

## Functional state pedagogical universities student's peculiarities of various faculties according to orthostatic reactions and psychophysiological capabilities indicators

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### Abstract

**The purpose of the study:** to determine the characteristics of students of various faculties of pedagogical universities regarding the performance indicators of the nervous and cardiovascular systems based on reaction speed indicators and the orthostatic test. **Material and methods.** 554 students of H.S. Skovoroda Kharkiv National Pedagogical University of 1-2 courses of various 9 faculties. During psychophysiological testing, a test for the time of a simple visual-motor reaction was used. The following indicators were determined: reaction time, number of errors. Orthostatic reactions were determined by the results of heart rate in the supine position and in the standing position using Polar devices (fitness - watches) and analyzed using the Polar flow applications on the phone and on the computer. The distribution of students into groups according to the characteristics of psychophysiological testing and orthostatic functions was carried out using a hierarchical cluster analysis. The relationship between the faculty of a pedagogical university and the number of students involved in clusters was conducted using the Pearson Chi-square test. **Results.** Students were divided into 2 groups (clusters) according to psychophysiological functions and orthostatic reactions. The first cluster of students was characterized as "the predominance of the sympathetic department of the autonomic nervous system and the mobility of nervous processes," and the second cluster was characterized as "the predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous processes." It was found that according to the results of the time of simple visual-motor reaction, the students of the first cluster probably differ from the students of the second cluster ( $p < 0.001$ ): in the subjects of the first cluster, the time of simple visual-motor reaction is significantly shorter compared to the students of the second cluster. But according to the number of errors in the test for determining the time of a simple visual-motor reaction, on the contrary, the students of the second cluster had better results ( $p < 0.001$ ). Students of the first cluster have a significantly higher heart rate in the supine position compared to students of the second cluster, as well as a greater difference between the heart rate indicators in the lying and standing positions ( $p < 0.05$ ). **Conclusions.** The faculty at which students study has a significant effect on the number of subjects with a predominance of the sympathetic (parasympathetic) department of the nervous system and the mobility (strength) of nervous processes according to the results of the Chi-square test and the determination of symmetry measures ( $p < 0.05$ ). The obtained results should be taken into account when conducting physical education classes for students of different faculties, when providing recommendations to students regarding classes in a certain sport (if the student hesitates when choosing a sports specialization), and when planning individual tasks to be conducted online.

**Keywords:** students, speed of reaction, mobility of the nervous system, strength of the nervous system, orthostatic test

### Introduction

Graduates of higher education institutions constitute the strategic potential of individual states and the world as a whole (Bejtka, et.al., 2022; Banville, et.al., 2021; Hennig, et.al., 2022). Therefore, preserving and strengthening the health of students in modern socio-economic conditions becomes one of the most important tasks of our time. But research results show that many students do not consider health a priority and are ready to sacrifice it for material benefits or social benefits. In the view of the majority, health does not look like a human-created resource and is not considered as a goal and value of development. This leads to the fact that the state of health of people is paid attention only when violations occur (Choi, et.al., 2021). In recent decades, the level of

morbidity among students has been increasing from year to year (Kozin, et.all., 2022). Diseases of the cardiovascular, nervous systems and musculoskeletal system predominate among the nosological forms (Kozin, et.all., 2022). One of the reasons that negatively affect the state of health is low physical activity, the lack of opportunity for a significant part of teenagers to engage in physical culture and sports on a regular basis at school age, and then during the period of university studies (Borysenko, et. all., 2020). World experience and many years of practice of sports organizations show that the use of physical culture and sports in the formation of a healthy lifestyle is effective and economically beneficial for society (Kim, et.all., 2021; Lamb, et.all., 2021). Physical culture and sports are considered as the most important tool for the development of human potential, as one of the effective means of preserving and strengthening health, increasing work capacity and increasing the duration of an active life (Garcia, et. all., 2021; Kozina, et. all., 2021; Orbaek, et al., 2021).

