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DYNAMICS OF CHANGES IN THE LEVEL OF PERSONAL EXCITEMENT CAUSED BY THE EFFECT OF EMOTIONAL STRESS OF THE EXAM PROCESS IN 21-YEAR-OLD STUDENTS OF DIFFERENT TEMPERAMENT TYPES

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One of the main causes of psychophysiological stress in students is exam stress, which often leads to neuropsychological disorders as the final result. The main goal of the present study was to reveal the age characteristics of the changes in the psychophysiological-excitement level caused by the emotional stress due to the examination process in students. Psychophysiological studies of different states of anxiety were conducted 2 months before the exam, 30 minutes before the exam and 30 minutes after the exam with 36 male students of 21 years of age having different typological features of the nervous system at Ganja State University. Practical health and voluntary engagement of the participants in researches were taken as important conditions. The analysis of the numerical average of the level of personal anxiety on ordinary days and the level after the exam shows that the personal anxiety was higher in young people after the exam. Thus, although the level of personal anxiety in 21-year-old students with four temperament types changed dramatically before and after the exam compared to their usual days, the difference between groups and temperament types was not statistically reliable and accurate in some cases.

Key words: emotional stress, personal excitement, exam stress, temperament type, melancholic type, sanguine type, phlegmatic type

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ДИНАМІКА ЗМІН РІВНЯ ОСОБИСТІСНОГО ЗБУДЖЕННЯ, СПРИЧИНЕНОГО ЕФЕКТОМ ЕМОЦІЙНОЇ НАПРУГИ ЕКЗАМЕНАЦІЙНОГО ПРОЦЕСУ, У 21-РІЧНИХ СТУДЕНТІВ З РІЗНИМИ ТИПАМИ ТЕМПЕРАМЕНТУ

Однією з основних причин психофізіологічного стресу у студентів є екзаменаційний стрес, який часто призводить до нервово-психічних розладів як кінцевий результат. Основною метою даного дослідження було виявлення вікових особливостей змін рівня психофізіологічного збудження, спричинених емоційним стресом внаслідок екзаменаційного процесу у студентів. Психофізіологічні дослідження різних станів тривоги були проведені за 2 місяці до іспиту, за 30 хвилин до іспиту та через 30 хвилин після іспиту у 36 студентів чоловічої статі 21 року з різними типологічними особливостями нервової системи Гянджінського державного університету. Важливими умовами були практичне здоров'я та добровільна активність учасників дослідження. Аналіз середнього значення рівня особистісної тривожності у звичайні дні та рівня після іспиту показує, що особистісна тривожність була вищою у молодих людей після іспиту. . Таким чином, хоча рівень особистісної тривожності у 21-річних студентів із чотирма типами темпераменту різко змінився до і після іспиту порівняно з їхніми звичайними днями, різниця між групами та типами темпераменту в деяких випадках не була статистично надійною та точною.

Ключові слова: емоційне напруження, особистісне хвилювання, екзаменаційний стрес, тип темпераменту, меланхолік, сангвінік, флегматик.

Psychological reaction, including stress and anxiety are highly prevalent among students worldwide and different tests and examinations are a major source of such stressful conditions [6]. Before the exam, the "waiting syndrome" itself creates psychological stress [9]. So, mental stress, insomnia when preparing for the exam, impact on the students dditionally. Due to these reasons, there is a violation of the regulation mechanisms in the mental, vegetative-hormonal systems, and finally, changes in the dynamics of perception and learning processes, weakening of the functions of adaptation to stress conditions are manifested. Despite the potential benefits, many students consider the some type of exams more stressful and intimidating than other kinds of tests [2, 6]. In extreme and critical conditions, the importance of the problem of self-regulation of mental functions is high, and it usually arises due to the mobilization of a person's internal capabilities, ensuring a person's adaptation to the conditions [3, 4]. The cumulative stress effect caused by this situation is a factor of increasing anxiety, fear, melancholy and depression [8]. Since stress interacts closely with lifestyle, stress tolerance and habits, personality temperament may play a causal role in their development not only depression and other disorders, but also of somatic diseases [11].

Based on what was written above, the study of the changes in psychological-excitement indices in students migth be useful to prevent more serious psychological disorders.

The purpose of the study was to reveal the age characteristics of changes in the psychophysiological-excitement level of students due to the effect of emotional tension created during the examination process, depending on the temperament types.

