



## **Identifying the interconnection between self-esteem and the development rate of agility and speed of girls at the age of 13 in the process of physical education**

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**Journal for Educators, Teachers and Trainers, Vol. 13 (2)**

<https://jett.labosfor.com/>

Date of reception: 28 Jan 2022

Date of revision: 16 May 2022

Date of acceptance: 24 May 2022

**Viacheslav Babych, Vitalii Kurilo, Volodymyr Prystynskyi, Oleksandr Dubovoi, Yurij Boychuk, Serhii Kharchenko, Volodymyr Zaitsev, Volodymyr Dubovoi, Valerii Gazaiev (2022). Identifying the interconnection between self-esteem and the development rate of agility and speed of girls at the age of 13 in the process of physical education *Journal for Educators, Teachers and Trainers*, Vol. 13(3). 111-120.**

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### **ABSTRACT**

The aim of the study is to identify the interconnection between self-esteem of girls at the age of 13 and the development rate of physical qualities (agility and speed). To develop and verify experimentally the effectiveness of the methods for the formation of self-esteem and to discover its influence on the development of physical condition.

The experiment involved 13-year-old female students of the standard training group (healthy school students) who study at general secondary school. The number of respondents was 97 schoolgirls (48 girls in the control group and 49 girls in the experimental group). A significant interconnection has been discovered between self-esteem of 13-year-old schoolgirls and their physical condition. It has been proved that the indices characterizing the level of self-esteem have a statistically significant influence on the development of agility and speed. The implementation of the original methods (a set of fitness exercises from fitness yoga, body-ballet, fly-yoga), as well as the use of modified psychotechnics (the autogenic training) have contributed to raising self-esteem and, as a consequence, accelerating the development rates of the level of physical qualities, in particular speed and agility.

**Keywords:** girls at the age of 13, self-esteem, self-confidence, agility, speed, physical condition.

### **1. INTRODUCTION**

Our long-term observations, analysis and generalization of educational experience testify that adolescents, especially girls at the age of 13 years, experience a slowdown in the development rate of certain physical qualities, especially such as speed and agility. This is confirmed by a number of works by respected scientists (Khudolii, Ivashchenko, 2013, Ivashchenko, Khudolii, Yermakova, Veremeenko, 2018). These studies aimed to identify the structure of power abilities development of girls at the age of 12-14. The results showed that agility and coordination of movements of girls develop at less high rates, than, for example, certain power indices. The current pattern of moderation in the development rate of agility and speed has led us to the need of identifying the factors that contribute to the effectiveness of this process. Other studies (Kovac, Jurakta, 2003) suggest that

the latent structure of the motor area of boys and girls is broadly similar but differs most at the age of 13. This is primarily because girls reach puberty earlier than boys do. Accordingly, it is manifested in the change of psychological states of 13-year-old girls, including the manifestation of self-esteem. It is at the age of 13 that girls become more vulnerable, more sensitive when their appearance is criticised by boys (their peers). Girls become less strenuous in exercising, which in one way or another affects their physical condition.

Other studies (Archard, 2012) also demonstrate that girls lack self-esteem, especially in the context of leadership. Some scholars (Meland, Haugland, Breidablik, 2007) point out that adolescent girls tend to complain of poor health more than boys do. Girls at this age, as well as at the older age, are also more likely to be dissatisfied with their appearance, their weight, etc. than boys are.

Studies in this context prove that it is at this age that there is a decline in girls' self-esteem, which in its turn often leads to depressive symptoms (M. Masselink Roekel, 2017). The research by Richard (W. Richard, 2005) testifies that there is deterioration in adolescents' self-esteem, especially of girls, which may increase their vulnerability to risky behaviour (Biro, Ruth, 2006). The susceptibility to the development of depressive symptoms also increases (Masselink, Van Roekel, Oldehinkel, 2018). Along with this, scientists (Jan, Soomro, & Nawaz, 2017) emphasize that educators and parents should play a more active role in raising adolescents' self-esteem. Therefore, taking into account the analysis of the results of the studies given above, we should emphasize the appropriateness of conducting a survey that would determine, firstly, the degree of influence of the level of self-esteem on the development of agility and speed of girls at the age of 13, and secondly, the possibility of increasing the level of self-esteem by means of physical education.

