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NEUROPHYSIOLOGICAL AND PSYCHOPHYSIOLOGICAL MECHANISMS OF EXCITABILITY IN YOUNG PEOPLE DEPENDING ON THE TYPOLOGICAL CHARACTERISTICS OF THE NERVOUS SYSTEM

Specialty: 2411.01 – Human and Animal Physiology

Field of science: Biology

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ABSTRACT

of the dissertation for the degree of Doctor of Science

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The thesis work was performed at the Department of Anatomy, Physiology and Zoology of Ganja State University, Ministry of Science and Education of the Republic of Azerbaijan.

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GENERAL CHARACTERISTICS OF THE WORK

Relevance of the topic and degree of development.In modern times, human life is characterized by constant changes in socio-economic demands and the excessive increase in the volume of the received information flow leads to the development of nervous and mental tension in all directions of their activity. At present, the study of psychophysiological and vegetative functions of a person in the conditions of professional activity is of particular relevance. One of the noteworthy points in the bibliography of recent years dedicated to emotional stress is the study of physiological processes such as behaviour, activity, adaptation indicators and defence ability of a person in emotional stress[1]. Institutions of higher education play an important role in the training of professional specialists and in the formation of a completely healthy person. The health level during adolescence consists of the implementation of future plans, as well as professional training, efforts to social development.

In this regard, the study of psychophysiological development issues of students is of special importance. It is obvious from the analysis of the literature on this problem that the role of the typological properties of temperament, the functional state of the central nervous system (CNS) and the mechanisms involved in physiological reactivity during the psychoemotional stress of demands have not been fully investigated. The level of anxiety in adolescents affects their personality development, self-confidence and behaviour. Therefore, in order to change the level of anxiety of adolescents at this stage of education, it is important to have a purposeful influence on

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[1]Лисова Н.А. Эффективная адаптация к стрессегенной нагрузке: Роль активационных и типологических свойств нервнной системы / Н.А. Лисова, А.А. Лукьянова, В.И. Кирков // Симферополь: Ученные записки Крымского Федерального Университета имени В.И. Вернадского, Биология. Химия, – 2020. том 6 (72). №3, с. 119-128.

their emotional and voluntary sphere[2].The teaching process is not always focused on the individual physiological capabilities of the student. Thus, the assimilation of knowledge can sometimes be caused by nervousness, sleep disorders and emotional overload can lower the "quality of life". This problem occupies one of the central places in the higher education system in modern times.[3] Regulation mechanisms are disturbed in nervous, vegetative-hormonal, mental and other systems due to the mental stress, insomnia when preparing for the exam, post-exam performance and others. Such cases as changes in the dynamics of perception and memory processes, weakening and disruption of the functions of adaptation to stressful conditions are manifested.[4] Modern students' physiological and psychological capabilities are not always adequate for the increased information loads, which leads to the exhaustion of their body's resources, the decrease in the efficiency of mental activity and the appearance of fatigue[5].

Thus, the process of inadaptation to a high level of learning develops in students with low individual psychophysiological characteristics in education in the chosen direction. It is obvious that the activation of systems and changes in the hormonal profile of the body in a stressful situation can lead to slowing down of physical

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[2]Долгова В.И., Капитанец Е.Г., Купцов М.В. Моделирование психолого-педагогической коррекции ситуативной тревожности подростков в период прохождения государственной итоговой аттестации. //Ученые записки университета им. П.Ф. Лесгафта, 2016, № 5 (135), с. 272-278.

[3]Юматов Е.А., Глазачев О.С., Перцов С.С. Психофизиологическое состояние студентов при эмоциональном напряжении. //Вестник психофизиологии. 2019, № 1, с.19-29.

[4]Юматов Е.А., Глазачев О.С., Быкова Е.В., Классина С.Я., Абсандзе Ц.Г., Семёнова В.А Психофизиологическая характеристика эмоционального напряжения, сна и характерологических черт учащейся молодежи. //Вестник МАН РС, № 1, 2018 с. 72-77.

[5]Яценко М.В., Кайгородова Н.З. Влияние погодных условий на показатели умственной работоспособности и биоэлектрическую активность головного мозга студентов. //Вестник Кемеровского Государственного Университета. Серия: Биологические, технические науки и науки о Земле, Серия, 2017, с. 31-36.

development processes and the disruption of cognitive functions[6]. The brain regulates physiological and psychological responses that are either adaptive or destructive for a person.

The tasks facing the educational process require the ability to be flexible in relation to norms and rules of conduct, changes in communication, the emergence of new social ways, orientation to new types of activity areas, assimilation. Sharp changes in the activity stereotype of many years are often manifested by stressful reactions, which can cause difficulties in the communication of students[7]. On the other hand, many research studies were devoted to the analysis of students' electroencephalogram (EEG) indicators during the examination process, while the authors of other studies paid more attention to the structure of EEG rhythms due to the nature of anxiety and motivation during the examination[8.9]. It is shown that in order to ensure success in all areas of human activity (education, sports, work, etc.), first of all, purposeful and systematic development of behavior under emotional stress is important.

Thus, notwithstanding that numerous approaches have been devoted to the study of the role of psychophysiological changes that occur during the emotional anxiety of the exam in the type of higher nervous activity (HNA) of students, the age characteristics of the changes that occurred at this time, the mechanisms of manifestation, and the reactions that occurred in the electrical rhythms of the brain have not been explained.

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[6]Проблемы интеграции в современном образовании: Международная научно-практическая конференция / под общ. ред. О. П. Морозовой. Барнаул: Изд-во Алтайского государственного университета, 15-16 декабря, 2020, 235 с.

[7]Анисимова, Т.Г. Общие подходы к оптимизации процесса адаптации студентов в среде Вуза. //Москва: Вестник университет. Государственный Университет Управления, 2014, № 12, с. 211-215.

[8]Джебраилова Т.Д., Коробейникова И.С., Руднева Л.П. Влияние мотивации на спектральные характеристики ЭЭГ и сердечный ритм у студентов в экзаменационной ситуации. Российский физиологический журн. им. И.М. Сеченова. 2014, 100 (9), с. 1076–1087.

[9]Джебраилова Т.Д. Индивидуальные особенности взаимодействия функциональных систем при целенаправленной деятельности человека в условиях эмоционального напряжения: Автореф. дисс. д-ра биол. наук. М., 2005, с. 44.

It may be possible to eliminate the negative impact of dysfunctions caused by emotional tension on the educational process of students by comprehensively studying such a relationship. In this regard, the study of the interaction between the emotional tension of the HNA temperament type, the emotional tension of the exam stress and the EEG rhythms of the brain made it necessary to conduct a thesis.

Purpose and objectives of the thesis. The main goal of the thesis is to determine the age characteristics of the changes in the interaction between the psychophysiological-anxiety level and the bioelectrical activity of the brain and autonomic impulses, depending on the HNA temperament type, due to the effect of emotional stress (EG) in the examination process.

In order to achieve this goal, the following issues have been put forward.

- to study the temperament type of HNA in students of different ages in I, II, III, IV, V years (17, 18, 19, 20, 21 years old) and to determine the autonomic indicators;
- to assess the age dynamics of changes in the situational anxiety level (SEL) of the emotional stress of the exam process in 17, 18, 19, 20, 21-year-old students, depending on the temperament type of the HNA;
- to investigate the age dynamics of the changes caused by the emotional stress of the exam process in the individual anxiety level (IEL) in 17, 18, 19, 20, 21-year-old students, depending on the temperament type of HNA;
- to compare the changes in SAL and IAL due to the emotional stress of the exam process according to the temperament type;
- to determine the age dynamics of the effect of EG on vegetative indicators of the examination process depending on the temperament type of HNA in students of different age groups;
- to perform a comparative analysis of changes in EEG rhythms in different parts of the brain during the examination process in 17, 18, 19, 20, 21-year-old students, depending on the temperament type of HNA;

- to compare the changes in psychophysiological, electrophysiological and vegetative processes in students due to the emotional stress of the exam process.

Research methods. 146 male students between the Ages of 17 and 21 studying in the I, II, III, IV and V years of Ganja State University were involved in the research for the preparation of the thesis. The students participating in the research were practically healthy, they joined the research on a voluntary basis. Experiments on those students were carried out taking into account the proposal of the Bioethics Committee of the European Convention (Strasbourg, March 18, 1986). Also, after receiving the scientific and ethical opinion of the Ethics Committee of Ganja State University (23.10.2017), the research was started.

In our studies, first of all, the types of HNA of students of all age groups were determined by Hans Jürgen Eysenck[10,11] test. The students involved in the experiments conducted in order to study the effect of the exam process on emotional stress were divided into three groups:

- students included in the first group were included in the study during regular school days (two months before the exam).
- students included in the second group were included in the study 30 minutes before the examination process.
- students included in the third group were included in the study 30 minutes after the examination process.

We conducted psychophysiological, vegetative and electrophysiological studies on students. In the course of the study, situational and individual levels of psychophysiological indicators and biocurrent activity of different areas of the cerebral cortex EEG

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[10]Королева, Т.П. Анализ информативности теста-опросника г. Айзенка "Личные качества и интересы" / Т.П. Королева, И.А. Филиппова // Краснодар: Общество: социология, психология, педагогика, 2018. №4, с.1-51.

[11]Солодовник, Е.М. Исследование влияние типа темперамента студентов, при выборе ими спортивных "элективных дисциплин» / Е.М. Солодовник, Л.А. Неповинных // Саранск: E-SCIO, 2020. №1, с. 369-374.

registration (delta, theta, alpha, beta waves) were studied in three groups.