Mass student sports are a powerful factor of unity, physical and spiritual improvement of each nation, keeping it in an adequate social tone (Lundvall, et.all., 2020; Sakamoto, et.all., 2018; Sebo, et.all., 2022). Thus, the development of sports contributes to the displacement of negative antisocial phenomena from the student environment, the strengthening of corporate spirit, organization, and a sense of responsibility for the result in young people. This problem especially concerns pedagogical universities, since students - future teachers need not only to have knowledge to strengthen and preserve their health, but also knowledge necessary to transfer to future pupils (Macken, et.all., 2020; Milley, et.all., 2021; Murfay, et.all., 2022).

Future teachers need not only to be healthy while studying at the university, but also to maintain health throughout their lives, and especially during their professional activities (Orhan, et.all., 2021; Sakamoto, et.all., 2018). The professional activity of a teacher requires a very good state of health due to the high level of dedication to work, the presence of great emotional stress, the presence of contradictions between the requirements for the physical, intellectual, emotional, and spiritual components of a teacher's professional activity and public recognition of the importance of a teacher's work (Thaqi, et.all., 2021; Tsuda, et.all., 2022; Tudor, et.all., 2020). In addition, the teacher works to create the future, and he must transfer knowledge on strengthening and preserving the health of students. Thus, the future teacher must be healthy while studying at the university; maintain health throughout life, and especially in professional activities.

Also, interaction with children and parents in the process of professional activity requires a good psycho-emotional state. This is ensured by appropriate health status. Interaction with management, work with documentation, preparation for classes, etc. can also be attributed to the problems that await future teachers in their professional activities. And the most important thing for a teacher is the ability to transfer knowledge to students about strengthening and preserving health.

The scientific base of evidence-based medicine, sports, rehabilitation, physical therapy, health care and analysis of the experience of European universities was applied to this problem. By querying the Web of Science "health care students" 1058 sources were found, of which 48 contained programs on student health care. The programs concern various aspects of students' health: mental (12), reproductive (10), cardio (10), general (16). The analysis of the experience of European universities showed the main directions of student health care: 1 – an individual approach to examinations with the involvement of leading specialists; 2 – availability of "Health Laboratories" and "Health Clubs"; 3 – physical education as one of the leading disciplines in terms of the number of hours with each student choosing a type of sport (motor activity) for classes (Macken, et.all., 2020; Milley, et.all., 2021; Thaqi, et.all., 2021; Tsuda, et al., 2022). But in the analyzed sources, we did not find information about the specifics of the construction of classes for students of different faculties. At present, the issue of developing recommendations has become ripe in society data on sports for students of various pedagogical specialties, as there are data on the presence of features of the nervous and cardiovascular systems in representatives of various professions and specialties.

In addition, it is known that playing a certain type of sport and corresponding professions are chosen by people with the appropriate aptitudes, which are reflected in the work of the entire organism, and, first of all, in the work of the nervous and cardiovascular systems (Korobejnikov, et.all., 2012). One of the most common and relatively simple to use for determining the features of the nervous system are psychophysiological indicators based on the registration of reaction speed in various testing modes (Korobejnikov, et.all., 2012; Deary, Deary et.all., 2001). One of the indicators of the work of the cardiovascular system and the regulation of vascular tone are the indicators of the orthostatic test, which are also relatively easy to use (Borysenko, et.all., 2020; Cretu, et.all., 2021; Kozina, et.all., 2020).

Based on these provisions, the following hypothesis was put forward: students have peculiarities in the work of the nervous and cardiovascular systems, which may be different for students of different faculties of pedagogical universities.

**The purpose** of the study: to determine the characteristics of students of various faculties of pedagogical universities regarding the performance indicators of the nervous and cardiovascular systems based on reaction speed indicators and the orthostatic test.