The research objective: to identify the interconnection between self-esteem of girls at the age of 13 and the development rate of physical qualities (agility and speed). To develop and verify experimentally the effectiveness of the methods for the formation of self-esteem and to discover its influence on the development of physical condition.

### Hypothesis

we assume that the development level of agility and speed of girls at the age of 13 is interconnected with their level of self-esteem.

In order to verify this hypothesis the following tasks have been outlined and implemented:

- to find out the degree of influence of the raise of self-esteem on the development rate of speed and agility with the account of the specifics of the age period peculiarities;
- to develop and implement the original methods in physical education lessons and to verify experimentally their effectiveness in raising self-esteem with the account of the specifics of the age period peculiarities (psychophysiological changes of the body of girls at the age of 13).

## 2. MATERIALS AND METHODS

The experiment involved 13-year-old female students of the standard training group who study at general secondary schools № 8 in Sloviansk, Donetsk Oblast, and № 8, 10 and 16 in Kramatorsk, Donetsk Oblast, Ukraine. The total number of respondents was 48 girls in the control group and 49 in the experimental group, the distribution of which took into account the desire of respondents (girls 13 years old) and their parents to engage in physical education according to the experimental program. The experiment participants and their parents had been informed about the specifics of the study and had signed a consent document.

In order to determine the development level of physical condition of the girls, namely agility and speed, the following tests from the program "State tests and standards of physical fitness of the population of Ukraine" were used:

- agility was determined by a shuttle run  $4 \times 9$  m (sec). The indices: 13,4 sec — a low level of the agility development; 13,2 sec — a level below average; 12,8 sec — an average level; 12,4 sec — a level above average; 11,8 sec — a high level (test 1);
- speed was determined by a run of 30 m (sec). The indices: over 6,8 sec — a low level of speed development; 6,8 sec — a level below average; 6,6 sec — an average level; 6,4 sec — a sufficient level; 5,8 sec — a high level (test 2).

In order to assess the level of self-esteem at the initial, current and final stages, a questionnaire developed by Spencer A. Rathus was used (Test 3). (Big encyclopedia of psychological tests, 2013)

Statistical analysis of the research results was carried out using the method of confidence of intervals based on Student's t-distribution. The following parameters were calculated: the arithmetic mean ( $X$ ), the root-mean-square deviation ( $\sigma$ ), the measure of precision or the average deviation ( $m$ ), the confidence intervals index ( $t$ ), the degree of probability ( $P$  at 95,0%; 99,0 %; 99.9%); the degree of freedom ( $c$ ) was determined at  $n \geq 3$ ; and the correlation was identified ( $r$ ).

### 3. ORGANIZATION OF RESEARCHES.

The peculiarities of the methods that we have developed for raising self-esteem of 13-year-old girls (in the experimental group) manifest themselves in the combination of various types of physical activity, including those popular with girls, such as fitness yoga, body ballet, fly fitness, etc., as well as modified psychotechnics (the autogenic training).

The stages of implementing the methods for raising self-esteem of 13-year-old girls:

Stage 1 (October-November, 2019). In the first stage, the girls performed mostly simple physical exercises on a balance beam, fitness yoga and body-ballet exercises.

Exercises on a balance beam:

- 1) walking on a balance beam;
- 2) walking on a balance beam with obstacles (the height of an obstacle — from 15 cm, the length of an obstacle — 10-15 cm);
- 3) balancing on an obstacle: the balance is on the right and left legs, arms extended sideward;
- 4) bouncing;
- 5) walking with side turns (180°);
- 6) leaning the torso forward (hands touching the balance beam).