Psychophysiological research methods. Phychophysiological research methods were used in order to study the effect of exam stress on the level of anxiety for all age groups. In this regard, SAL and IAL were studied by us using the Spilberger-Khanin test[12].

Vegetative research methods. Systolic arterial pressure (SBP), diastolic arterial pressure (DAP) and the number of heart beats per minute (HBM) were recorded by the method of N.S.Korotkov using an automatic brachial manometer (Turkey) Microlife BP 3BTO-2 on normal day (ND), before exam (BE) and after exam (AE) in order to study arterial blood pressure during all tests[13]. Vegetative tone was determined based on the results of these obtained indicators. That is to say that vegetative tone was calculated on the basis of Kerdon's vegetative index (VIK)[14].

Method of recording the bioelectrical activity of the brain. EEG registration in neurophysiological studies on ND, BE and AE was performed in the following areas: nape (O right, left), occiput (T right, left), sinciput (C right, left) and forehead (F right, left). In the research, the EEG waves of the brain were registered using the "neuron spector-4" Russian-made device. When electroencephalography is performed, 8 monopolar leads are used in the international "10-20%" installation system of electrodes. The reference electrode is placed on the auricle of the ipselateral ear[15].

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[12]Шкала тревоги. Тест на тревожность Спилберга Ханина http://clinica.nsk.ru/info/testy/testy-na-stressy-depressiyu-trevozhnost/shkala-trevogi-test-na-trevozhnost-spilbergera-khanina.

[13]Тихоненко В.М. Достоинства метода Короткова при мониторировании артериального давления. //Санкт-Петербург: Вестник Аритмологии, 2005. № 40, с. 36-38.

[14]Вагин Ю.Е. Вегетативный индекс Кердо: роль исходных параметров, области и ограничения применения. /Ю.Е. Вагин, С.М. Деунежева, А.А. Хлытина //Москва: Физиология человека, 2021. том 47. № 1, с. 31-42.

[15]Borbély S. Physiology Practical / S. Borbély, L. Détári, T. Hajniks [et al.]. Budapest: Eötvös Loránd University, 2013, 215 p.

Statistical analysis of the results of the conducted research; All numerical indicators obtained during the research were statistically analysed taking into account modern recommendations[16]. In order to compare the obtained ranks, KU-Kruskal-Wallis (KU-Kruskal-Wallis)[17] was applied in independent groups (before and after the examination) and T-Wilcoxon (T-Wilcoxon) pair criteria in dependent groups.

The statistical integrity of the obtained results was evaluated by the F-Fisher (Fisher) criterion. All calculations were made in MS EXCEL-2016 spreadsheet and SPSS-22 (3) package program, the results were summarized in tables and diagrams.

Main provisions of defence.

1. On regular school days certain differences are observed in the numbers of the temperament type of HNA on the basis of dynamics of the I-V course (17-21 age limit) students. During the examination process, increased alertness in the CNS prevails in all age groups.
2. Depending on the temperament type of HNA, certain age-related differences are observed between hemodynamic indicators (number of heart beats, systolic and diastolic pressure) in ND, BE and AE as emotional tension rises during the examination process in 17-21-year-old students. So, the indicators obtained AE do not fully return to the norm. In all age groups, VIK shows a predominance of the sympathetic nervous system (SNS) during the examination process.
3. Depending on the temperament type of HNA, changes in SAL during regular school days in students aged 17-21 are affected by the emotional stress of the exam process and it changes in different directions (increases or decreases).

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[16]Гланц С. Медико-биологическая статистика. /Перевод с английского / С. Гланц. Москва: Практика, Москва: 1998. Москва: 459 с.

[17]Петри А. Наглядная медицинская статистика: учеб. пособие. /А. Петри, К. Сэбин; пер. с англ. под ред. В. П. Леонова. 3-е изд., перераб. и доп. М.: ГЭОТАР-Медиа, 2015. 216 с.

4. Depending on the temperament type of HNA, there are different changes in IAL according to the age dynamics of the emotional stress of the examination process (IPEG) in students aged 17-21.
5. As the effect of the emotional stress of the examination process increases, IAL partially increases in the comparison of changes in SAL and IAL according to temperament type.
6. Depending on the temperament type of HNA, along with the changes in the level of anxiety due to the effect of IPEG, there are different direction changes in the amplitude and frequency of the waves of the EEG of the electrical activity of the separate areas of the cerebral cortex in the 17-21 years-old students of the I-V years. Indicators of the electrical activity of the cortical areas of the brain change differently as the level of EG increases.
7. Depending on the strength and stability of the nervous system, changes in the rhythms of the amplitude and frequency of the EEG waves of the brain have different characteristics BE and AE and change in an increasing-decreasing direction. In most amplitudes and frequencies, a partial reduction is observed AE. Different age-related changes are observed in the amplitude and frequency indicators of alpha-, beta-, theta- and delta-waves of the cerebral cortex of young people in different age groups ND, BE and AE.
8. Due to the effect of emotional stress during the examination process, differences are observed in the changes in psychophysiological, electrophysiological and vegetative indicators of students.

Scientific novelty of the research: It was determined for the first time that the temperament types of HNA students of the I-V years (age limit 17-21) studying at the bachelor's level differ sharply according to the age dynamics. It was determined that in 17-21-year-old students, depending on the temperament type of HNA, there is a change in vegetative indicators (number of heart beats, systolic and diastolic pressure) on ND, BE and AE. The tone of the sympathetic nervous system (SNS) prevails during the examination process in all age groups. The vegetative indicators of 20-21-year-old students of the IV and V years change slightly less than those of 17-year-olds.

In 17-year-old students, no significant differences are observed in temperament types and SAL and IAL between groups ND, BE and AE. However, certain deviations occur between the later age periods. In comparing the changes in SAL and IAL due to the effect of ESEP, IAL is partially elevated.

It was determined for the first time that the amplitude of EEG delta-, theta- and alpha-waves changes on an ascending line BE and IS in the first half of the academic year, depending on the effect of the level of anxiety of the EG in both parts of the brain. However, the beta-waves of those students vary in the increasing and decreasing direction. Due to the effect of ESEP, there is a difference in the frequency rhythm of EEG pulses in the right and left parts of the brain in young people studying in the IV and V years. When the emotional tension between types (Phlegmatic, Choleric, Sanguine, Melancholic) rises BE, ND and AE, a change in the amplitude and frequency indicators of delta-waves was observed in the alpha-, beta-, theta- in the right and left parts of the cerebral cortex in the nape, occiput, crown and forehead. Depending on the strength and stability of the nervous system, changes in the amplitude and frequency rhythms of EEG waves of the brain are different BE and AE. In the rhythm of most waves, partial reduction is observed AE.

It was determined that there are noticeable differences between the shares in the electrical activity of the brain depending on the temperament of the nervous system of 17,18,19, 20 and 21-year-old students. Thus, the EG neurophysiological correlates of 20- and 21-year-old students in the exam pose, the change of the activity of different parts of the brain, are different from the indicators obtained in 17-year-old students.

Parallelism is observed in the changes in psychophysiological and electrophysiological indicators of students due to the effect of ESEP. The obtained results show that the process of psychophysiological adaptation in the process of improving the quality of education and professional selection of young people is formed depending on the mechanisms of regulation of electrical

waves of the cerebral cortex, vegetative indicators, indicators of SAL and IEL.

Theoretical and practical significance of the work: In the conditions of ESEP, by determining the temperament type and different types of anxiety levels of students of different years and at the same time determining the change in the activity of ANS, they can achieve the goal set by students doing their bachelor's degree. During ESEP, it is considered appropriate to use the determination of psychophysiological (situational and individual anxiety) and electrophysiological (EEG electrical activity in different parts of the brain) indicators in students, depending on the type of temperament, in their choice of profession (especially in professions associated with high neuro-psychic stress). As well, besides the proposed results, this method can be used as a forecast in the personnel selection of other professions. Studying changes in HNA temperament type, state of anxiety, autonomic and electrophysiological processes on the eve of ESEP in students of different ages can be considered as the basis for the classification of psychophysiological type of students.

Thus, the results of this study can be used to optimize teaching activities, correct exam stress and protect students' health.

Approbation and application: The main provisions of the dissertation were presented at many national and international conferences and symposia. Actual problems of modern natural and economic sciences (Ganja 2018,2019,2020), Biomedikal serles İnternational Congress of Georgian İvane Beritashvili Society of Physiologists proceedings IV (Georgian 2019), Proceedings of the XIX International Scientific and Practical Conference Social and Economic Aspects of Education in Modern Society (Warsaw, Poland, 2019), Universities of Azerbaijan and Turkey: Education, science, technology" Materials of the 1st International scientific-practical conference Part III (Baku 2019), Anatolian congress, 4 Uluslararasi uygulamali bilimler kongresi (Diyarbakir, 2020), Dedicated to the 97 Anniversary of the National Leader of Azerbaijan Heydar Aliyev IV international scientific conference of young researchers Baku Engineering University (Baku 2020), International scientific

conference on current problems of modern natural sciences (Ganja 2020), Euroasia Congress on scientific researches and recent trends-VII Baku Eurasian University (Bakı 2020), V international scientific conference of young researchers dedicated to the 98th anniversary of the birth of our national leader Heydar Aliyev (Bakı, 2021), Actual problems of modern natural and economic sciences International scientific conference. The conference is dedicated to the 98th anniversary of the birth of National Leader Heydar Aliyev. (Ganja, 2021), VI Міжнародна науково-практична конференція з міжнародною участю. Проблем, досягнення та перспективи розвитку медико-біологічних і спортивних наук. р. Миколаїв, (Україна, 2021), Actual problems of modern natural and economic sciences (Ganja, 2022), Achievements & Challenges in Biology, 11 th International Conference Baku State University (Baku, 2022), Міністерство охорони здоров'я України Полтавський державний Медичний Університет Наукове товариство анатомів, гістологів, ембріологів та топографоанатомів (України, 2022), Implementation of modern technologies in science Proceedings of the XIII International Scientific and Practical Conference (Varna, Bulgaria, 2022)

Name of the institution where the thesis work was performed: The thesis work was carried out at Ganja State University, Ministry of Science and Education of the Republic of Azerbaijan.