## Material and methods

*Participants* - 554 students of H.S. Skovoroda Kharkiv National Pedagogical University of 1-2 courses of various 9 faculties: 60 students of the Faculty of Elementary Education, 52 students of the Faculty of History, 89 of Natural Sciences, 89 of Foreign Philology, 64 of the Faculty of Preschool Education, 136 of the Faculty of Ukrainian Language, 16 of the Faculty of Physical Education and Sports, 16 of the Faculty of Arts, 32 students of the Faculty of Psychology and Sociology. Student testing was conducted in classes on the subject "Health Care Technologies" from 8:00 a.m. to 9:00 a.m. in September - October 2021.

*Procedure* - Testing was conducted in each academic group of students separately. From 5 to 20 people were tested at one time. Students were tested as follows. On the first day, students were tested on orthostatic stability. The next day, the students underwent a psychodiagnostic test to determine the speed of reaction in different modes of signal appearance.

*Method of psychophysiological testing* - When conducting psychophysiological testing, students were first explained the essence of the tests and the peculiarities of working with the "Psychodiagnostics" program, according to which the testing was conducted, then they made 1-3 attempts to master the tests, and passed the testing. After filling out a special form with the subject's data, a window with the names of the tests appears on the screen. The subject chooses a test that will be used to determine reaction speed. After that, different images appear on the screen. When determining the speed of a simple visual-motor reaction, the subject presses the left mouse button as soon as he sees any image on the screen (Korobejnikov, et.al., 2012). During psychophysiological testing, a test for the time of a simple visual-motor reaction was used. The following indicators were determined: reaction time, number of errors. The shorter the reaction time, the higher the mobility of nervous processes, which is also related to the activity of the sympathetic division of the autonomic nervous system. The smaller the number of errors, the higher the strength of nervous processes, which is also related to the activity of the parasympathetic division of the autonomic nervous system.

*Orthostatic test* - Orthostatic reactions were determined by the results of heart rate in the supine position and in the standing position using Polar devices (fitness - watches) and analyzed using the Polar flow applications on the phone and on the computer. Testing was carried out as follows. In a special auditorium for massage, students put on fitness watches and lay quietly on their backs on massage tables for 10 minutes to stabilize their heart rate. Then a special mode of orthostatic testing was set on the watch, heart rate was measured in the lying position for 30 seconds.

Then the students got up, and heart rate was measured again for 30 seconds. Average heart rate values for 30 s in the lying position and in the standing position were recorded, which were automatically calculated using Polar flow applications in computers and phones. Heart rate values greater than 80 beats·min<sup>-1</sup> were considered indicators of inefficient work of the cardiovascular system. The difference between the heart rate in lying and standing positions of more than 30 beats·min<sup>-1</sup> was regarded as an indicator of difficult adaptation of the body to a change in body position (Borysenko, et.al., 2020; Cretu, et.al., 2021; Kozina, et.al., 2020).

*Statistical analysis* - During the statistical processing of the research results, the normality of the distribution of each sample was first checked using the Kolmogorov-Smirnov test. If the samples obeyed a normal distribution, the comparison of the test results between students of different formed clusters based on the results of the tests on orthostatic and psychophysiological indicators was carried out using the Student's test.

The distribution of students into groups according to the characteristics of psychophysiological testing and orthostatic functions was carried out using a hierarchical cluster analysis. On the basis of the comparison of indicators of psychophysiological functions and orthostatic reactions of students of different clusters according to the Student's method, the formed clusters were characterized:

The number of students in each faculty belonging to each cluster was determined. Students of the two formed clusters were compared according to psychophysiological and orthostatic indicators.

The relationship between the faculty of a pedagogical university and the number of students involved in clusters was conducted using the Pearson Chi-square test.

## Results

First, all samples were tested for normal distribution for all indicators. The test was carried out using the one-sample Kolmogorov-Smirnov test. Table 1, as an example, shows the results of the test results of students of the Faculty of Primary Education according to this criterion. No significant differences were found between the obtained distribution and the normal one ( $p > 0.05$ ).

The results of testing all other samples gave a similar result. Thus, a conclusion was made about the possibility of using parametric methods of processing research results.

