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## **SITUATIONAL EXCITEMENT INDICATORS OF THE EXAMINATION PROCESS INFLUENCE TO THE NERVOUS SYSTEM IN 17 AND 20-YEAR-OLD STUDENTS IN I AND IV COURSES DEPENDING ON THEIR TYPES OF TEMPERAMENT**

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## **ПОКАЗАТЕЛИ СИТУАЦИОННОГО ВОЗБУЖДЕНИЯ, ВЛИЯНИЯ ЭКЗАМЕНАЦИОННОГО ПРОЦЕССА НА НЕРВНУЮ СИСТЕМУ У 17-20-ЛЕТНИХ УЧАЩИХСЯ I И IV КУРСОВ В ЗАВИСИМОСТИ ОТ ИХ ТИПА ТЕМПЕРАМЕНТА**

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*Abstract.* The article deals with changes in situational excitement level of the examination process in I and IV courses depending on the temperament of the nervous system. The research was conducted 2 months before the exam, 30 minutes before the exam and 30 minutes after the exam. Before starting the study, the temperament types of the nervous system of young people were studied. Situational anxiety of young people of different temperament types (emotional stress) was determined by a score system in three different situations: on normal days, before the exam and after the exam. The situational alarm was determined by an express version of the test questionnaire according to the Spielberg. It was found that at all stages, first- and fourth-year students had an insignificant difference between the types in situational excitement level. Also, the difference between groups was not statistically reliable. In addition, the indicators of phlegmatic, choleric and sanguine types of situational excitement level in the 4th year students changed statistically reliable in comparison with normal days. At the same age, the phlegmatic and sanguine types of situational excitement level in after the exam were statistically reliable compared to normal days. In the IV course traps, the indicators of the phlegmatic type are statistically reliable in comparison with before the exam and after the exam situational excitement level.

*Аннотация.* В статье рассматривается изменение уровня ситуационной возбудимости экзаменационного процесса на I и IV курсах в зависимости от темперамента нервной системы. Исследование проводилось за 2 месяца до экзамена, за 30 минут до экзамена и через 30 минут после экзамена. Перед началом исследования были изучены типы темперамента нервной системы молодых людей. Ситуативная тревожность молодых людей с разным типом темперамента (эмоциональное напряжение) определялась по балльной системе в трех различных ситуациях: в обычные дни, перед экзаменом и после экзамена. Ситуационная тревога определялась экспресс-версией тестовой анкеты по Спилбергу. Выяснилось, что на всех этапах у студентов первого и четвертого курсов разница между типами уровня ситуационной возбудимости незначительна. Кроме того, разница между группами не была статистически достоверной. Показатели флегматического, холерического и сангвинического типов уровня ситуационной возбудимости у студентов 4 курса изменились статистически достоверно в обычные дни. В том же возрасте флегматический и сангвинический типы уровня ситуационной возбудимости после экзамена отличались статистически достоверно по сравнению с обычными днями. В группах IV курса показатели флегматического типа статистически достоверны при сравнении уровня ситуационной возбудимости перед экзаменом и после экзамена.

*Keywords:* situational-anxiety, types of central nervous system, sanguine, phlegmatic, melancholic, choleric.

*Ключевые слова:* ситуативная тревожность, типы центральной нервной системы, сангвиники, флегматики, меланхолики, холерики.

### *Introduction*

From the point of view of modern directions of neurophysiology, the problem of interaction between emotional stress and excitement indicators is a great scientific and practical interest. Recent literature has also shown that there is a strong link between behavior, adaptation and other physiological processes and emotional stress [1–8]. However, the complexity of a number of neurophysiological mechanisms that form the basis of this relationship, and the fact that many questions remain unanswered, make it necessary to conduct research in this area. It is known that the violation of the dynamics of the processes of arousal and retardation in the central nervous system causes the formation of a number of emotional reactions in the body [7–12]. Increased emotional tension leads to disruption of many physiological functions. In modern civilization, the disruption of the relationship between man and nature [1–2, 13], exposure to various irritants becomes an integral part of stress and its continuation [2, 14–15] and leads to the development of serious functional disorders in the body [7–8, 16] and creates optimal conditions for human exposure to stress [1, 6, 17].

