 %	36.4 ± 2.1	42.7 ± 2.1* 108.4 %
Pull-ups (count)	5.2 ± 0.2	7.2 ± 0.3 100 %	5.3 ± 0.3	9.3 ± 0.2** 129.2 %
Long jump (cm)	161.6 ± 3.1	170.4 ± 3.2 100 %	162.7 ± 3.6	176.8 ± 3.2 103.8 %
Bending forward from a sitting position (cm)	6.2 ± 0.3	8.1 ± 0.2 100 %	6.5 ± 0.3	10.1 ± 0.8** 124.7 %
Shuttle running 3x10 (sec.)	8.7 ± 0.2	8.4 ± 0.3 100 %	8.8 ± 0.3	8.1 ± 0.3 96.4 %

Note: p is the reliability of differences in the results of the experimental group by the end of the year in relation to the reference group, found using the Student's t-test: \* –  $p < 0.05$ ; \*\* –  $p < 0.01$ .

As is known, general physical training ensures the comprehensive and harmonious physical development of a child (Adolph, Margraf, 2017; Fine, 2002; Mazur, Mykhailyshyn, Budnyk, Serman, 2018). The identified significant

improvement in the physical fitness of the students in the experimental group compared to those in the reference group during the school year proves the efficiency of the implemented physical education program, taking the individual typological approach to the personality of adolescents into account, with an emphasis on reducing their school-based anxiety.

## CONCLUSION

The results of the study have allowed formulating some recommendations for improving the approaches to holding physical education classes: an individual typological approach should be implemented in physical education classes to make physical loads adequate to the student's capabilities. The main form of exercise at school is a physical education class. Compared with other forms of physical education, physical education class has several advantages, because: it is the most widespread form of organized, systematic and compulsory classes for students; it is held on the basis of a scientifically-based state program designed for a long study term; it is held under the guidance of a teacher who takes the age-gender and individual characteristics of students into account; it promotes the comprehensive and harmonious physical improvement of all students, regardless of their motor abilities, athletic performance, distribution into medical groups, etc. Teachers do not differentiate their requirements to the children attending sports sections and those with little experience in motor activity or minor deviations in health. The differences between their physical abilities are quite significant, although standards are uniform for both groups of children. Exercises can help purposefully influence the formation of physical qualities in the child, which can naturally improve his or her physical development and physical fitness, which, in turn, will influence health indicators. For example, the improvement of endurance forms not only the ability to perform any moderate work for a long time but also improves the cardiovascular and respiratory systems. Monitoring of the progress in the physical qualities of a child during schooling should be introduced in the physical education system, and motor abilities should be assessed based on the analysis of indicators for the previous years.

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## AUTHOR CONTRIBUTIONS

Structuring the experimental design: V.I. Dolgova, N.V. Mamylyna, G.Yu. Golieva, E.G. Kapitanets, O.A. Kondratieva; formulating the problem/hypothesis: V.I. Dolgova, N.V. Mamylyna; collecting the data: V.I. Dolgova, N.V. Mamylyna, G.Yu. Golieva, E.G. Kapitanets, O.A. Kondratieva; literature review: V.I. Dolgova, N.V. Mamylyna; organizing and conducting the statistical analysis: N.V. Mamylyna, G.Yu. Golieva, E.G. Kapitanets, O.A. Kondratieva; interpreting the results: V.I. Dolgova, N.V. Mamylyna, G.Yu. Golieva, E.G. Kapitanets, O.A. Kondratieva; writing a major portion of the paper: V.I. Dolgova, N.V. Mamylyna; building the apparatus: V.I. Dolgova, N.V. Mamylyna, G.Yu. Golieva, E.G. Kapitanets, O.A. Kondratieva.

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