ANALYSIS OF MORPHOFUNCTION CHARACTERISTICS OF GENERAL SECONDARY SCHOOL STUDENTS OF FERGANA CITY

Mamadjanov Neimadjon
Associate Professor of the Department of Physical Culture Theory and Methodology ,
Candidate of Pedagogical Sciences, Fargana State University
e-mail: neymadjon@bk.ru

Abstract
The article examines the practical application of the method of canonical values in determining the physical fitness of secondary school students of Fergana city , as well as the issues of determining the canonical value and canonical correlations between indicators.

Keywords: education, physical development, physical fitness, correlation coefficient, canonical values, morphometric parameters, mobility.

Relevance and necessity of the topic. Implementation of large-scale work aimed at the further development of physical education and mass sports is considered one of the urgent problems of our day. For this purpose, the President of the Republic of Uzbekistan Shavkat Mirziyoyev on June 3, 2017 Decision No. PQ-3031 "On measures for the further development of physical education and mass sports" and Decree No. PF-5368 of March 5, 2018 "On measures to radically improve the state management system in the field of physical education and sports" especially for the young generation to regularly engage in physical education and mass sports, a large-scale task was assigned to create conditions suitable for the requirements of the time, to systematically organize training activities aimed at selecting talented athletes [1,2]. This determines the need to develop consistent measures to popularize physical education and sports in Uzbekistan, create the necessary conditions and infrastructure for promoting a healthy lifestyle among the population, especially among young people, and ensure the proper participation of our country in international arenas. In the physical development of students, it reflects the processes of growth and development of the organism at individual stages of ontogenesis, in which the sum of all signs and characteristics acquired during the development of the organism and its interaction with the external environment occurs. Along with birth, morbidity and mortality, physical development is one of the indicators of the level of human health. The processes of physical and sexual development are interrelated and reflect the general laws of growth and development, but at the same time they are significantly dependent on social, economic, sanitary and other conditions, the influence of which is mainly determined by the age of a person.

The school is in the process of growth and development of students, and the violation of its normal state should be evaluated as an indicator of poor health. Therefore, obtaining and

analyzing information about the physical development of the young generation in a timely manner is one of the urgent problems of health promotion.

Research purpose . To test the practical application of the method of canonical values in determining the physical fitness of Fergana city general secondary school students, as well as to determine the canonical values and canonical correlations between the specified groups.

Research methods - analysis and generalization of available scientific and methodical literature, regulatory documents, and conducting tests that determine psychological development .

Research results and its discussion . One of the main directions of changing physical education classes in general secondary schools in accordance with modern requirements is to introduce monitoring of students' health, physical development and physical fitness. The results of physical exercise in students have long attracted the attention of researchers [3,4].
In order to apply the practical aspects of this issue to life, to further develop physical education and sports in our country, to turn it into a mass movement, and to create a healthy lifestyle among the population, the introduction of the "Physical Fitness Level" sports test complex was approved on June 17, 2021 in general secondary education, it is of particular importance to higher educational institutions and other branches of the physical education movement in creating a system of educating young people in all aspects of physical education, highly productive work and defense of the homeland.
Further improvement of the "Physical Fitness Level" test depends on the overall size of the participant's body, ie heavier children have an advantage in throwing and taller children have an advantage in high jumping. And in exercises determined by relative strength values (for example, pull-ups), the advantage goes to those with a small body weight.
Two methods have been proposed to eliminate the influence of anthropometric parameters on the results of physical fitness examination of students [5].
The first suggestion is that the use of only physical fitness tests as a test when working with students does not affect their results, the characteristics of the morphological structure of their bodies. However, this proposal is very difficult to implement for two reasons. First, this type of exercise is relatively small; secondly, test exercises to assess the level of physical fitness lead to the exclusion of traditional physical exercises - throwing, high jump, that is, all actions related to overcoming the resistance of one's own body weight. The second method is the introduction of various indicators that take into account the influence of the overall dimensions of the body on the results of individual physical exercises, shown in the practice of a number of foreign countries. The practical difficulty here is that with this approach, it is necessary to use different techniques for each exercise, or at best for a homogeneous group of them (for

example, for all throws). This is due to the obvious fact that the dependence of the results of different physical exercises on anthropometric characteristics is not the same.