Printed works. 56 scientific works have been published on the topic of the thesis. Out of these works, 25 scientific articles and 31 theses were published.

Scope and structure of work. The thesis 382335 thousand signs (Introduction-17264, Chapter I - 57711, Chapter II - 7428, Chapter III - 5122, Chapter IV - 39419, Chapter V - 17501, chapter VI - 14969, chapter VII -85046, chapter VIII - 75574, chapter IX - 52311 signs, result 3397, practical significance-1386), Introduction, 9 conclusions, 348 pages, bibliography list of 300 names and appendices. The dissertation is enriched with 57 tables and 80 graphs.

Contribution of the author. It is the responsibility of the author to formulate the scientific idea and purpose of the thesis, to develop a

methodological approach for its solution, to perform experimental studies and to generalize them.

RESEARCH RESULTS AND THEIR DISCUSSION

1. Results of individual studies. Analysis of students' age dynamics and Type of higher nervous activity.

Firstly, the age dynamics of the students participating in the study and the temperament type of HNA were determined and the students were divided into the following types according to their results.

Out of 146, 32 students aged 17 (Phlegmatic – 4, Choleric – 10, Sanguine – 10, Melancholic – 8), 23 students aged 18 (Phlegmatic – 5, Choleric – 8, Sanguine – 6, Melancholic – 4), 29 students aged 19 (Phlegmatic – 11, Choleric – 8, Sanguine – 6, Melancholic – 4), -26 students aged 20 (Phlegmatic – 5, Choleric – 7, Sanguine – 9, Melancholic – 5), 36 students aged 21 (Phlegmatic – 5, Choleric – 13, Sanguine – 11, Melancholic – 7) (Figure 1). Choleric and Sanguine temperament types were more common among students of all age groups

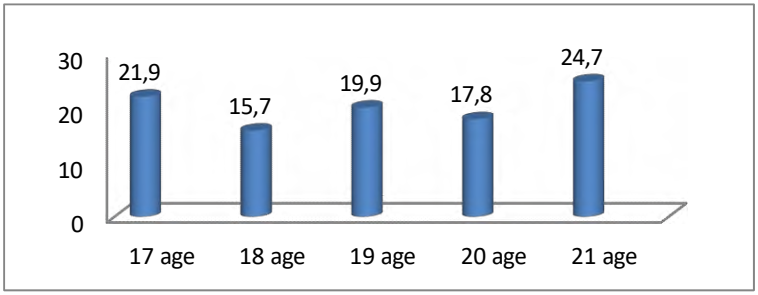

Figure 1. Age dynamics of students (%)

2. The effect of exam stress on the age dynamics of autonomic nervous system indicators of students with different temperament types.

During the emotional stress of the exam process (IPEG) in students studying between the ages of 17-21 with different temperament type characteristics, there are certain differences in the number of heart contractions, systolic and diastolic arterial pressure BE and AE compared to the level of autonomic nervous system (ANS) indicators on ND, that is to say that, there are sharp rises and falls between these indicators. The dynamics of changes in hemodynamic indicators in the period BE and AE characterizes the tense state of the regulatory mechanisms of the blood-vascular system. VIK shows the predominance of the sympathetic tonus of ANS on ND and AE differing from BE. It was observed that the vegetative indicators of students AE tend to return to the level of ND due to the removal of the stress factor, the main reason for which is the decrease in ANS tone associated with fatigue. According to the vegetative indicators and the Kerdo index, the SNS advantage was observed in the students, which is the result of how important the exam is for young people, the responsible approach to the exam and the activity of adaptation processes. The VIK of students proves this advantage that the sympathetic tone is superior in the AE period[18.19].

3. Comparison of SAL changes due to the emotional stress of the exam process in 17-year-old students with different temperament types

A comparison between types in 17-year-old students shows that ND SAL does not differ significantly.

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[18]Рустамова Т.В. Влияние экзаменационного стресса на вегетативные показатели у 17-21 летних студентов с меланхолическим типом высшей нервной деятельности. Образовательный Вестник «Сознание», Калининград, 2021, Том.23, №6, с.18-29.

[19]Рустамова Т.В. Влияние экзаменационного стресса на вегетативные показатели у студентов с преобладанием флегматического типа темперамента. //Український журнал медицини, біології та спорту. 2021, Том 6, №1 (29), с.332-338.

Therefore, since P_{KU} = 0.297 > 0.05, the difference between types is not considered statistically true. (The difference between the types is not fair since it is 0.426 >0.05 according to the Fisher criterion). SAL on ND is moderate (Table 1). Since P>0.05 in three types (Phlegmatic, Choleric, Sanguine) no significant difference was observed between ND and SAL in BE, this difference is not true.

Table 1.

Comparison of SAL changes due to the emotional stress of the exam process in 17-year-old students with different temperament types (M± m)

Groups	Types	N	M± m	min	max	P_{Fisher}	P_{KU}	P_{ND}	P_{BE}
ND	Phlegmatic	4	36,0 ±1,6	32	40	0,426	0,297		
	Choleric	10	35,2 ± 2,7	25	53				
	Sanguine	10	39,1 ± 1,1	33	44				
	Melancholic	8	34,3 ± 2,7	26	44				
BE	Phlegmatic	4	40,5 ± 2,5	35	47	0,796	0,577	0,066	
	Choleric	10	41,8 ± 3,1	30	64			0,074	
	Sanguine	10	44,0 ± 3,0	24	62			0,075	
	Melancholic	8	40,3 ± 2,2	30	49			0,025*	
AE	Phlegmatic	4	43,0 ± 2,7	36	49	0,901	0,895	0,068	0,068
	Choleric	10	40,0 ± 2,1	29	48			0,201	0,438
	Sanguine	10	40,0 ± 3,0	24	48			0,766	0,811
	Melancholic	8	41,1 ± 2,3	30	50			0,034*	0,228

Note: Statistical validity of the difference between indicators:
P_{Fisher} – Between different types (ANOVA test – according to Fisher's criterion)
P_{KU} – Between different types (according to the colored Kruskal-Wallis criterion)
P_{ND}– with ND indicators in the corresponding group (according to the pair-Wilcoxon test)
P_{BE}– with BE indicators in the corresponding group (according to the pair-Wilcoxon criterion)

The difference between SAL on ND and BE was partial, except for melancholic type. However, there is a significant difference in SAL in melancholic type BE and the difference is true (P<0.05). Thus, in 17-year-old students of four types, SAL BE and AE vary in

increasing and decreasing direction. Comparison of SAL by groups shows that the difference between these young people was not noticeable [20].

4. Comparison of SAL changes in 18- and 19-year-old students with different temperament types under the influence of emotional stress of the examination process.

The comparison of SAL in 18 and 19-year-old students between two independent types on ND, BE and AE shows that the difference between types and between matched groups was not statistically significant ($P>0.05$)[21]. Thus, the level of SAL in II and III years is similar. The low level of anxiety among students at this age is the result of the development of the body's defence reactions and the activity of adaptation processes.

5. Comparison of the change of SAL under the influence of emotional stress of the examination process in 20-year-old students with different temperament types.

SAL does not differ significantly on ND of emotional stress during the exam process in 20-year-old students. Since P_{KU} is $0.539 > 0.05$, the difference between temperament types is not statistically significant (Table 2). Also, in 4 temperament types, SAL varied between 29.6-34.6 points on ND, but except for phlegmatic type at this level (Phlegmatic temperament type had 29.6 points, which indicates low HS), changes in other temperament types indicate that HS is at a medium level of anxiety. According to the results of SAL between BE Types in students, IS anxiety level is not significantly different, and more. precisely, since $P_{KU} = 0.633 > 0.05$ and $P_{fischer}=0.743 > 0.05$, the difference between temperament types is not considered statistically true. Also, SAL BE in 4 temperament types of those students varied between 40.1-43.8 points

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[20]Рустамова Т.В Сравнительный анализ влияния экзаменационного стресса на уровень ситуативной и личностной тревожности студентов. Siberian Journal of Life Sciences and Agriculture 2021, том 13, №1, с.222-237.

[21]Rustamova T.V. Indicators of the influence of sitiative excitation of examination stress in students of the III course of the sanguine type of temperament.//Українська академія наук. Вісник проблем біології і медицини, 2021, 2(160), с.346-348.