Table 1 An example of the results regarding the test of the hypothesis of the normality of the distribution according to the Kolmogorov-Smirnov test of students of the faculty of primary education ( $n=60$ )

No	Indicators	Hypothesis	Criterion	Asymptotic significance	Decision
1	Time of a simple visual-motor reaction, ms	The distribution is uniform with a low of 206.46 and a high of 392.75	One-sample Kolmogorov-Smirnov test	0.209	The null hypothesis is accepted
2	Errors in the test for the time of a simple visual-motor reaction, number	The distribution is uniform with a minimum of 2.42 and a maximum of 5.853	One-sample Kolmogorov-Smirnov test	0.312	The null hypothesis is accepted
3	Heart rate lying down, beats·min <sup>-1</sup>	The distribution is uniform with a minimum of 58 and a maximum of 76	One-sample Kolmogorov-Smirnov test	0.234	The null hypothesis is accepted
4	Standing heart rate, beats·min <sup>-1</sup>	The distribution is uniform with a minimum of 79 and a maximum of 97	One-sample Kolmogorov-Smirnov test	0.136	The null hypothesis is accepted
5	Standing heart rate - lying heart rate, beats·min <sup>-1</sup>	The distribution is uniform with a minimum of 11 and a maximum of 17	One-sample Kolmogorov-Smirnov test	0.381	The null hypothesis is accepted

Notes. Fixed Lilieforsa. The level of significance is equal to 0.05

In order to determine the individual characteristics and the possibilities of developing a differentiated approach to physical education of students, a cluster analysis of the subjects was conducted based on the indicators of psychophysiological capabilities and autonomic regulation of cardiovascular activity. First, the optimal number of clusters (groups) of students was determined. For this, according to the rules of cluster analysis, the step at which the cluster coefficients begin to grow non-linearly was subtracted from the total number of students whose results were processed (Table 2). This turned out to be step 552. Then, the step at which the coefficients begin to grow non-linearly (552) is subtracted from the total number of subjects (554). As a result of these calculations, we obtained a value of 2, that is, 2 clusters are the optimal number of clusters in this study.

Table 2

The order of agglomeration in the cluster analysis of cases (students) by indicators of psychophysiological functions and orthostatic reactions (n=554)

Stage	Combination of clusters		Coefficients	The stage of the first appearance of the cluster		The next stage
	Student 1	Student 2		Student 1	Student 2	
1	119	121	0	0	0	51
2	251	266	25	0	0	8
3	22	257	132	0	0	34
4	210	225	142	0	0	36
5	264	278	189	0	0	30
6	235	270	195	0	0	54
7	52	113	217	0	0	19
8.....	115	251	257.5	0	2	27
.....552	4	170	68902.839	73	71	75
553	4	172	89525.959	74	69	0

Thus, we got 2 clusters. At the next stage, the belonging of each student to a certain cluster was determined by specifying the number of clusters (2) when dividing the subjects into groups (tables 3, 4). As a result of the distribution of students who passed all the tests, it was determined that 430 people entered the first cluster, and 124 people entered the second cluster.

Table 3

Belonging to clusters of students of pedagogical universities (examples)

Belonging to clusters	Student, conditional number
1	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 34, 36, 37, 38, 39, 40, 41, 43, 44, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58.....554
2	7, 17, 14, 28, 33, 35, 42, 45, 50, 59.....552

It was found that according to the results of the time of a simple visual-motor reaction, the students of the first cluster probably differ from the students of the second cluster ( $p < 0.001$ ): in the subjects of the first cluster, the time of a simple visual-motor reaction is significantly shorter compared to the students of the second cluster (Table 4). But according to the number of errors in the test for determining the time of a simple visual-motor reaction, on the contrary, the students of the second cluster had better results ( $p < 0.001$ ) (Table 4). The obtained