Exam stress is accompanied by the emergence of numerous complex neurophysiological changes in the body, which negatively affects to the life of young people [18–22]. The pace of development of young people's lifestyles and the increase in the level of stress in the environment leads to changes in the adaptive function of the body and various deviations. In all cases, young people try to achieve their goals, which results in emotional tension [15, 17, 21–26]. Already before the exam, the "waiting syndrome" itself creates emotional stress [27–30]. It is caused a violation of regulatory mechanisms in the system, and finally there are changes happened in the dynamics of the processes of awakening and delay, the weakening of the functions of adaptation to stress. The body's tolerance to stress depends on its individual-typological characteristics of nervous system and is based on genetically programmed and their different neurochemical organization of cellular components [3–6, 9–10, 31]. The study of the mechanism of regulation of the interaction of multifaceted functions of the body is always one of the most pressing issues in the science of physiology.

The purpose of the study was to identify changes in the examination process in students aged 17–20 years, depending on the typological features of the nervous system, due to the impact on situational anxiety indicators.

### *Materials and methods*

The study involved 58 male students aged 17 and 20 studying at the Faculty of Biology and Chemistry of Ganja State University. 32 of them were 17 years old (1st year students) and 26 were 20 years old (4th year students). According to the purpose of the study, the nervous system was divided into groups according to different temperament types. The research was conducted 2 months before the exam, 30 minutes before the exam and 30 minutes after the exam. The study studied the psychophysiological state of various anxiety states. Practically healthy students were involved in the research on a voluntary basis. Before starting the experiment, the temperament types of the nervous system of young people were determined by the G. Yu. Aizenk test [32]. Situational anxiety levels (emotional stress) of 17- and 20-year-olds of different temperament types were assessed. According to Spielberg, situational anxiety is defined in three different situations: on normal days (ND), before the exam (BE) and after the exam (AE) with an express version of the test questionnaire.

For the purpose of statistical analysis, taking into account the number of young people, “SPSS” (Statistical Package for Social Science) program made “non-parametric” analysis methods. At the same time, taking into account the need to measure the alarm state in three different situations and to compare in three forms (comparison between two groups, comparison between several groups and comparison within the group) The Mann-Whitney criterion and the ANOVA-F criterion were used to compare different samples.

*Research results and their discussion*

According to the tests, according to the temperament type of the nervous system, 4 of the 17-year-old students were phlegmatic (strong, balanced, motionless), 10 choleric (strong, balanced, active), 10 sanguine (strong, balanced, active) and 8 were melancholic (weak, unbalanced, sedentary), 5 of the 20-year-olds were phlegmatic, 7 were choleric, 9 were sanguine and 5 were melancholic.

The results of a study of 17-year-old students is showed that ND there is not significantly differences in situational excitement level (SEL) between temperament types of students’ nervous system (Table 1). Thus, according to the ANOVA-F criterion, the difference between the types is  $P=0.426$ , so it is not statistically accurate. At the same time, the differences among the types in ND are less than the high SEL: 39.1 (sanguine) > 36.0 (phlegmatic) > 35.2 (choleric) > 34.3 (melancholic). Thus, the differences among the different temperament types of SEL in ND were not statistically significant ( $P>0.05$ ). It can be concluded that, the temperament types of 17-year-olds have a practically weak effect to SEL in ND.

These are not statistically valid ( $P> 0.05$ ) because the difference in the level of excitement between the types of BE SHS is  $P=0.796$ . However, the differences between the types are less than the high SEL: 44.0 (sanguine) > 41.8 (choleric) > 40.5 (phlegmatic) > 40.3 (melancholic). The distinction between the two independent types of SEL in ND was also inaccurate. Thus, the differences between phlegmatic and choleric, sanguine and melancholic, and choleric and sanguine and melancholic types are also incorrect ( $P>0.05$ ). This indicates that the differences between the different types of temperament in the first-year students are not noticeable (Table 1).