Table 2

Comparison of SAL changes due to the emotional stress of the exam process in 20-year-old students with different temperament types (M± m)

Groups	Types	n	M± m	min	max	P_{Fisher}	P_{KU}	P_{ND}	P_{BE}
ND	Phlegmatic	5	29,6±2,7	23	38	0,630	0,539		
	Choleric	7	34,1±3,2	27	49				
	Sanguine	9	32,8±1,9	28	44				
	Melancholic	5	34,6±3,0	28	46				
BE	Phlegmatic	5	42,4±2,7	34	48	0,743	0,633	0,043*	
	Choleric	7	40,1±1,7	35	46			0,027*	
	Sanguine	9	42,0±2,1	34	53			0,021*	
	Melancholic	5	43,8±2,7	37	51			0,080	
AE	Phlegmatic	5	49,2±2,3	45	58	0,180	0,237	0,043*	0,043*
	Choleric	7	43,3±1,9	36	50			0,075	0,237
	Sanguine	9	44,3±1,1	40	48			0,040*	0,312
	Melancholic	5	47,4±3,1	38	54			0,080	0,066

Note: The statistical integrity of the difference between indicators is as in Table 1.

Changes in temperament type indicate that the level of anxiety is at a moderate level of anxiety. The difference between SAL on ND and AE suggests that the existing difference between phlegmatic and Sanguine types is statistically true at $p<0.05$ level. The comparison of the level of situational anxiety in the BE and AE groups also shows that the difference in the other three groups was insignificant. In phlegmatic type, we can say that $p<0.05$ is true. However, although the difference between SAL of temperament type BE and AE compared to on ND was acutely high, it was not statistically true in other Types[22,23].

[22]Rustamova T.V. Situational excitement indicators of the examination process influence to the nervous system in 17 and 20 year old students in and IV courses depending on their types of temperament. //Bulletin of Science and Practice Scientifik Journal, 2020, Volume 6, № 8, pp.55-64.

[23]Рустамова Т.В Сравнительный анализ влияния экзаменационный стресса на индивидуальные показатели студентов первых и четвертых курсов, обладающих различным типом темперамента. //Jomard Publishing Advances in Biology and Earth Sciences, 2020, vol 5, №2, pp.151-159.

6. Comparison of SAL changes due to the emotional stress of the exam process in 21-year-old students with different temperament types.

In 21-year-old students, SAL on ND was at a medium level of anxiety[24]. In 4 temperament types of these students, SAL BE varied between 41.2 and 47.6 points, which indicates that the level of anxiety is medium and high (Fig. 3). In 21-year-old students, choleric type differs from phlegmatic, meloncholic and Sanguine types in SAL on ND[25]. The comparison of SAL BE also shows that the difference between temperament types is not statistically significant and true at the level of $P < 0.05$.

Table.3

Comparison of SAL changes due to the emotional stress of the exam process in 21-year-old students with different temperament types (M± m)

Groups	Types	N	M± m	min	max	P_{Fisher}	P_{KU}	P_{ND}	P_{BE}
ND	Phlegmatic	5	32,8±3,0	24	40	0,024	0,051		
	Choleric	13	41,5±1,6	32	48				
	Sanguine	11	36,0±1,6	29	46				
	Melancholic	7	35,4±2,5	28	45				
BE	Phlegmatic	5	41,2±3,1	33	48	0,188	0,258	0,042*	
	Choleric	13	43,8±2,0	24	53			0,420	
	Sanguine	11	46,5±1,2	40	53			0,006*	
	Melancholic	7	47,6±1,3	43	52			0,018*	
AE	Phlegmatic	5	45,2±1,5	40	49	0,600	0,548	0,043*	0,416
	Choleric	13	43,4±2,2	30	56			0,656	0,461
	Sanguine	11	45,5±2,2	30	54			0,014*	0,824
	Melancholic	7	48,1±3,3	33	57			0,043*	0,351

Note: The statistical integrity of the difference between indicators is as in Table 1.

[24]Rustamova T.V. Comparison Of Changes In The Situational Anxiety Level Due To The Effect Of Emotional Stress Of The Exam Process In 21-Year-Old Students With Different Temperament Types. //India South Asian Journal of Experimental Biology, 2022, vol, 12, № 6, pp.890-895.

[25]Rustamova T.V., Alshanli U.S., Heydarli L.A.,Change of vegetative indicators due to the influence of emotional tension of the examination processin 21-year-old students with choleric type. //Bulletin of Science and Practice/Scientifik Journal, 2024, vol 10, №2, pp. 195-202.

According to the results obtained in those students, SAL BE truly increased in phlegmatic, sanguine and melancholic types compared to ND ($P < 0.05$), and no difference was observed in choleric type. The comparison of two independent types of SAL AE from a statistical point of view shows that the difference between the types of temperament was not true at the level of $P < 0.05$.
Thus, although SAL of 17-21-year-old 1st- and 5th-year students of 4 temperament types BE and AE changed differently compared to regular school days, the difference between groups and types was not statistically true in some cases.

7. Dynamics of changes in the level of individual anxiety caused by the influence of emotional stress during the examination process in 17-year-old students with different temperament types of HNA.

IAL differs significantly among four temperament types. It was found that IAL was significantly increased in melancholic type students in the BE period compared to ND and the existing difference was statistically significant[26]. Along with all this analysis, the increase of IAL BE compared to ND was phlegmatic - 16.2%, choleric -14.5%, sanguine - 12.9%, and melancholic temperament type - 18.5%. The increase of IAL BE compared to ND was 17.6% in phlegmatic students, 21.8% in choleric type students, 5.3% in sanguine type students, and 18.5% in melancholic type students. The comparison of individual anxiety BE and AE shows that the difference between IAL in these groups was insignificant. The results of the conducted studies show that different types of students have different results in IEL. In particular, this difference is observed both between different types and between groups.

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[26] Rüstəmova T.V. 17 yaşlı tələbələrdə situativ və fərdi həyəcan göstəriciləri. //Naxçıvan Dövlət Universiteti Elmi əsərlər. Təbiət və tibb elmiləri seriyası. Naxçıvan. 2020, №3, (104), s.204-210.

8. Dynamics of changes in the level of individual anxiety caused by the emotional stress of the exam process in 18-year-old students with different temperament types.

A comparison between the four temperament types on ND in 18-year-old students shows that IAL is not significantly different in the remaining three types, with the exception of the phlegmatic type (elevated by 17.9%). IAL does not significantly differ from the effect of emotional stress BE. So, since $P_{KU} = 0.650$ and $P_{Fisher} = 0.814$, the difference between their types is not statistically true. SAL increase compared to ND was 39.6%, Choleric type students 18.0%, Sanguine type students 12.5%, Melancholic type students 26.4%. A comparison of the level of individual anxiety in IAL and in IS shows that no significant difference was observed in IAL between all studied Types, and the existing difference is not considered true at the 0.05 level[27].

Thus, certain differences were obtained between different types of IAL in 18-year-old students. Since differences are observed between different types and groups, approaches are recommended in the teaching process according to the nature of the type of nervous system of these students.

9. Dynamics of changes in the level of individual anxiety caused by the effect of emotional stress of the exam process in 19-year-old students of different temperament types.

The comparison between two independent types of IAL on ND also shows that the difference between types was not statistically significant and true. Since P=0.014 was observed only between choleric type and sanguine type, the observed difference between these two types is high and this difference is reliable ($P<0.05$). Compared to ND, IAL in students increased by 13.3% in phlegmatic type students, 22.0% in sanguine type students, 9.9% in melancholic type students, the overall indicator increased by 4.2%, but decreased by 9.3% in choleric type students BE.

[27]Rustamova T.V İndicators of anxiety in young people 18 years of Age. /Proceedings of the XIX International Scientific and Practical Conference Social and Economic Aspects of Education in Modern Society Warsaw, Poland. November 25, 2019, p.33-37.

The results obtained on the basis of comparison of the condition of FHS on ND and AE also show that the existing difference in four types was insignificant. In these types, the difference between the EI of young people and the FHS AE was very small.

Thus, there were no significant differences between FHS in different types of 19-year-old students.

10. Dynamics of changes in the level of individual anxiety caused by the emotional stress of the exam process in 20-year-old students with different temperament types

In 20-year-olds students IAL did not significantly differ on ND, and the difference between types is not true. Compared with ND, IAL BE is sharply increased. The increase of this level was 44.1% in phlegmatic type students, 15.1% in choleric type students, 26.6% in sanguine type students, 27.3% in melancholic type students and the overall indicator increased by 26.4%. This means that IAL BE was slightly different and the existing difference is not significant. The results obtained on the basis of the comparison of the state of individual anxiety on ND and BE also show that there was no significant difference in choleric and melancholic types as $p>0.05$ and the existing difference is not considered statistically true. However, the difference between IAL on ND and BE in phlegmatic and Sanguine types is statistically significant at the level of $p<0.05$. The difference between IAL BE and AE was insignificant in three groups and was higher in the sanguine type. The current distinction between phlegmatic, choleric and melancholic types is not considered true. But since $p<0.05$ in sanguine type, it can be said that the difference between this group is high and statistically true.

11. Dynamics of changes in the level of individual anxiety caused by the emotional stress of the exam process in 21-year-old students with different temperament types

There is a significant difference between choleric, phlegmatic, sanguine and melancholic types in terms of IAL on ND in 21-year-olds. It generally resulted in high difference between types in terms of individual anxiety on ND[28]. Comparison of IAL BE between two independent types also shows that the difference between Types was not statistically significant (Table 4). Compared to ND, IAL BE and AE differ in other three types, except choleric type. So, since $p<0.05$ in phlegmatic, sanguine and melancholic types, the existing difference between the two situations compared in these three groups is considered statistically true.