If we try to formulate the approaches described above in more strict terms of mathematical statistics, then the results of the first of these propositions correspond to attempts at such motion tasks that do not correspond to morpho-functional properties, and the second - on the one hand, any physical

determination of multiple correlation coefficients and calculation of regression equations between success in exercise and, on the other hand, a group of morphological characteristics. Canonical quantities and canonical correlation analyzes can make some progress in problem solving. The application of canonical correlation results analysis in local scientific literature on physical education and sports is not fully covered.

The purpose of our research is to test the practical application of the method of canonical values in the study of physical fitness of schoolchildren, as well as to determine the canonical values and canonical correlations between the specified groups. The research work was conducted among students of general secondary school of Fergana city and the results of indicators are presented in the table.

Test organization and methods . Tests of physical development were carried out, distinguishing them from traditional and relatively rare movement tasks. The conducted measurements include the main direction of morphofunctional indicators. R. in the generally accepted anthropometric practice during measurements. It was done using Martin's measurement methods. The measurement results are presented in Table 1.

Table 1 **Experimental results**

No	Age	Sex	Number	Height, cm	Weight, kg	% of body muscle tissue
				$\overline{x} \pm \sigma$	$\overline{x} \pm \sigma$	$\overline{x} \pm \sigma$
1.	8	Boys	42	122.7±5.8	24.3±3.2	40.8 + 2.6
		Girls	48	121.2±6.7	24.2±2.7	38.5 + 3.1
2.	9	Boys	52	128.2±7.1	27.9±3.4	41.2 + 1.6
		Girls	47	127.8±6.4	26.9±3.2	39.7 + 3.4
3.	10	Boys	48	132.7±4.9	29.8±2.9	42.3 ± 2.4
		Girls	44	133.4±5.7	29.5±3.8	40.2 + 3.9
4.	11	Boys	47	137.4±5.2	29.5±4.5	43.5 +3.7
		Girls	52	140.2±6.4	31.5±5.2	41.9 + 3.2
5.	12	Boys	43	142.4±7.7	31.5±3.8	45.7 ± 2.5
		Girls	48	138.7±5.3	29.8±4.6	42.9 + 2.2
6.	13	Boys	51	145.4±5.1	32.5±3.8	44.6 + 2.6
		Girls	54	142.5±5.4	28.2±6.3	42.3 + 2.1
7.	14	Boys	49	148.3±5.4	37.5±3.8	46.4 ± 3.8
		Girls	5 2	143.3±3.7	32.2±6.4	42.8 + 2.3
8.	15	Boys	42	151.6±7.2	42.5±3.6	46.4 ± 4.2
		Girls	48	148.2±6.1	34.5±6.2	44.1 + 2.5

During the conducted research and observations, the head, neck, chest, abdomen and groin parts, arms and legs of the students are compared and growth or changes are monitored. Length, width and angle marks are measured using anthropometric instruments.

Also, skin folds were determined using Tanner's caliper according to the scheme developed by anthropologists. The absolute mass of muscle tissue, the weight of the absolute mass of fat and subcutaneous fat was determined by the Matievka formula, and the absolute body surface area was determined by the Isakson formula.

Mathematical processing was performed in two stages. At the first stage, one-dimensional statistical characteristics, correlation matrices were calculated for each age group, and factor analysis was conducted (principal components method was used with rotation of the reference axes according to the Varimax criterion). Based on factor analysis, nine morphofunctional indicators and eight motor tests were selected that gave the highest factor weights on the identified factors. In the second step, a canonical analysis was performed on two sets of differentiated variables.