Fitness yoga exercises:

- 1) exercises for balance —“the warrior pose”: standing on one leg (the left one and the right one, in turn), arms forward, looking forward, the other leg straight back, parallel to the floor (hold from 3 sec to 10 sec);
- 2) feet wider than one’s shoulders. Hips do figure 8 horizontally. The exercise is performed “smoothly” with a smile. The duration is 1-2 min.

Body ballet exercises:

- 1) standing near stall bars, holding it with both hands alternately, swings back are performed in turn by the right and left legs, trying to make the swing as high as possible. From 5 to 15 reps per each leg are performed;
- 2) standing sideways to the stall bars, a leg on the stall bars (at the torso level gradually increasing the height up to the shoulder level). The torso leans towards the leg, one arm rests on the raised leg, the other arm up. From 4 to 12 reps are performed;
- 3) standing sideways to the stall bars, one hand holding the stall bars, the other — straight forward. The leg (the farthest from the stall bars) swings alternately forward and sideways (90° swings). Each leg performs from 5 to 15 swings.

In addition, we used modified psychotechnics (the autogenic training) in order to increase self-esteem.

When modifying the autogenic training, we relied on the studies (Kozina, Iermakov, 2015; Kozina, Iermakov, 2016) which prove that the implementation of the autogenic training in the form of mental images is more effective than its usage in the traditional form.

**Example 1:** I feel that I am getting more agile, faster and more beautiful. My body becomes slim, flexible and ready for any tests. The exercises that I am constantly doing have a positive effect on my physical and psychological state. After each exercise, I become more attractive, bolder and more confident in my abilities and myself. I can manage my emotions, not get offended by others, and overcome all the difficulties that arise on my way.

**Stage 2** (December-January, 2019-2020). In the second stage, the following exercises were added to the exercises performed in the first stage:

Fly yoga exercises (exercises aimed at feeling control over one’s body when there is no foot or hand support on the floor)

- 1) lying with one’s back on a special “hammock” (a wide acrobatic strip) fixed to the ceiling (the height of the lower part of the strip is 70 cm from the floor), the small amplitude oscillations are performed (1-2 minutes);
- 2) lying down on one’s stomach in a “hammock”, arms out to the side. Swinging and flight simulation are performed with the help of the teacher (1-2 minutes);
- 3) with the help of the teacher, rolls forward in a “hammock” by pushing one’s feet against the floor are performed (3-4 times).

Exercises with a dummy for practicing hand strokes and foot kicks:

- 1) right and left kicks (Low kick). Imitation of kicking a leg of a potential opponent;
- 2) right and left kicks (Front kick — direct kick). Imitation of a direct kick on the trunk.

In the second stage, we also used modified psychotechnics (the autogenic training) in order to increase self-esteem

**Example 2.** I am a very pretty and agile girl. I feel confident; I do not pay attention to those who are trying to mock me. I am very smart, fast and bold. I know that my future depends on my self-esteem. Every day I become more and more attractive and persistent in achieving my goal. I do all the exercises with pleasure. Each exercise gives me strength and confidence. I overcome all my fears confidently and uncompromisingly. I feel brave and very beautiful all the time.

**Stage 3** (February-March, 2020). In the third stage, the following exercises were added to the exercises performed in the first and second stages:

Fly yoga exercises:

1) lying down on a “hammock” (1-5 lumbar vertebrae), the back is bent with arms resting on the floor, legs are in the air paralleled to the floor. The arms are pushing against the floor and slight swings are made. It is important to be careful and keep the balance.

2) lying with one’s back on the acrobatic strip, hands holding the side parts of the strip, rolls back are performed. When the feet touch the floor, rolls forward are made (repeat 3-4 times).

Exercises with a dummy (for practicing hand strokes and foot kicks):

1) right and left kicks (at the torso level of the potential opponent);

2) drilling arm defense techniques.

Modified psychotechnics (autogenic training) was also used to raise self-esteem.

**Example 3.** I feel more and more confident. Physical education lessons give me more confidence. I am an extremely brave, strong and beautiful girl. My age is wonderful. I feel that I overcome any difficulties with confidence. I can compete with anyone and win! I am fully set to win. My life credo is a winning aspiration! I am confidently facing the future. I am becoming more energetic, persistent, and purposeful. I am the boldest and most beautiful girl in the world...!!!