result is related to the fact that the mobility of the nervous system, which is reflected by the time of a simple visual-motor reaction, often comes into conflict with the strength of the nervous system, which is reflected by the number of errors when performing this test. Significant differences between the test results of students of two clusters were also found for the heart rate indicator in the supine position ( $p < 0.05$ ) (Table 4). Students of the first cluster have a significantly higher heart rate in the supine position compared to students of the second cluster. This indicates a greater influence of the parasympathetic division of the autonomic nervous system on heart rate regulation at rest in students of the second cluster. Students of the first cluster, on the contrary, have a predominance of the sympathetic division of the autonomic nervous system. Based on the obtained data, the first cluster of students was characterized as "the predominance of the sympathetic department of the autonomic nervous system and the mobility of nervous processes", and the second cluster - "the predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous processes."

Table 4

Indicators of psychophysiological functions and orthostatic reactions of students with a predominance of sympathetic and parasympathetic departments of the autonomic nervous system

Indicators	Clusters *	N	$\bar{x}$	S	m	t	p
Time of a simple visual-motor reaction, ms	1	430	353.59	52.54	6.84	-13.46	0.00
	2	124	567.88	73.90	17.92	-11.17	0.00
Errors in the test for the time of a simple visual-motor reaction, number	1	430	10.94	9.11	2.21	-4.16	0.01
	2	124	1.35	4.99	0.65	-5.69	0.00
Heart rate lying down, beats·min <sup>-1</sup>	1	430	74.61	11.85	1.54	2.11	0.038
	2	124	68.24	6.92	1.68	2.80	0.08
Standing heart rate, beats·min <sup>-1</sup>	1	430	90.80	11.97	1.56	1.61	0.011
	2	124	75.47	12.07	2.93	1.61	0.020
Standing heart rate - lying heart rate, beats·min <sup>-1</sup>	1	430	16.19	10.84	1.41	-0.37	0.043
	2	124	7.24	2.04	1.95	-0.44	0.041

Notes: \* - Clusters: 1 – predominance of the sympathetic division of the autonomic nervous system and the mobility of nervous processes; 2 – predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous processes

The next step of our research was to clarify the question: does the faculty where students study affects the number of students with a predominance of the sympathetic (parasympathetic) departments of the nervous system and the mobility (strength) of nervous processes. Based on the results of processing the test results using the CrossTabs tool, it was found that the expected number of students with a predominance of the sympathetic nervous system and mobility of nervous processes is significantly less than the number obtained at the Faculty of Natural Sciences and the Faculty of Foreign Philology. At all other faculties, the expected number of students is either significantly greater or almost equal to the received number. The faculty at which students study has a significant effect on the number of subjects with a predominance of the sympathetic (parasympathetic) department of the nervous system and the mobility (strength) of nervous processes according to the results of the Chi-square test ( $p < 0.05$ ) (tables 5, 6, fig. 1).

Table 5

The relative number of students with a predominance of the sympathetic (parasympathetic) departments of the nervous system and the mobility (strength) of nervous processes at various faculties of pedagogical universities

Indicators	Faculty *									Total
	1	2	3	4	5	6	7	8	9	
The number of students of the first cluster at each faculty. %	100	87.50	100	55.60	100	75.90	33.30	66.70	66.70	77.6
The number of students of the second cluster at each faculty. %	0	12.50	0	44.40	0	24.10	66.70	33.30	33.30	22.4
Total, %	100	100	100	100	100	100	100	100	100	100

Notes: \* - Faculties: 1 - Elementary education; 2 – Historical; 3 - Science, 4 - Foreign philology, 5 - Preschool education, 6 - Ukrainian language, 7 - Physical education, 8 - Arts, 9 – Psychological \*\* - Clusters: 1 – predominance of the sympathetic division of the autonomic nervous system and the mobility of nervous processes; 2 – predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous processes

Table 6

The influence of the faculty of pedagogical universities on the number of students with a predominance of the sympathetic (parasympathetic) departments of the nervous system and the mobility (strength) of nervous processes

Chi-square criteria	Value	Asymptomatic significance
Pearson's chi-square	12.227a	0.041
Probability relationships	15.068	0.048
Number of allowable observations	76	

Notes. a - For the number of cells, 13 (72.2%) are expected to be less than 5. The minimum expected number is 0.45.