Table 4

Comparison of the influence of the examination process on the dynamics of IAL change in 21-year-old students of different temperament types (M± m).

Groups	Types	N	M± m	min	Max	P_{Fisher}	P_{KU}	P_{ND}	P_{BE}
ND	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				
	Melancholic	7	36,6±2,8	25	48				
BE	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*	
	Melancholic	7	48,9±1,6	43	54			0,018*	
AE	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	0,875
	Sanguine	11	48,8±1,5	39	57			0,019*	0,154
	Melancholic	7	52,4±3,3	35	59			0,028*	0,149

Note: The statistical integrity of the difference between indicators is the same as in Table 1.

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[29]Rustamova T.V., Jafarova Sh. B., Heydarli L. A., Alshanlı U. S. Dynamics of changes in the level of personal anxiety caused by the effect of emotional stress of the exam process in 21-year- old students of different temperament types. World of Medicine and Biology. //України, Полтава. 2024, №1(87), pp.162-165.

12. Dynamics of EEG amplitude and frequency changes in the left and right parts of the brain due to the influence of the level of anxiety during the emotional stress of the exam process in phlegmatic students

Adolescent stress has a different effect on brain function[29]. Thus, in 17-21-year-old phlegmatic type students who are under stress BE and AE, a number of different indicators were found in the percent change of the frequency-amplitude rhythm of EEG waves in the left and right forehead-occiput-sinciput-temple parts of the brain compared to ND.

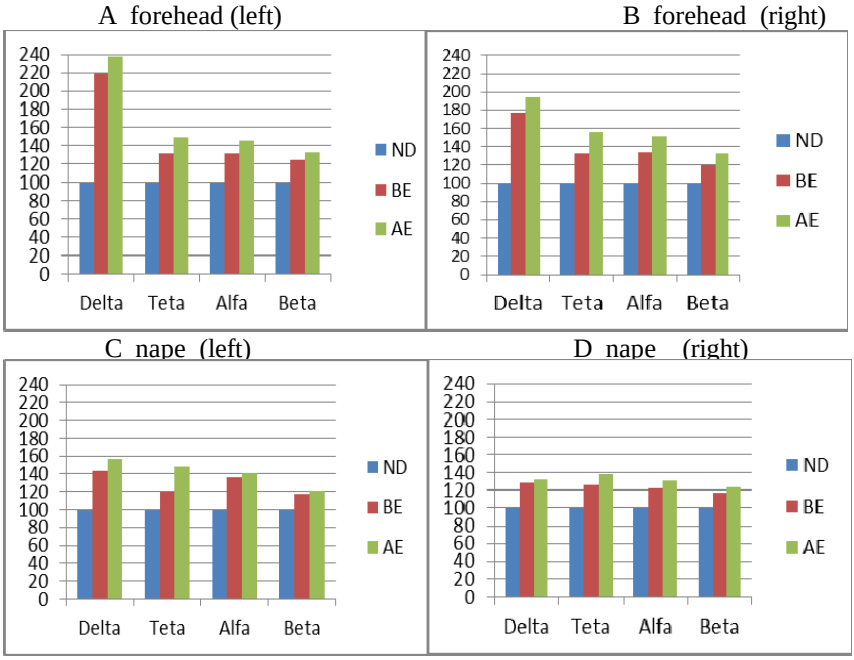

Figure 2. Dynamics (%) of EEG frequency changes in the (A) left and (B) right forehead and nape, (C) left and (D) right parts of the brain in Phlegmatic type 17-year-old students in connection with ESEP

[29]Birn, R.M. Childhood maltreatment and combat posttraumatic stress differentially predict fear-related fronto-subcortical connectivity. / R.M. Birn, R. Patriat M.L. Phillips [et al.]. // Depression and Anxiety, 2014, 31 (10), – pp. 880-892.

The frequency of delta waves in the left frontal lobe (SBP) of 17-year-old phlegmatic students compared to ND increased BE and equalled 76.5%, but it increased AE and reached 94.1%. The frequency of -delta waves in the right forehead region of the brain increased by 118.8% and 137.5%, respectively. The frequency of theta waves BE increased by 32.6% in SBP compared to ND. It continued to increase AE and was 56.6% more than the usual day, and it was 18% more BE (Figure 2). In the right forehead area, the frequency of beta waves increased by 24.7% and AE by 32.9% compared to the usual day. However, compared to BE, the frequency of beta waves in the right forehead portion of brain increased by 6.6% AE (Figure 2). The frequency of beta waves in the right temporal lobe of the brain decreased sharply from the frequency of other waves, but compared to ND, it was 20.0%, BE and 23.2% AE. When the spectral strength and percentage of the alpha rhythm BE increases in the left and right forehead-occiput-sinciput-temple parts, changes of different nature in the rhythm of waves AE were noted.

Compared to ND, EEG theta waves increased by 8.7% and delta waves by 3.7%, but the amplitude of alpha waves decreased by 12.3%. Beta waves increase by 4.0% (Figure 3). The increase in the amplitude of EEG waves of the right forehead share increased AE compared to BE. So, in this comparison, AE delta waves were 11.5%, theta waves 19.7%, alpha waves 72.7%, and beta waves 61.1% more. These results show that BE and AE periods have both activating and depressing effects on the amplitude of EEG waves in the left and right forehead parts of the ESEP brain. Most likely, it shows that adaptation to the first IP in students at this age is not fully formed[30].

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[30]Rüstəmova T.V, Ə.H.Kazımov. Müxtəlif temperamentli tələbələrin baş beyinin sinciput və nape payinda EEG-nin tezliyinə emosional gərginliyin təsiri. //Journal of Baku Engineering University, Baku, --2019, volume 3, №2, -pp.121-129

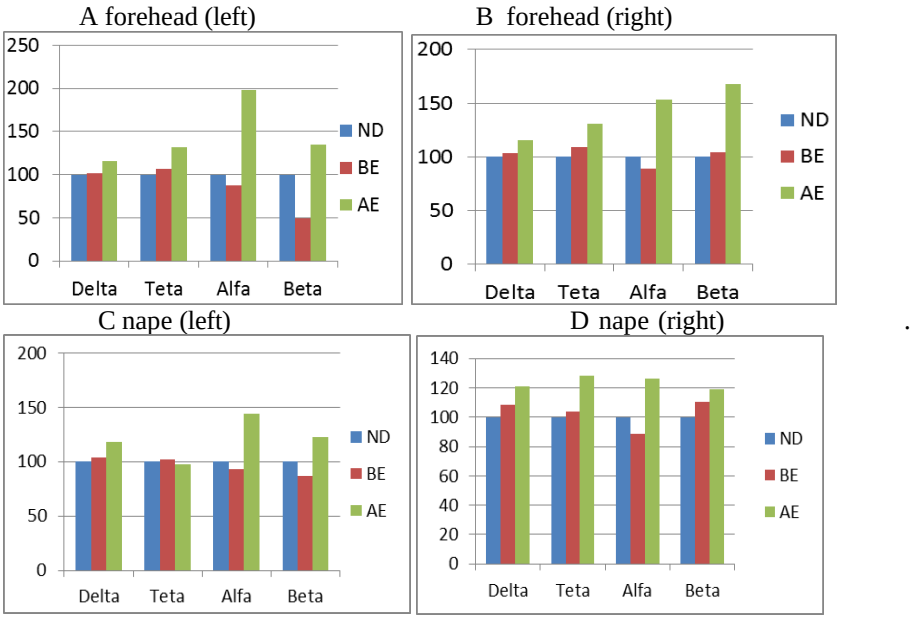

Figure 3. Dynamics (%) of EEG amplitude changes in the left (A) and right (B) forehead and left (C) and right (D) nape regions of the brain in 17-year-old Phlegmatic students in relation to ESEP

There is no significant difference in the EEG amplitude of delta, theta, alpha and beta waves of the EEG in the left nape BE compared to ND. Different results are obtained AE (theta waves decrease by 2.4%). Comparison of EEG wave amplitude in ND, BE and AE in the left and right nape of the brain shows that changes in the right nape are more noticeable in both cases[31] (Figure 3).

Although the amplitude of the EEG alpha waves of the left and right temple part of the brain in phlegmatic type students decreases, it increases sharply AE (Figure 4).

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[31] Rüstəmova T.V. Emosional stresin fleqmatik tipli tələbələrin baş beyininin təpə və ənsə payinda EEQ-nin ampilituduna təsiri. // Odlar Yurdu Universitetinin Elmi və Pedaqoji xəbərləri. Bakı, 2020, №56, s.208-214.

The amplitude of the EEG beta waves of the left temporal lobe of the brain increased sharply BE compared to ND (15.2%, $p<0.05$), but its level increased AE and was 57.3% more than the level observed on ND.