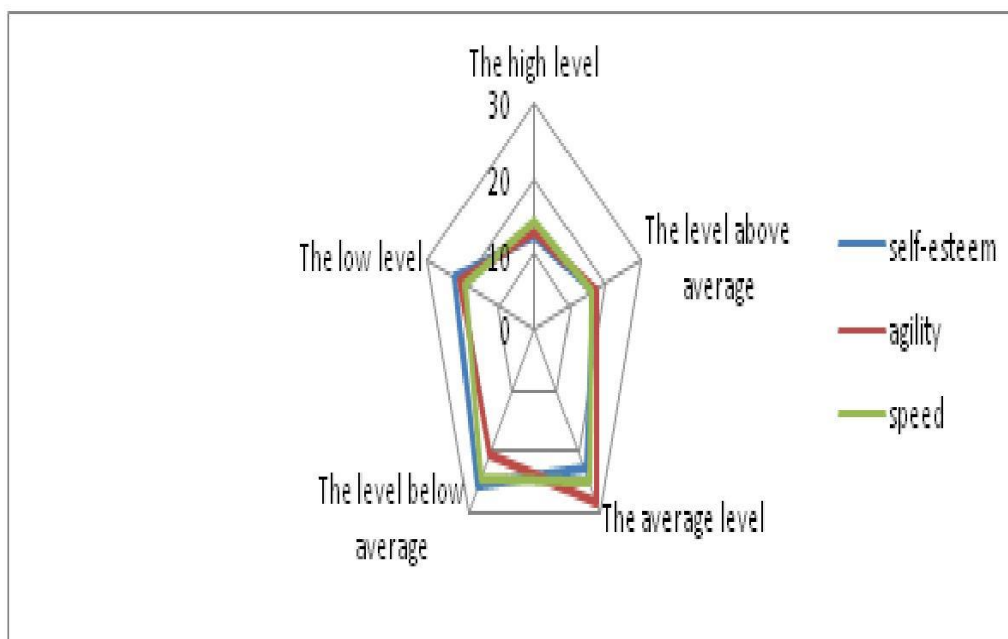
It should also be noted that, firstly, the lessons with the girls were carried out separately from the boys, and secondly, in the individual conversations, the teacher constantly emphasized that she (this girl) was the most beautiful and the most courageous. At the same time, the physical education teacher took into account both the individual characteristics of each girl, as well as her mood, relationships in her family and class, as well as the girl’s temperament, and other factors (except for the peculiarities of the age period) that could also affect the decline in her self-esteem.

Individual exercises, including fitness yoga and modified autogenic training, were also performed by the girls at home.

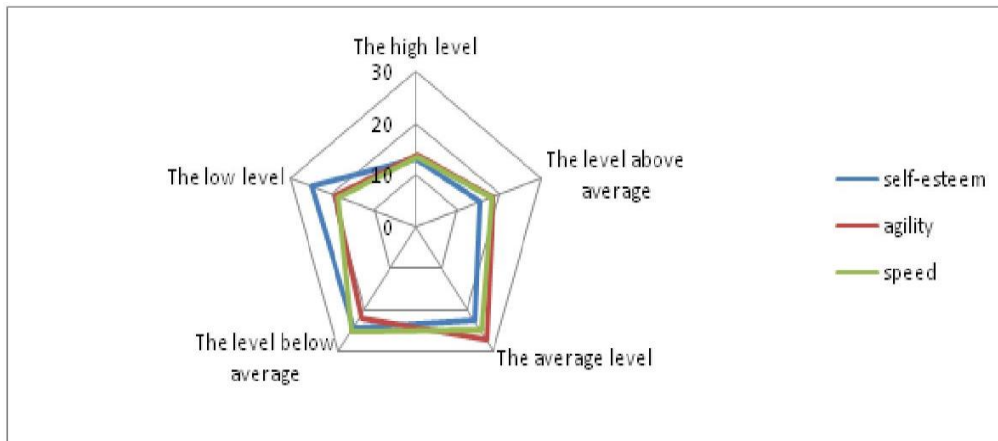
In the control group physical education classes for 13-year-old girls took place according to the traditional program.