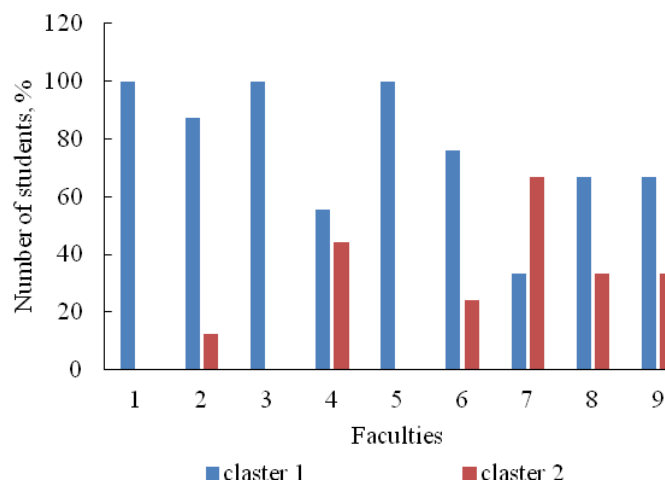


Fig. 1. The number of students (as a percentage of the total number of students in each faculty), with a predominance of the sympathetic (parasympathetic) departments of the nervous system and the mobility (strength) of nervous processes:

\* - the relationship of the faculty with the predominance of the sympathetic (parasympathetic) departments of the nervous system and the mobility (strength) of nervous processes is reliable at  $p < 0.05$

Cluster 1 - students with a predominance of the sympathetic division of the autonomic nervous system and the mobility of nervous processes

Cluster 2 - students with a predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous processes

Faculties: 1 - Elementary education; 2 – Historical; 3 - Science, 4 - Foreign philology, 5 - Preschool education, 6 - Ukrainian language, 7 - Physical education, 8 - Arts, 9 – Psychological

## Discussion

The hypothesis that was put forward in this study was fully confirmed: it was found that students of various faculties of pedagogical universities have peculiarities in the work of the nervous and cardiovascular systems. The data obtained by us in previous studies regarding the presence of psychophysiological and orthostatic features of students of various faculties and the influence of sports on these indicators were confirmed. Thus, in our previous studies (Bejtka, et.al., 2022) it was shown that the reaction speed is best among students of the faculties of elementary education, preschool education, and science. It also reflects the mobility of nervous processes. And the number of errors in the reaction speed test is the lowest among students of the Faculty of Physical Education and Sports.

In the presented study, we obtained similar results. Using cluster analysis, all experimental students were divided into two groups as a result of cluster analysis. The first cluster included students with a significantly shorter reaction time to various indicators, a significantly higher number of errors in the reaction speed test, and higher heart rate values ??in the orthostatic test. The second cluster, on the contrary, included students with significantly longer reaction times, significantly fewer errors in the reaction speed test, and significantly lower heart rate values ??in the orthostatic test. The first cluster was called "the predominance of the sympathetic division of the autonomic nervous system and the mobility of nervous processes", since the reaction speed reflects the mobility of nervous processes, and high heart rate values ??in the orthoprobe are one of the indicators that reflect the activity of the sympathetic division of the autonomic nervous system. The second cluster was called "predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous

processes", because it included students with significantly longer reaction times, significantly fewer errors in the reaction speed test, and significantly lower heart rate values ??in the orthostatic test.