Table 1.

COMPARISON OF THE DYNAMICS OF CHANGE OF SEL IN CONNECTION WITH THE EXAMINATION PROCESS IN FIRST-YEAR STUDENTS UNDER THE INFLUENCE OF DIFFERENT TEMPERAMENT TYPES ( $M \pm m$ )

Stages of research	Types	n	M	± m	min	max	$P_{Fisher}$	$P_f$	$P_x$	$P_s$	$P_{ag}$	$P_{iya}$		
Normal days	Phlegmatic	4	36.0	1.6	32	40	0.426							
	Choleric	10	35.2	2.7	25	53							0.839	
	Sanguine	10	39.1	1.1	33	44							0.142 0.089	
	Melancholy	8	34.3	2.7	26	44							0.808 0.829 0.274	
	Total	32	36.3	1.2	25	53								
Before the exams	Phlegmatic	4	40.5	2.5	35	47	0.796					0.066		
	Choleric	10	41.8	3.1	30	64							0.945	0.074
	Sanguine	10	44.0	3.0	24	62							0.240 0,393	0.075
	Melancholy	8	40.3	2.2	30	49							0.808 0,965 0.237	0.025
	Total	32	41.9	1.5	24	64								
After the exams	Phlegmatic	4	43.0	2.7	36	49	0.901					0.068 0.068		
	Choleric	10	40.0	2.1	29	48							0.454	0,201 0,438
	Sanguine	10	40.0	3.0	24	48							0.839 0.796	0,766 0,811

Stages of research	Types	<i>n</i>	<i>M</i>	$\pm m$	<i>min</i>	<i>max</i>	$P_{Fisher}$	$P_f$	$P_x$	$P_s$	$P_{ag}$	$P_{iya}$
	Melancholy	8	41.1	2.3	30	50		0.683	0.633	0.965	0,034	0,228
	Total	32	40.7	1.3	24	50						

Note: Statistical accuracy of the difference among the indicators:

1.  $P_{Fisher}$  — Between different types (ANOVA test — according to Fisher’s criterion).
2.  $P_f$  — with indicators of the phlegmatic type group (according to the ranked Mann-Whitney criterion).
3.  $P_x$  — with indicators of the choleric type group (according to the ranked Mann-Whitney criterion).
4.  $P_s$  — with indicators of the sanguine type group (according to the ranked Mann-Whitney criterion).
5.  $P_{ag}$  — with the indicators of the ordinary day in the appropriate group (according to the double-Wilcoxon criterion).
6.  $P_{iya}$  — with pre-exam performance in the appropriate group (according to the double-Wilcoxon criterion).

Similar patterns are obtained in AE results. Thus, SEL did not differ significantly among IS types, and the difference among types was not accurate as  $P=0.901$  ( $P>0.05$ ). However, the differences among the types from the higher SHS to the lower ones have shifted from the previous groups and are noted as follows: 43.0 (phlegmatic)  $>41.1$  (melancholic)  $>40.0$  (choleric)  $>40.0$  (sanguine). A comparison of two independent types of AE SEL shows that the difference between the types is not statistically significant. This means that the first course student’s different temperament types do not affect AE SEL.

In the next phase of the study, we compared the ND of these students with BE (Table 1). These results showed that only in melancholic increased SEL ( $P<0.05$ ), and in other types no significant difference was observed ( $P>0.05$ ). Thus, while  $P=0.066$  in the phlegmatic type,  $P=0.074$  in the choleric type, and  $P=0.075$  in the sanguine type, this was  $P = 0.025$  in the melancholic type. In other types, no significant difference was obtained between ND SEL and AE SEL.