#### 4. RESULTS

The development rate of agility of 20,8% of the girls and the development rate of speed of 19,7% of the girls were at a low level. The differences range from 1,5% (between the level of self-esteem and the level of agility) to 2,6% between the level of self-esteem and the level of speed. Only 12,6% of respondents showed a high level of self-esteem; 13,1% had highly developed agility and 14,2% — a high level of speed (discrepancies between a high level of self-esteem and agility were 0,5%; between the level of self-esteem and speed level — 1,6%). A similar tendency is observed for the girls of the control group (see Fig. 1,2).



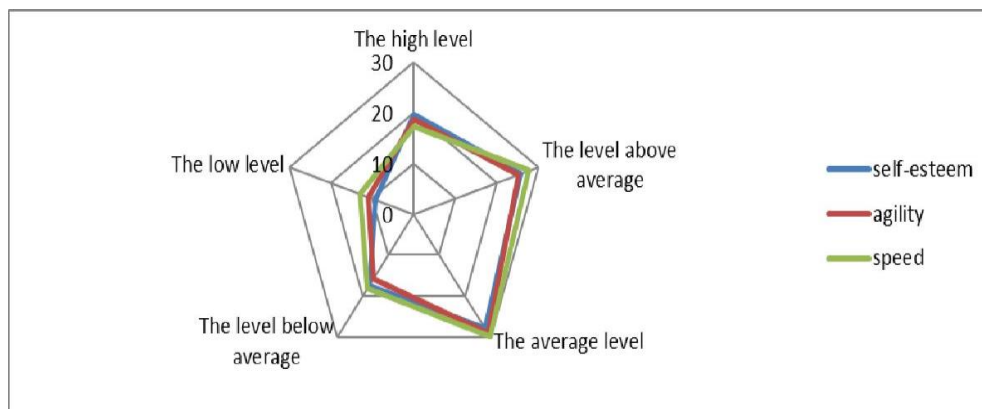
**Fig. 1:** The level of self-esteem and the development level of agility and speed of girls at the age of 13 in the diagnostic stage of the experiment in the experimental group.



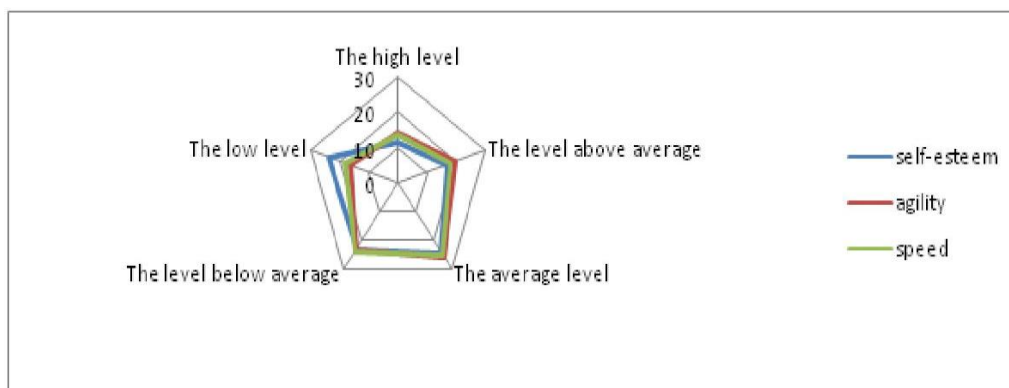
**Fig. 2: The level of self-esteem and the development level of agility and speed of girls at the age of 13 in the diagnostic stage of the experiment in the control group.**

Thus, it should be noted that in the diagnostic stage (prior to the implementation of the original methods of raising self-esteem), the level of self-esteem and the level of physical qualities of almost a quarter of the respondents in the control and the experimental groups were mainly low and below average.