It was also found that the representatives of the first cluster generally predominate in number among students of pedagogical universities (430 out of 554 experimental students). This can be explained by the fact that the pedagogical specialty generally requires high indicators of the mobility of nervous processes, because the work of a teacher requires a high speed of switching attention (Bejtka, et.all., 2022). And therefore it is no coincidence that students with high mobility of nervous processes intuitively choose a pedagogical university. Mobility of nervous processes is not the only indicator for future teachers. After all, the main thing is that, so that the student likes the future specialty. And that is why a person with any indicators of mobility and strength of nervous processes can become a good teacher. And that is why it is not accidental that among the future teachers there are also representatives with a more inert nervous system, which is compensated by higher values ??of the indicators of the strength of the nervous system. It should also be noted that students with greater mobility of nervous processes have worse orthostatic test scores: they have significantly higher heart rate values ??both in the lying position and in the standing position, and the difference between these indicators is greater compared to the students of the second cluster. This shows, first of all, that the students of the first cluster have a lower level of functional readiness and general endurance, which is reflected in significantly higher values ??of heart rate in the lying position and the difference in heart rate between the lying position and the standing position (Borysenko, et.all., 2020; Cretu, et.all., 2021; Kozina, et.all., 2020). Hence the need to improve the general endurance of the students of the first cluster. But it is necessary to do this by means that correspond to the peculiarities of the nervous system of these students. For this, for example, mobile games can be used, which contribute to the development of endurance in accordance with the peculiarities of the nervous system of students with a predominance of the mobility of nervous processes (Bejtka, et.all., 2022).

The largest number of students of the first cluster was found at the faculty of elementary education (100%), at the faculty of preschool education (100%) and at the faculty of natural sciences (100%). These results also complement our previously obtained data using Duncan's analysis of variance regarding significantly lower values ??of reaction time and significantly more errors when performing a test of reaction speed of students of these faculties.

The largest number of students of the second cluster was found at the Faculty of Physical Education and Sports (66.7%). This is not accidental: because the state of vegetative-vascular regulation depends on the development of general endurance and, accordingly, the functional state of the cardiovascular system. Since playing sports contributes to improving the state of the cardiovascular system, we can note that the results obtained regarding the largest number of students of the second cluster were found precisely at the Faculty of Physical Education and Sports. The results obtained in the conducted research also complement the results of our previous ones studies (Bejtka, et.all., 2022), in which significantly lower heart rate values ??were found with the help of variance analysis using the Duncan method when transitioning from a lying position to a standing position in students of the Faculty of Physical Education and Sports.

Relatively new knowledge obtained in the presented research is that the mobility of nervous processes is coupled with the activity of the sympathetic division of the autonomic nervous system, and the strength of nervous processes is associated with the activity of the parasympathetic division of the autonomic nervous system. This should be taken into account when conducting physical education classes for students of different faculties, when providing recommendations to students about classes in a certain sport (if the student hesitates when choosing a sports specialization), and when planning individual tasks to be conducted online.

## Conclusions

1. Students were divided into 2 groups (clusters) according to psychophysiological functions and orthostatic reactions. The first cluster of students was characterized as "the predominance of the sympathetic department of the autonomic nervous system and the mobility of nervous processes," and the second cluster was characterized as "the predominance of the parasympathetic department of the autonomic nervous system and the strength of nervous processes."

2. It was found that according to the results of the time of simple visual-motor reaction, the students of the first cluster probably differ from the students of the second cluster ( $p < 0.001$ ): in the subjects of the first cluster, the time of simple visual-motor reaction is significantly shorter compared to the students of the second cluster. But according to the number of errors in the test for determining the time of a simple visual-motor reaction, on the contrary, the students of the second cluster had better results ( $p < 0.001$ ). Students of the first cluster have a significantly higher heart rate in the supine position compared to students of the second cluster, as well as a greater difference between the heart rate indicators in the lying and standing positions ( $p < 0.05$ ).

3. The faculty at which students study has a significant effect on the number of subjects with a predominance of the sympathetic (parasympathetic) department of the nervous system and the mobility (strength) of nervous processes according to the results of the Chi-square test and the determination of symmetry measures ( $p < 0.05$ ).

4. The obtained results should be taken into account when conducting physical education classes for students of different faculties, when providing recommendations to students regarding classes in a certain sport (if the student hesitates when choosing a sports specialization), and when planning individual tasks to be conducted online.

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