SEL was higher in first-year students in the AE group than in ND. AE level of situational anxiety the difference between ND SEL was not significantly different from other types except for the melancholic type. Thus, while in phlegmatic  $P = 0.068$ , in choleric  $P = 0.0201$ , in sanguine  $P=0.766$ , in melancholy it was  $P = 0.034$ . Although there is no significant difference between ND SEL and AE SEL in the first three types, there is a significant difference between ND SEL and AE SEL in melancholy ( $P<0.05$ ). Analysis of ND and AE SEL shows that ND and AE SEL is higher in students. Comparison of ND and AE SEL in these students shows that  $P=0.068$  in phlegmatic,  $P=0.438$  in choleric,  $P=0.811$  in sanguine,  $P=0.228$  in melancholy. Although there was no significant difference among the BE SEL and the AE SEL in all four types, the difference was slightly higher than the BE SHS.

Although slightly different results were obtained in fourth-year students (20-year-old students), ND SEL did not differ significantly among types (Table 2). Thus, since  $P_{ku}=0.539$  and  $0.539>0.05$ , the difference among the types is not accurate choleric)  $>32.8$  (sanguine)  $>29.6$  (phlegmatic). ND SEL was at  $P>0.05$  as the difference between the two independent types was small. As can be seen, ND SEL was not significantly different in 20-year-olds with different temperament types. In these young people, there is not significantly differences BE of SEL among the types. Since  $P=0.743$ , the difference among the types was negligible and was not statistically significant at 0.05. However, the difference from high SEL to less was as follows: 43.8 (melancholic)  $>42.4$  (phlegmatic)  $>42.0$

(sanguine) >40.1 (choleric). The difference is statistically significant but not significant at the level of 0.05. In other words, in 20-year-olds of different temperament types, BE SEL was poorly differentiated and the existing difference was not significant. AE SEL is not significantly different in these young people. More precisely, since  $P_{ku}=0.237>0.05$ , the difference among the types is not considered significant ( $P=0.180$ ).

However, even though the difference is small, the lower direction of high SHS is as follows: 49.2 (phlegmatic) >47.4 (melancholic) >44.3 (sanguine) >43.3 (choleric). The difference between the two independent types of IS SHS was not statistically significant. This means that, as in other groups, AE SEL is less in 20-year-olds with different temperament types, and this difference is not reliable. We also compared the SEL groups. The results of a comparison of ND situational alarm levels with ND SEL show that in 20-year-old phlegmatic, choleric, and sanguine types, ND SEL increased significantly compared to ND, and only in the melancholic type did no significant difference be observed between the two conditions. Thus, in phlegmatic  $P=0.043$ , in choleric  $P=0.027$ , in sanguine  $P=0.021$ , in melancholy it was  $P=0.080$ . Since the first three types have  $P<0.05$ , the result obtained from this point of view is important, as there is a significant difference between the SEL of the ordinary days and the SEL of the AE. However, the result obtained in the melancholy type does not matter. Thus, the analysis of ND SEL shows that compared to ND, SEL is higher in young people. While the difference between ND SEL and AE SEL in 20-year-olds is high between phlegmatic and sanguine types however, it is small in choleric and melancholic types. Thus, in phlegmatic  $P=0.043$ , in choleric  $P=0.075$ , in sanguine  $P=0.015$ , in melancholy  $P=0.080$ . Since this is  $P<0.05$  in phlegmatic and sanguine types, there is a significant difference between ND SEL and AE SEL in these two groups.

Table 2.

COMPARISON OF THE DYNAMICS OF CHANGE IN THE LEVEL OF SITUATIONAL AROUSAL IN RELATION TO THE EXAMINATION PROCESS IN 20-YEAR-OLD STUDENTS UNDER THE INFLUENCE OF DIFFERENT TEMPERAMENT TYPES ( $M\pm m$ )