The comparative analysis of the results **after** the implementation of the original methods demonstrates that in the experimental group there were significant positive changes. This applies to both the level of self-esteem and the development level of the physical qualities — speed and agility. The development rate of these indices in the control group was much lower without any significant changes (see Fig. 3,4).



**Fig.3: The dynamics of self-esteem and the development level of agility and speed of girls at the age of 13 after the implementation of the original methods in the experimental group (the final stage of the research)**



**Fig. 4: The dynamics of self-esteem and the development level of agility and speed of girls at the age of 13 after the implementation of the original methods in the control group (the final stage of the research)**

The identified positive dynamics of indices is confirmed by the absolute values of the parameters that are the subject of the research. For example, when characterizing the indices of self-esteem, we should mention that in the experimental group they increased by an average of 23,2 points compared to the initial data ( $t = 5,48$ ;  $P \leq 0,001$ ), which corresponds to a high level and a level above average; the result of the agility level improved by 1,2 sec ( $t = 2,14$ ;  $P \leq 0,05-0,01$ ), which is above average; the result of the development of speed — by 0,8 sec ( $t = 1,99$ ;  $P \leq 0,05$ ), which corresponds to a sufficient level (Table 1).

**Table 1. Indices of the dynamics of the state of self-esteem and the development level of agility and speed of girls at the age of 13 in the experimental group**

N	Test	Before the experiment		After the experiment		t	p
		X	±m	X	±m		
	Test 1	54,7	2,75	77,9	2,81	5,48	≤0,001
	Test 2	13,2	0,51	12,0	0,45	2,14	≤0,05-0,01
	Test 3	6,8	0,33	6,0	0,29	1,99	≤0,05

In the control group, these indices also tended to rise, but they were not characterized by a statistically significant increase. In our opinion, it was due to the natural development of girls at the age 13 years (Table 2).

**Table 2: Indices of the dynamics of the state of self-esteem and the development level of agility and speed of girls at the age of 13 in the control group**

N	Test	Before the experiment		After the experiment		t	p
		X	±m	X	±m		
	Test 1	54,9	2,76	61,2	2,77	0,87	≥0,05
	Test 2	13,4	0,43	13,0	0,41	1,77	≥0,05
	Test 3	6,8	0,34	6,6	0,33	1,79	≥0,05

Table 3 summarizes the data that characterize the tendency in the context of the interconnection between the state of self-esteem and the development rate of physical condition of girls at the age of 13 years under the influence of the author's methods during the experiment.

**Table 3: The comparative dynamics of the indices of the state of self-esteem and the development level of agility and speed of girls at the age of 13 in the control group and the experimental group under the influence of the original methods**

N	Test	Stages of the experiment	The experimental group (n = 49)		The control group (n = 48)		t	p
			X±m	σ	X±m	σ		
	Test 1	Before the experiment	54,7±2,75	3,23	54,9±2,76	3,32	0,87	≥0,05
		After the experiment	77,9±2,81	3,44	61,2±2,77	3,14		
	Test 2	Before the experiment	13,2±0,41	0,31	13,4±0,43	0,40	1,77	≥0,05
		After the experiment	12,0±0,55	0,57	13,0±0,71	0,33		
	Test 3	Before the experiment	6,8±0,33	0,15	6,8±0,34	0,17	0,94	≥0,05
		After the experiment	6,0±0,29	0,14	6,6±0,33	0,15		

It should be noted that there is a certain correlation between the parameters that characterize the state of self-esteem and the development rate of the girls' physical qualities. For example, in the experimental group, a positive correlation was observed between the state of self-esteem and the development of agility and speed (at the level of average correlation,  $r = 0,55$ ), and between the development of agility and speed ( $r = 0,62$ ). We explain this fact by the phenomenon of positive transfer in the formation of a dynamic locomotor stereotype and the state of psycho-emotional manifestation that accompanies any physical activity, especially physical and



sports activities. In the control group, these factors appear to be less prominent and are characterized by a weak correlation dependence at the level of  $r = 0,25-0,30$ .