Materials and methods. The study involved 36 male students aged 21 years undergoing training at Ganja State University. Exclusion criteria: the presence of confirmed psychological disorders of a permanent nature, taking psychotherapeutic medications, age less than or more than 21 years, females

In the conducted studies, before starting the experiment, the temperament types of higher nervous activity of students of all age groups were determined by G. Eysenk test [7].

In the conducted experiment, psychophysiological research methods were used to study the effect of exam stress on the level of excitement in all age groups. To determine the level of situational and personal excitement, the Spilberger-Khanin test (1976) consisting of 40 questions was used [12]. Questions 1–20 of the survey allow you to determine the level of situational arousal, questions 21–40 the level of personal arousal (personal arousal level). The questions have four options and are evaluated with a 4-point system.

The obtained results are evaluated in the following order: less than 30 points – low alarm, 31–45 points - medium alarm, 46 and more points - high alarm level. The test takes 20–30 minutes. The level of situational and personal excitement (emotional stress) of 21-year-olds was evaluated. According to Spilberger-Khanin test, the level of situational and personal arousal was determined on a regular day, before and after the exam.

All numerical indicators obtained during the research were statistically analyzed taking into account modern recommendations. The statistical analysis of the results of the experiments conducted for this purpose was carried out on the basis of the statistical-mathematical methods and formulas widely used in the field of modern biology. The statistical analysis was carried out by applying the variation and dispersion methods.

U-Mann-Whitney (U-Mann-Whitney) in independent groups, KU-Kruskal-Wallis (KU-Kruskal-Wallis) in dependent groups (before and after the examination) T-Wilcoxon (T-Wilcoxon) pairwise tests for comparison of obtained ranks applied. The ratio of between-group variance to within-group variance allows us to estimate the influence of controllable factors on the final result. The statistical integrity of the influence of the factors was evaluated by the F-Fisher (Fisher) criterion.

All calculations were made in MS EXCEL-2016 spreadsheet and SPSS–22 package software, the results were summarized in tables and diagrams.

Results of the study and their discussıon. There is a significant difference between the choleric type and the phlegmatic, sanguine and melancholic types in terms of the level of personal excitement in 21-year-olds. This generally resulted in a high difference between types in terms of personal excitement on a typical day. A comparison of the level of personal anxiety before the exam between two independent types also shows that the difference between the types was not statistically significant at the 0.05 level.

Compared to the usual day, the level of personal anxiety increased before the exam, and a significant difference was observed in the other three groups, except for the choleric type, who had a high level of anxiety even on the usual day. However, it shows that the difference between the two conditions in the choleric type is negligible. That is, since $p>0.05$ in this group, the existing difference between the level of personal anxiety before the exam and the usual day cannot be considered statistically honest at the level of 0.05. However, since $p<0.05$ in phlegmatic, sanguine and melancholic types, it can be said that the existing difference between the two situations compared in these three groups is significant at the 0.05 level.

According to the score level, the difference between the types was $pKU=0.045$. (According to the F criterion, since $p=0.101$, the difference between the types is insignificant, from a statistical point of view, the result is not honest at the level of 0.05). However, the difference between the types was insignificant.

A comparison of personal arousal with post-examination results shows that there is a difference, and this difference is high in the other three types (phlegmatic, sanguine, and melancholic) except for the choleric type, who has a high level of arousal in the ordinary day. Since $p>0.05$ was found in the choleric type, no significant difference was observed between the level of personal excitement during the normal day and after the exam.

However, since there are phlegmatic, sanguine and melancholic types, the difference between the usual day and personal arousal level in these three groups is statistically significant and high at the level of $p<0.05$.

The effect of the examination process on the dynamics of changes in the level of personal excitement in 21-year-old students with different temperament types before and after exams (M±m) are presented in the Table 1.

Table 1

The personal arousal score levels of students depend on temperament types and the day of measurement

Groups	Types	N	M± m	min	max	$P_{Fişer}$	P_{KU}	P_{OD}	P_{BE}
An ordinary day	Phlegmatic	5	32.4±3.2	25	42	0.005	0.010		
	Choleric	13	45.8±2.1	32	56				
	Sanguine	11	39.3±2.0	30	48				
	Melancholy	7	36.6±2.8	25	48				
Before the exam	Phlegmatic	5	43.8±2.9	36	51	0.249	0.421	0.042*	
	Choleric	13	45.4±1.3	34	52			0.916	
	Sanguine	11	47.2±1.2	40	52			0.026*	
	Melancholy	7	48.9±1.6	43	54			0.018*	
After the exam	Phlegmatic	5	48.0±2.2	44	56	0.101	0.045	0.042*	0.141
	Choleric	13	45.2±1.5	34	55			0.756	0875
	Sanguine	11	48.8±1.5	39	57			0.019*	0.154
	Melancholy	7	52.4±3.3	35	59			0.028*	0.149