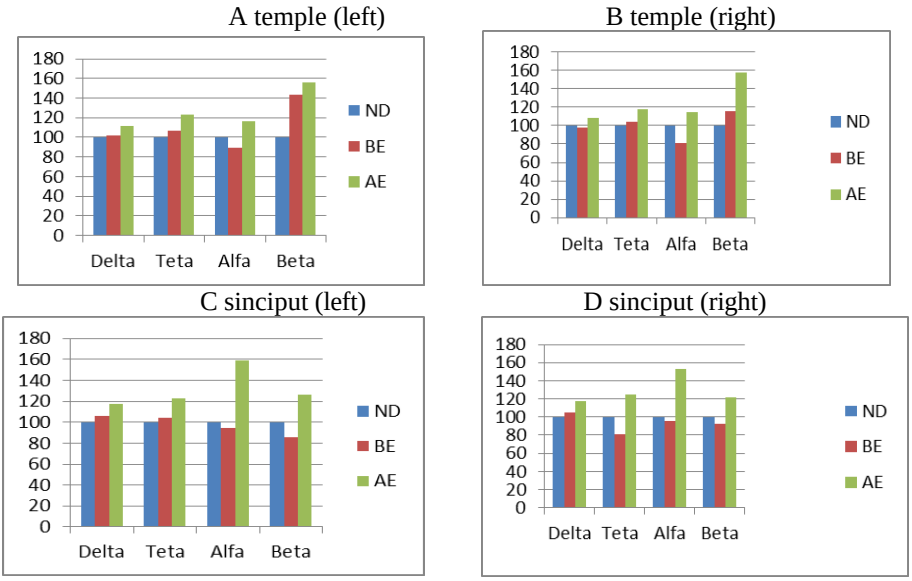

Figure 4. Dynamics (%) of changes in the amplitude indicators of EEG waves in the left (A) and right (B) temporal lobes, left (C) and right (D) sinciput lobes of the brain in Phlegmatic type 17-year-old students related to ESEP

There is an increase in alpha waves in the rhythm of the amplitude of the EEG pulses in the right and left sinciput parts of the brain in phlegmatic type of young people. Intense exam stress has a different effect on the frequency-amplitude rhythms of EEG in the brain regions of first-year students BE and AE. The increase in the level of both types of anxiety during the exam period and the emotional stress about the result also affected the frequency-amplitude of these waves.[32].

[32]ДжебраиловаТ.Д. Индивидуальные особенности взаимодействия функциональных систем при целенаправленной деятельности человека в услових эмционального напряжения. / Дисс. доктора биологических наук. / Москва, -2005, -242 с

The negative emotional impact of the BE and AE period on students with different temperaments. The dynamics of EEG amplitude and frequency changes in the forehead, occiput, sinciput and temple parts of the brain are similar in 18-19-year-old male students (II and III years) and no significant difference is observed[33].

In 20-year-old students of phlegmatic type, compared to ND, the amplitude of EEG delta waves does not change in SBP BE, and the amplitude of theta and alpha waves increases. The amplitude of beta waves decreases BE. In contrast to EEG delta and theta waves, the amplitude of alpha and beta waves is truly greater ($p<0.05$) in IS SBP compared to ND. The amplitude of EEG waves of SBP is significantly higher ($p<0.05$) than the amplitude of beta waves AE compared to BE. Compared to BE, the amplitude of the waves of the right forehead lobe increases, and theta waves decrease.

In the comparison of ND and BE period in the left nape, the amplitude of delta, theta and beta waves of the EEG increases, while the amplitude of alpha waves decreases. Along with all these changes, only the amplitude of beta waves of EEG waves increases ($p<0.05$) in the SEP of the IS brain compared to ND. Compared to IS ND, the amplitude of delta, theta and beta waves of EEG in the right nape of the brain increases, while alpha waves weaken. In comparison to the IU, the increase in the amplitude of beta waves is still observed in the IS. Compared to ND, the amplitude of delta and theta waves of the EEG in the BE left sinciput share increased, while the amplitude of alpha and beta waves decreased. Compared to ND in LSL and right sinciput, the amplitude AE, only beta waves increased ($p<0.05$). Compared with ND, the amplitude of EEG delta and theta waves in brain LTP BE increases accordingly, but the amplitude of EEG alpha waves decreases. But the amplitude of beta waves increases. Beta waves are increased ($p<0.05$) AE compared to BE. Although the amplitude of EEG delta and theta waves does not change in the right

[33]Rustamova T.B Izmenenie EEG v lobnoy doli kory golovnogo mozga pod vliyaniem ekzamenatsionnogo protsessa u 18-letnikh studentov flegmaticheskogo tipa. Mezhdunarodnyy nauchno-issledovatelskiy zhurnal Ekaterinburg, 2022, № 7 (121), s. 87-91.

temporal lobe, sharp changes occur in other waves. The frequency of alpha waves of the right forehead share decreases BE and AE compared to ND. Beta waves increase relative to them BE and AE. The frequency of beta waves AE and delta waves BE increased in the left and right regions of SEP. The frequency of beta waves in LSL of the brain is weakly increased BE and AE compared to ND. Its level has not changed compared to BE. The frequency of delta waves in the left and right temporal region of the brain is increased compared to BE and then ND, it does not change AE compared to BE. Compared to ND in LTP, the frequency of theta waves AE truly reduced. A corresponding change is obtained AE compared to BE. The frequency of the theta waves of the right sinciput does not change in the BE period. The frequency of alpha waves in the left and right temporal region of the brain partially increased in all three cases. In 21-year-old phlegmatic students, a sharp difference is felt in the amplitude and frequency indicators on ND and alpha, beta, delta and theta waves in the left forehead part of the brain AE due to the effect of ESEP. These results show that, compared to ND, the amplitude of EEG delta, theta, and beta waves in brain SBP is reduced to IU, but the amplitude of EEG alpha waves is increased. A number of differences are observed in the amplitude of EEG waves in the right frontal part of the brain of phlegmatic type students compared to ND, BE and AE. Although the amplitude of EEG alpha waves changes slightly more than other waves compared to ND in this forehead region, weak changes occur in the remaining waves. The frequency of theta and beta waves increased in the SBP of the brain AE and compared to the ND, frequency of theta and beta waves increased BE and AE. The frequency of LSL beta waves was higher BE and AE than on ND. The frequency of beta waves in LSL was 9.8% higher AE compared to BE. Similar patterns are found in the frequency of beta waves in the right sinciput region. The frequency of delta waves in LTP and right temple portion decreased compared ND with BE and BE with AE. Although the frequency of theta waves increased by 11.8% in LTP in the BE period compared to ND, this amount exacerbated and increased by 27.5% AE. These results show that the frequency of theta waves varies from

11.8 to 27.5% compared to ND in both cases. The frequency of theta waves is increased AE compared to those observed in the BE period.

There is an increase and decrease in the indicators of the amplitude of the EEG waves in the left and right parts of the nape on ND, BE and AE. But in both cases, the changes in the amplitude of the EEG beta waves of the nape are more noticeable. Somewhat different indicators are observed in LSL of the brain in students of phlegmatic type in the comparison of indicators observed BE and AE waves. Thus, in LSL of the brain compared to BE, IS delta waves increased by 1.6%, beta waves increased by 14.1%, but theta waves and alpha waves decreased by 4%. Compared to BE, the amplitude of EEG beta waves of the Temple part was 4.7% less in the left part and 6.2% less in the right part. These results show that during the exam period, the change of the EEG wave amplitude of both temple parts of the brain increases and decreases in the last semester of 21-year-old students.

13. Dynamics of amplitude and frequency changes of EEG in the left and right parts of the brain due to the effect of anxiety caused by the emotional tension of the EP on students with choleric temperament type

Notwithstanding that the amplitude of EEG delta waves increased by 3.7%, the amplitude of theta waves decreased by 10.4% BE, while the amplitude of EEG alpha waves increased in choleric type 17-year-old students. The amplitude of beta waves decreases accordingly BE. In addition to all this, the amplitude of EEG theta waves in SBP does not change AE compared to ND, on the contrary, the amplitude of alpha waves is greater compared to ND ($p<0.05$), the amplitude of beta waves is true compared to ND ($p<0.05$) decreases. Compared to ND in the right forehead region, there is an increase in the amplitude of the EEG delta and alpha waves, but on the contrary, a decrease in the amplitude of the theta and beta waves is obtained. Compared to ND, the amplitude of EEG delta waves in the right frontal part of the brain increases truly AE ($p<0.05$), and the amplitude of theta waves increases by 2.0%. The amplitude of alpha waves is slightly weaker by 4.1%, and the amplitude of beta waves

decreases sharply. The amplitude of the EEG waves of the right forehead share changed in different levels of AE period compared to BE period. Compared to ND in the left nape of the brain, the amplitude of EEG delta and theta waves is slightly reduced BE compared to other waves, while the remaining waves increase. Compared to BE, IS delta waves increased by 14.4% and theta waves by 8.8%, but the percentage of alpha and beta waves was lower. A comparison of the amplitude of EEG waves in the left and right sinciput parts of the brain with the indicators observed on ND, BE and AE periods shows that different changes in the amplitude of EEG waves were observed BE and AE in both sinciput parts of the brain. However, in both cases, the changes occurring in the right sinciput part of the brain are more noticeable. These are changes related to the results of the EP. Comparing ND with the AE period, the amplitude of EEG delta, theta and alpha waves increases, while the amplitude of beta waves decreases in the left and right temporal lobe of the brain. Compared to BE period, change in the AE period is as follows: while the amplitude of delta, theta and alpha waves increased, beta waves decreased. In the frequency indicators of alpha, beta, theta and delta waves of the EEG in the right and left forehead, sinciput, temple and nape of the brain, alpha and beta waves have truly changed in the BE and AE periods. These results we obtained show that ESEP has a different effect on the amplitude of EEG waves in the left and right temporal region of the cerebral cortex, both in the BE and AE periods[34]. It is very likely that the process of adaptation to the first exam process is not fully formed in students at this age[35,36].

[34]Rustamova T.V. Statistical indicators of the change in the amplitude of the EEG in the brain due to the effect of anxiety caused by the exam process in 17-year-old choleric students. South Asian Journal of Experimental Biology. India, 2023, vol 13, № 3, pp 240-246.