Thus, the argumentativeness of the interconnection between the level of self-esteem of girls at the age of 13 with the development of agility and speed is confirmed by the results obtained not only in the experimental group (where the original methods were implemented), but also in the control group (in which the girls had physical education lessons according to the traditional syllabus), when the state of self-esteem correlates with the development level of physical qualities.

## 5. DISCUSSION

Our research has confirmed that there is a positive interconnection between self-esteem and the development of physical qualities of 13-year-old girls. If the positive changes that the girls in the experimental group had can be, to some extent, explained by the influence of the targeted methods, no additional factors (physical exercises) were introduced for the development of speed. Thus, when the girls were performing kicks and arm strokes on a special model, the main focus was on mastering the technique of kicks and strokes (meanwhile we ensured that the performance of motor tasks did not provoke the excessive aggression or other negative emotional states). At the same time, it is worth mentioning that in both the control and the experimental groups, the manifestation of self-esteem contributed to the raise of the level of speed abilities and agility.

It must be emphasized that the results of our research are consistent with the scientific standpoints (Heydari, Soltani, Mohammadi-Nezhad, 2018), according to which the interconnection between the level of self-esteem and the development rate of physical qualities of young volleyball players was proved. It is noteworthy that in this study, psychological techniques such as suggestion and the like were used in order to raise the level of self-esteem of the young volleyball players. In our research, in order to boost the level of self-esteem of 13-year-old girls, we used our own methods according to which different types of physical activity (exercises) that are popular with girls were performed, namely, fitness yoga, body ballet, fly yoga, and also modified psychotechnics (the autogenic training), which positively resulted in the development rate of physical condition. The use of fly yoga exercises in the author's method also helped to raise self-esteem, which to some extent correlates with the results of other studies that confirmed that extreme sports increase self-esteem, which in its turn promotes the formation of a successful personality. (Bostancı Ö, Karaduman E, Mayda MH., 2019). The appropriateness of introducing the original methods is confirmed by the results of other researches of respected scientists and practitioners. Thus, Skurikhina, Kudryavtsev, Kuzmin, Iermakov (2016) suggest that fitness yoga should be used in lessons with students of special medical groups to improve the psychophysical condition and psychosocial health in the training and recreational lessons of physical education; Babich, Boychuk, Poluljasshenko (2018) have used fitness yoga to reduce the mental stress of students with problems in physical health; researches by Zh. Kozina confirmed the effectiveness of the use of the autogenic training provided that it is modified in order to increase the adaptive capacity of people with high levels of physical and mental activity; Kudryavtsev, Kopylov, and Kuzmin (2016) point out that there is a need to change approaches to organizing and conducting physical education lessons, in particular at general secondary educational institutions. Therefore, our research has confirmed the effectiveness, as well as the appropriateness of introducing the original methods in order to optimize the process of physical education of adolescent girls.

## 6. CONCLUSION

Thus, the research found:

- 1) the relevance of a study into the interconnection of physical education and the manifestation of the psycho-emotional state of adolescents in the context of the formation of a harmoniously developed personality;
- 2) a statistically significant and positive correlation between self-esteem of girls at the age of 13 and the development rate of physical qualities (agility and speed);
- 3) that the implementation of the original experimental methods (fitness yoga, body ballet, fly yoga, modified psychotechnics with elements of the autogenic training) helps to optimize the process of physical education of 13-year-old girls.

## 7. ACKNOWLEDGEMENT

We express our gratitude to the Heads and the teaching staff of the institutions of general secondary education of Donetsk Oblast; the Head of the Ukrainian Federation "Sport for Development", the Head of the Department for Methodical Support of the Health-Promoting Function of Education and Physical Rehabilitation of Donetsk Regional Institute of Continuing Teacher Training Education Katchan Oleksii Anatoliiovych for giving us the opportunity to conduct the research and supporting it.

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