Taking into account the large amount of data obtained, in this article we limit ourselves to the results of the canonical analysis and present only the highest canonical correlation coefficients obtained in the group of 14-year-old boys and their corresponding canonical values (table. 2)

Table 2 **Canonical values of morphometric indicators and movement test results (canonical coefficient of n=90 students = 0.852)**

No	Adults	$\bar{x} \pm \sigma$	The canonical k magnitude		
			I	II	III
Morphofunctional indicators					
1.	Body length, cm	1 49 ,6±8,4	1,594	1,746	2,550
2.	Shoulder length, cm	2 6 , 8 ±2, 3	- 1,310	0.021	0.125
3.	Leg length, cm	7 6 , 8 ±5, 4	- 0.998	2,146	1,817
4.	Foot length, cm	31, 9 ±3.4	2,040	- 1,459	
5.	Chest diameter, cm	30.5 ± 1.7 _	0.013	0.991	0.016
6.	Shoulder circumference, cm	2 2 ,1±2, 9	- 2,036	1,143	0.014
7.	Average thickness of skin and subcutaneous fat layer, cm	3.4± 0.6	1,266	0.017	0.879
8.	Percentage of subcutaneous fat	6.08± 1.6	0.196	-0.673	-0.024
9.	Percentage of muscle tissue	45, 6 ±2.45	0.742	-0.638	0.620
Physical fitness tests					
1.	Running 30 m, s	5.8 ± 0.5	0.581	-0.848	-0.272
2.	Shuttle run 3 x 10 m, s	9.7± 0.8	0.428	-0.676	0.028
3.	Throwing the ball from the position with the legs apart, facing backwards, m	4 85 .2 ± 1 35 .9	0.960	-0.164	
4.	Running 500 m, s	1 33,6 ±22,0	-0.302		-0.017
5.	Writing with folded hands while leaning on the floor (kolich. raz)	11.8 ± 5.2 _	-0.139	-0, 12 1	1, 321
6 .	Sitting with legs stretched forward, cm	5.8±4 , 3	0.513	0.153	-0, 698
7 .	M uvozanat test , p	12 , 2 ± 4 , 8	0, 32 5		-0.2 65

The canonical correlation coefficient of the values of the indicators obtained as a result of measurement is equal to 0.852. This shows a very close relationship between morphological and functional performance in specific movement tests. It should be noted that the canonical correlation method automatically avoids "false" correlations that arise from the existence of

correlations between features belonging to the same set. For example, the relationship between high jump performance and torso length may be "false" and only recorded because body length is related to leg length, and the latter directly affects jump height.

Such a large value of the canonical correlation coefficient is determined by the fact that morphological and functional indicators, for example, the percentage of fat and muscle tissue, directly reflect the state of the child's motor function. 2 canonical values can be used to calculate the indices that most accurately assess the child's morphofunctional condition and physical fitness. In particular, if the value of the morphofunctional indicators recorded in the subjects is multiplied by the corresponding canonical values and the obtained values are summed up, the final total canonical index is derived, the value of which is most closely related to the results of the movement tests. Since such a canonical index is also a random variable and has a statistical distribution, the canonical indices of individual students will differ from each other. This variability can be used, on the one hand, to assess the morphofunctional state of the student, and on the other hand, to eliminate the influence of differences in the morphofunctional state in the assessment of physical fitness. This can be done, for example, by introducing different standards for students with different morphofunctional status. Such procedures are determined in large-scale studies.

Summary

1. It is proposed to use the method of canonical analysis to evaluate the relationship between morphological, functional indicators and movement abilities of students.
2. The canonical correlation coefficient of morphological and functional indicators, the percentage of fat and muscle tissue can directly reflect the state of the child's motor function.
3. In order to assess the morphofunctional status of students who do not play sports, on the other hand, it is possible to achieve some progress in solving the problem raised by the results of its use to eliminate the influence of differences in the morphofunctional status in the assessment of physical fitness.

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