[35]Əkbərova, X.M. Temperament və emosional gərginlik haqqında ədəbiyyat icmalı . // Psixologiyanin aktual problemləri: yeni perspektivlər, yeni mülahizələr və yeni düşüncələr. Beynəlxalq konfransin materiallari (onlayn). Bakı, 19-20 iyun, 2021, s.-106-107

[36]Quliyev Y. N., Əbiyev Q. Ş., Adıgözəlova V.A. Orqanizmin yaş xüsusiyyətləri (Dərs vəsaiti), Bakı, -2018,-123 s.

During the process of waiting for the results of the exam, the situation of anxiety rises. Therefore, the rhythms of the EEG waves increase due to the anxiety that choleric type people experience BE and AE. The main reason for it is the lack of confidence of the lower-year student in obtaining the necessary results. Since the study of students in the examination process is one of the most important problems of modern age physiology and biomedicine as a whole, the implementation of these issues is closely related to the necessity of developing theoretical criteria for the absolute values of the physiological norm during the educational process, the proportions reflecting the functions of the brain temple share[37]. At the next stage of the study, the results of changes occurred in the amplitude and frequency indicators of the EEG waves in the left and right regions of the forehead, occiput, sinciput and temple regions of the brain in 18- and 19-year-old choleric students due to the effect of ESEP on ND, BE and AE show that in all parts delta waves are more excited than other waves. In beta waves, the level of activation is very low compared to other waves. However, excitation was observed in beta waves AE. When the percentage of the rhythm of the frequency of delta-theta waves of the left-right forehead parts of the brain of 20-year-old choleric students decreased BE, the frequency of alpha-beta waves increased. While, the frequency of delta-beta waves increased, theta-alpha waves decreased AE. In the left nape, the frequency of delta-beta-alpha waves increased, but theta waves decreased BE. The frequency of all waves increased AE. In the right nape and right temple, the frequency of delta waves decreased, and the frequency of theta, beta and alpha waves increased BE. The frequency of theta and alpha waves increased, and the frequency of delta and beta waves decreased AE. In the left sinciput, the frequency of alpha waves is weakly decreased and the frequency of theta (weak) and

[37] Rustamova T.V, Ismayilova Kh.Y. Kazimov Ə.H Changes of the EEG oscillations in the temporal lobe of the cerebral cortex under the effect of examination process in students with choleric temperament. International Journal of Biological and Chemical Sciences Africa, Cameroon; 2022, 16(5) pp.2281-2288.

beta waves is increased both BE and AE. The delta-alpha (weak) frequency of the left sinciput portion of increased, the frequency of beta waves decreased AE. A slightly higher change was observed in the right sinciput portion. The frequency of other waves increased in the left temple portion BE and AE. High theta activity in the EEG structure is associated with emotional stress and high anxiety. It was determined that the frequency-amplitude of EEG waves in the right and left parts of the brain during the exam period in 20-year-old students changed differently, as in other age groups. The rising level of anxiety in the exam and the emotional tension about the result has a sharp effect on these waves. Due to the effect of ESEP, the amplitude of EEG delta, theta and beta waves in the cerebral cortex of 21-year-old choleric students in the left frontal lobe of decreases, while the amplitude of alpha waves increases by 14.2% (Figure 5) in the AE period comparing with the ND. Compared to ND, the amplitude of EEG delta and theta waves does not change in the AE period. However, the amplitude of EEG alpha waves increases by 8.7% AE. Along with all this, the amplitude of beta waves decreases by 24.5%. In young people of that age, the amplitude of the EEG waves of the SBP increased compared to the BE period, but the alpha and beta waves decreased. In the right frontal portion of the cerebral cortex of 21-year-old young people, a number of changes in the amplitude of EEG waves are observed in the BE period compared to ND. There were also certain differences in the amplitude of EEG waves of the left and right sinciput parts of the brain. In this part, the amplitude of waves decreases to an untrustworthy level BE and AE compared to ND. In this group, the amplitude of EEG theta and alpha waves of LSL is insignificantly reduced in the AE period compared to the BE period. Although there is a weak increase in delta waves, the amplitude of beta waves increases by 14.1%. In the amplitude of the EEG waves of the left and right temporal part of the cerebral cortex, the amplitude of EEG delta, alpha and beta waves is slightly reduced in the BE period compared to ND, while the amplitude of theta waves is partially increased (Figure 5). Compared to ND, the amplitude of EEG delta,

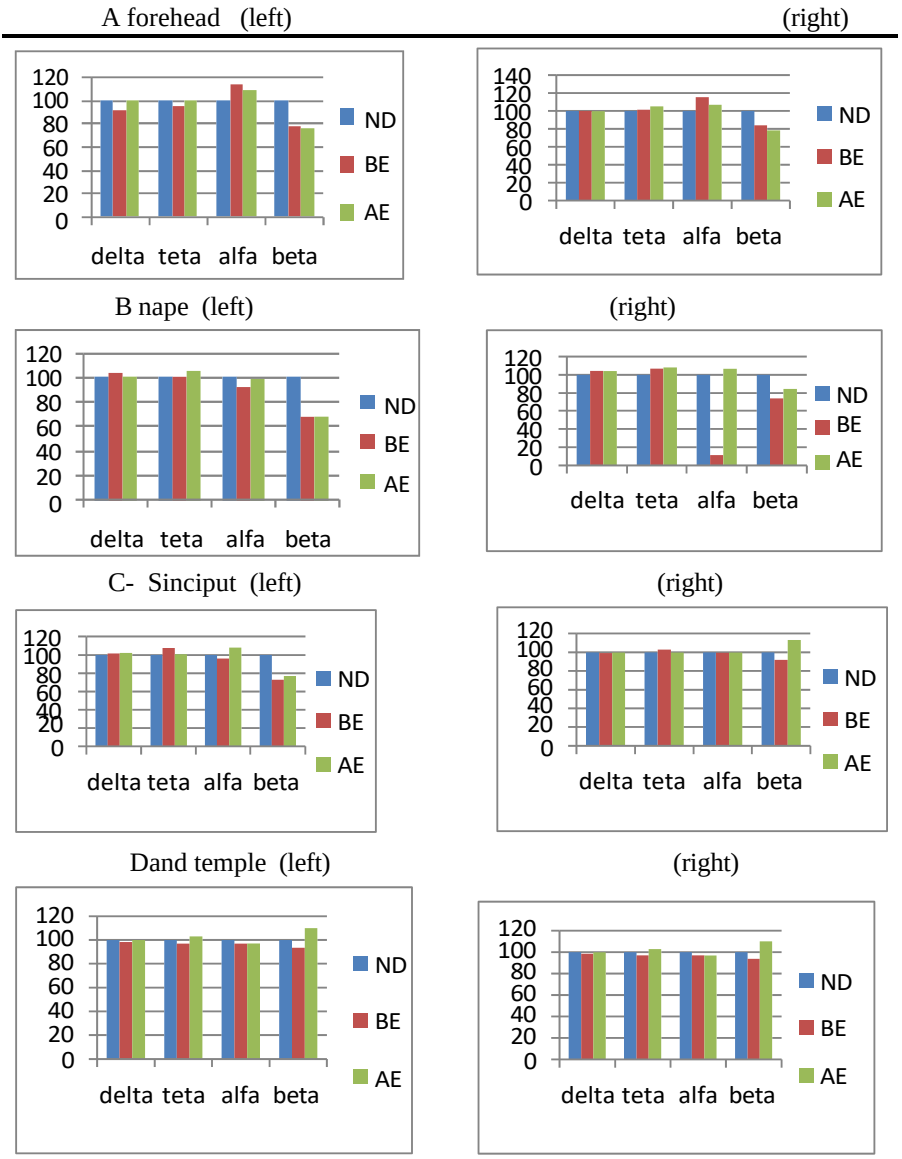

Figure 5. Dynamics of EEG wave amplitude changes in the left and right forehead (A), nape (B), Sinciput (C) and temple (D) parts of the brain in 21-year-old choleric type students in relation to ESEP

theta and alpha waves does not change AE. However, the amplitude of EEG beta waves increases by 13.9% AE. In young people of the same age, the amplitude of EEG waves in the LTP of the brain increased by 23.9% compared to BE. Differences in the rhythm of the frequency of all EEG waves of in the parts of the brain of 21-year-old students are obtained in the BE and AE period. The students of this year are excited about the results of the exam.

Therefore, the rhythms of the EEG waves change in different directions in connection with anxiety experienced by choleric types in the BE and AE periods. On the other hand, the motivations for the development of emotional tension in the exam situation are of different degrees in different students. Therefore, the situation of IAL and SAL in BE 21-year-old students varies in the high score range.

14. Dynamics of amplitude and frequency changes of EEG in the left and right parts of the brain due to the effect of anxienty caused by the emotional tension of the EP in melancholic temperament type students.

Due to the influence of ESEP, in the BE period the amplitude of delta, theta, alpha waves increased and the amplitude of beta waves increased truly in the left forehead part of the brain in 17-year-old melancholic students compared to ND ($p<0.05$). In the left and right forehead parts of the brain, the amplitude of EEG waves is affected in different ways both in the BE and AE periods. It is very likely that at this age, it shows that adaptation to the first exam process is not fully formed in students[38]. Compared to ND, the amplitude of delta and theta waves of EEG increased, but the amplitude of alpha and beta waves decreased.