Note: Statistical validity of the difference between indices: P_{Fisher} – Between different types (ANOVA test – According to Fisher's criterion); P_{KU} – Between different types (according to colored Kruskal-Wallis criteria); P_{OD} – with indicators of a typical day in the corresponding group (according to the pair-Wilcoxon criterion); P_{BE} – with IU indicators in the corresponding group (according to the pair-Wilcoxon criterion

Although arousal levels in 21-year-old students of four temperament types varied biphasically and sharply, the difference between groups and between temperament types was not statistically significant in some cases.

The change in the level of situational arousal on a typical day in the types of 21-year-old students is at the average level of arousal. Also, the differences between the two independent types of situational arousal level are high. In these students, pre-exam and personal anxiety level changes were in medium and high anxiety levels. In 21-year-old young people, the level of personal excitement differs significantly in the choleric type.

In phlegmatic, sanguine and melancholic types, score rises before the exam. Comparing the situational personal level with the previous situations (normal day and before the exam), the phlegmatic, sanguine and melancholic types were high, while the choleric type was weak. The level of personal arousal plays a major role in neuropsychological regulation and self-regulation of the individual's activity in students, but some aspects of the mechanisms of the effect of emotional stress on the functions of the nervous system are consistent with our results.

In this regard, one of the causes of emotional stress in students is exam stress, which often leads to the disruption of neuro-psychic functions as a final result.

As we have noted based on our own research and literature data, in most students, waiting for the results of the examination process causes emotional tension, so the level of situational and personal anxiety increases [9, 10]. As a result, mental, vegetative, hormonal, etc. there is a violation of regulatory mechanisms in the systems, and finally, changes in the dynamics of perception and learning processes, weakening of the functions of adaptation to stress conditions are manifested [2].

Thus, although there are many approaches to the study of the role of types of higher nervous activity in psychophysiological changes that can occur during emotional stress in literature sources, the regularities of the changes, manifestation mechanisms, and different reactions in the electrical activity of the brain have not been explained. From this point of view, in our researches, we tried to explain the role of temperament during stress effects by studying students studying in different courses under the influence of emotional stress model of exam stress with psychophysiological testing methods and electrophysiological method.

In the other works researches studied anxiety and stress by Spielberger-Khanin test in patients with different diseases [1, 11]. So, Burbela E.I., et al (2016) observed 121 children with asthma and 226 healthy school children (8 to 17 years old) and assessing anxiety by Spielberger-Khanin test revealed that personal anxiety presented in 97.52 % of children and situational one in 78.51 %. The indices of the reactive anxiety in the experimental group were slightly lower than of the personal one, but reliably higher than in the control group. The results indicate that children with asthma aged 8-10 years are the most sensitive to stressful school situations and factors [1]. In our study we detected the personal arousal score levels, using it as a factor of anxiety assesment in different situations.

The other authors with the aim to evaluate relationship of social anxiety disorder symptoms, while controlling the personality traits of neuroticism and extraversion, anxiety and depression symptoms formed a sample of Turkish university students (n=455) [5]. They used different scales for assessment of

psycological deviation (Beck Depression Inventory, the Beck Anxiety Inventory (BAI), the Eysenck Personality Questionnaire Revised-Abbreviated Form, and the Liebowitz Social Anxiety Scale). In contrast, in our work we valued only Eysenck Personality Questionnaire for detection of temperament types, which may e considered as a limitation of our study.

The different reaction on the stress depending on physiological reactivity and (indirectly) types of temperament noted Dimitroff SJ, et al (2017), who hypothesized that observers would show stronger psychophysiological reactions to the "Stress" and "Post Stress" videos as compared to the "No Stress" videos and that levels of empathy would interact with these physiological responses to viewing others who are stressed, in that empathetic individuals would have greater physiological reactivity in response to viewing stress [3]. But we did not assess the response based on video, only by questionnaire, which might impact on results.

Conclusions

1. The personal arousal level of 21-year-old students of different temperament types on a normal day has high differences between the two independent types, and the personal arousal level before the exam was at medium and high arousal levels.

2. The level of personal excitement in 21-year-olds differs significantly in the choleric type.

3. Although the levels of excitement in 21-year-old students of four temperament types were biphasic and changed sharply, the difference between groups and between temperament types was not statistically significant in some cases

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