Stages of research	Types	n	M	± m	min	max	$P_{Fisher}$	$P_f$	$P_x$	$P_s$	$P_{ag}$	$P_{iya}$		
ND	phlegmatic	5	29.6	2.7	23	38	0.630	0.298	0.918	0.310	0.755	0.606		
	choleric	7	34.1	3.2	27	49								
	sanguine	9	32.8	1.9	28	44								
	melancholic	5	34.6	3.0	28	46								
	Total	26	32.9	1.3	23	49								
BE	phlegmatic	5	42.4	2.7	34	48	0.743	0.699	0.681	0.690	0.268	0.518	0.080	
	choleric	7	40.1	1.7	35	46								
	sanguine	9	42.0	2.1	34	53								
	melancholic	5	43.8	2.7	37	51								
	Total	26	41.9	1.1	34	53								
AE	phlegmatic	5	49.2	2.3	45	58	0.180	0.083	0.606	1.000	0.268	0.364	0.080	0.066
	choleric	7	43.3	1.9	36	50								
	sanguine	9	44.3	1.1	40	48								
	melancholic	5	47.4	3.1	38	54								
	Total	26	45.6	1.0	36	58								

Note: The statistical accuracy of the difference among the indicators is as in Table 1.

This difference is insignificant, as there is no significant difference between ND SEL and AE SEL in choleric and melancholic types. Thus, the analysis of ND AE SEL shows that compared to ND, SEL was higher among young people.

A comparison of the BE and AE SEL of these students showed that only the phlegmatic type differed significantly from other types, and in the other three types, the SEL differences between these two groups was weak. Thus, in the phlegmatic type  $P=0.043$ , in the choleric type  $P=0.237$ , in the sanguine type  $P=0.312$  and in the melancholic type  $P=0.066$ . Since  $P<0.05$  is present in the phlegmatic group, the difference between BE SEL and AE SEL is high and is statistically significant at the level of 0.05. Since  $P=0.05$  was observed in the other three groups, no significant difference was observed between the BE SEL and the AE SEL, and the difference obtained at 0.05 is not considered significant.

In general, the analysis of the results of BE and AE SEL shows that in the case of BE, SEL is lower than in the case of AE. In extreme and critical conditions, the problem of self-regulation of physiological functions is of great importance, and it is usually due to the mobilization of a person's internal capabilities, which allows a person to adapt to the situation [1, 23–24]. It is no coincidence that 17-year-olds have high levels of anxiety in melancholy and cholera. It is known that temperament is based on the same indicators based on the individual characteristics of the conditioned reflex activity, i. e. the characteristics of the nervous system. The combination of the three main features of the nervous system (strength, balance, and mobility) is noted as the types of higher nervous activity of the nervous system. The English psychologist H. J. Eysenck, who studied this information, assumes that there are strong and weak species according to I. Pavlov [2, 14]. According to Pavlov, extrovert and introvert personality types are awfully close to each other. The characteristics of extraversion and introversion depend on the innate characteristics of the central nervous system, which provides a balance of excitement and delay processes. At the same time, according to I. P. Pavlov's classification, indicators of personality temperament are extraversion, introversion, and neuroticism. According to the classification, the increase in the level of anxiety in both types of BE and AE can be attributed to the imbalance of the types. However, in 20-year-olds there was a difference in phlegmatic, choleric, and sanguine types. The results of the research show that there is a significant difference between the levels of situational anxiety in different types of 1st and 4th year students. This difference is observed both between different types of courses and among types in courses. Approaches to the nature of the types of nervous system of different courses of students are recommended. This will prevent these or other neurotic changes that may occur in them. Thus, based on the analysis of this study, the following results were obtained.

### *Conclusion*

1. In first-year, 17-year-old students, there is no significant difference in SEL in ND, BE and AE among types. Also, the difference between the two independent types was not statistically reliable.

2. Only melancholic type indicators are statistically reliable in the comparison of ND and BE and AE SEL in first-year youth.

3. 4th year students differed slightly in ND, AE and BE SEL. Also, the difference between the two independent types was not statistically valid. In 20-year-olds, the indicators of phlegmatic, choleric and sanguine types are considered statistically reliable in comparison with ND, BE SEL. However, in comparison with AE, phlegmatic and sanguine types are considered statistically reliable.

5. While the difference between ND SEL and AE SEL in these young people is high between phlegmatic and sanguine types, it is low in choleric and melancholic types. Phlegmatic type indicators are considered statistically reliable in comparison with ND and AE SHS.

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