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[38]Rustamova T.B. Влияние экзаменационного стресса на амплитуду волн ээг в теменной доле головного мозга у студентов факультета биологии-химии с различными индивидуально-типологическими особенностями. // Siberian Journal of Life Sciences and Agriculture.-2020, том 12, №5, s.-97-112

Compared to BE, the amplitude of EEG waves of SEP and the amplitude of delta waves decreased by 6.8%, the amplitude of theta waves decreased by 9.7%, and the amplitude of beta waves decreased by 28.4% (Figure 6) in the AE period. Compared to ND, the amplitude of the EEG waves of the right nape of the neck increased significantly before the exam, and alpha- and beta-waves, on the contrary, decreased. Comparing the AE period with ND, the amplitude of delta, theta and beta waves of the EEG in the right nape part increased, but alpha waves decreased.

Although the amplitude of beta waves increased in the AE period compared to the BE period, delta, theta and alpha weakly increased.

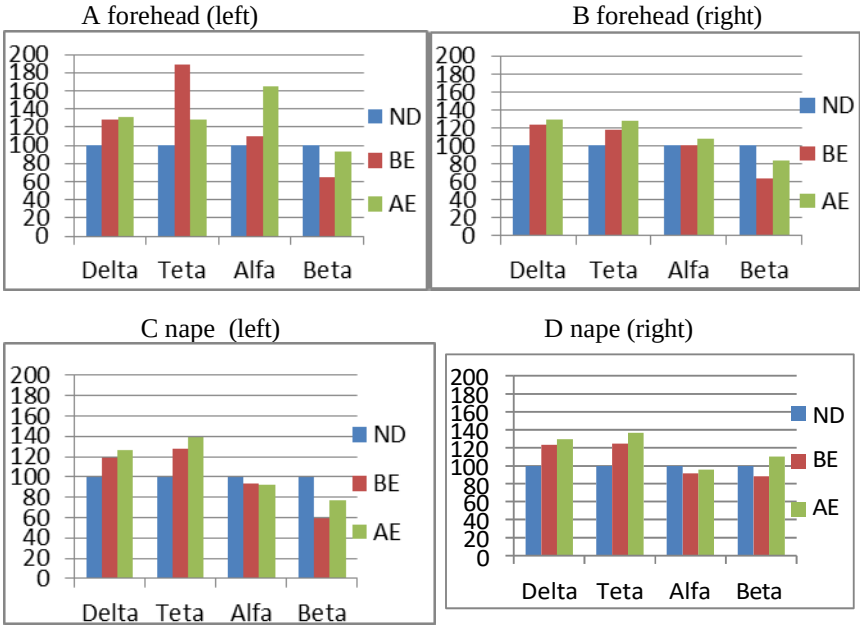

Figure 6. Dynamics (%) of EEG amplitude changes in the left (A) and right (B) forehead, left (C) and right (D) nape of the brain in 17-year-old melancholic type students in relation to ESEP

The amplitude of EEG beta waves of LSL is sharply attenuated in the BE period compared to ND. Compared to ND, the decrease in the amplitude of EEG beta waves was 35.6% BE, and 16.7% AE.

The amplitude of EEG alpha waves of the right sinciput share decreased from 51.4% BE to 37.1% AE, respectively, compared to ND in both examination periods. As it can be seen, the amplitude of alpha and beta waves is affected by the level of emotional tension in different directions. These results show that the amplitude of EEG waves changes differently in both sinciput parts of the brain of first-year melancholic students during the EP period. The stress on the increase in anxiety level BE and AE and the future outcome will change dramatically affecting the amplitude of these waves.

In the next stage of the study, the amplitude of EEG delta, theta and alpha waves increased in the left temporal lobe of the brain in melancholic students, but beta decreased in the BE period compared to ND. In LTP, the amplitude of EEG delta waves changed weakly by 2.8%, theta increased by 15.8%, alpha decreased by 9.3%, beta decreased by 20.0% AE. Although the amplitude of theta and beta waves increases in the left temporal lobe of the brain AE compared to BE, the amplitude of other waves changes weakly.

In the right temporal lobe, the amplitude of EEG waves compared to ND, the amplitude of delta and alpha waves increased BE, but the amplitude of beta waves decreased truly ($p<0.05$). Comparing the indicators observed in the AE period and on ND, the amplitude of EEG delta waves in the right temporal lobe does not change, although the amplitude of alpha waves increased by 19.4%, the amplitude of theta waves increased, and the amplitude of beta waves decreased by 2.1%. As can be seen, the amplitude of EEG delta waves decreases by 6.9%, alpha- by 9.9%, theta waves by 12.2% ($p<0.05$), beta waves by the amplitude increased by 16.3%. Changes in the amplitude of EEG waves of both temple parts of the brain are different.

On ND the frequency of theta waves in the left forehead lobe increased as it was true BE. In the right forehead part of the brain, the frequency of theta waves was 5.1±0.2 Hs on ND, it increased to

7.0±0.4 Hs ($p<0.01$) BE. This level decreased slightly AE and was 6.8±0.3 Hs ($p<0.01$). It should be noted that the increase of these levels was true in both examination processes ($p<0.01$). The frequency of BE alpha waves in the left forehead lobe truly increased ($p<0.01$) BE and AE in compared to ND.

The frequency of theta waves in the left nape portion was 5.2±0.5 Hs on ND, increased and reached to 6.4±0.4 Hs BE. After the exam, it was 6.5±0.6 Hs. In the right nape, the frequency of theta waves is 4.9±0.5 Hs on ND, increases significantly ($p<0.01$) BE and slightly decreases to 6.3±0.7 Hs AE. In the right nape region, the frequency of beta waves increased in the BE period and decreased in in the AE period compared to ND. It should be noted that the frequency of beta waves in the left sinciput region of the brain is honestly higher than the frequency of other waves.

The frequency of beta waves in the right sinciput region of the brain increased by 14.6±0.5 Hs truly on ND, BE and AE ($p<0.01$).

At the next stage of the research, due to the emotional stress of the EP, changes in delta and theta waves were observed in the left and right forehead, nape, sinciput and temple parts of 18 and 19-year-old melancholic students on ND, BE and AE. Despite the low level of changes in beta waves on ND and BE, elevation was observed AE. Compared to ND, only the amplitude-frequency indicators of delta and theta waves decrease, while other waves increase BE and AE[39].

In 20-year-old melancholic type students of HNA, changes in the amplitude of EEG delta waves are observed in the SBP of the brain due to the effect of ESEP in the AE period in comparison with ND. In this age group, compared to BE, the amplitude of IS theta and alpha waves decreases, and the amplitude of beta waves increases. Certain different results compared to ND, EEG theta waves amplitude

[39]Рустамова Т.В. Влияние эмоционального напряжения на амплитуду и частоту ЭЭГ в головном мозге 19-летних студентов меланхолического темпераментного типа. //Сборник материалов II Международной научно-практической конференции «Современные проблемы цивилизации и устойчивого развития в информационном обществе» (шифр, МКПЦР) Москва, 26 март -2021г, с.-80-87.

is true BE ($p<0.05$), alpha waves amplitude partially increased, but beta waves amplitude decreased. Compared to ND in the left nape of the brain, the amplitude of all EEG waves dishonestly increased BE. Compared to BE, the amplitude of the remaining EEG waves decreases, with the exception of the amplitude of the beta waves of LNP in the AE period. Compared to ND, the amplitude of delta waves increases truly AE ($p<0.01$) and the amplitude of beta waves increases dishonestly, the amplitude of theta waves decreases somewhat, but the amplitude of alpha waves does not change in the AE period compared to ND. Compared to BE, a decrease in the amplitudes of EEG delta, theta and alpha waves of the right nape of brain is observed in the AE period.

`Notwithstanding that the amplitude of delta waves decreases in the amplitude of EEG waves of LSL in the BE period compared to ND, the amplitude of theta (weak), alpha and beta waves increases. In LSL, compared to ND, the amplitude of EEG delta and theta waves does not change AE. The amplitude of beta (sharp) waves increases. However, the amplitude of alpha waves significantly ($p<0.05$) reduces. Comparing the AE period with ND, the amplitude of delta waves is still unchanged in the right sinciput lobe, the amplitude of theta waves reduces and the amplitude of alpha and beta waves truly increases.

In LTP, the amplitude of delta and theta waves does not change AE. However, the amplitude of alpha waves significantly reduces ($p<0.05$) and the amplitude of EEG delta and beta waves of the left temporal lobe of the brain significantly increases in the AE period compared to the BE period. A slight decrease in the amplitude of theta and alpha waves was observed.

Compared to ND, the amplitude of EEG delta and beta waves in the right temporal lobe does not change, the amplitudes of theta and alpha waves increase weakly, only the amplitude of alpha waves increases BE.

Under the influence of the emotional tension of the exam process, the frequencies of the waves in the left and right parts of the brain of 20-year-old melancholic type youth become different.

Compared to ND, the amplitude of delta and theta waves increased, while the amplitude of alpha waves did not change, but the amplitude of beta waves decreased BE in 21-year-old melancholic type V-year students. Although the amplitude of EEG delta and theta waves is weakly increased in SBP in the AE period compared to ND, the amplitude of alpha and beta waves is still unchanged. Although the amplitude of the EEG waves, the amplitude of delta and theta waves increased slightly in the AE period compared to the BE period, still the amplitude of alpha waves did not change, but of beta waves increased.

Compared to ND, the amplitude of EEG delta waves in the right forehead does not change AE, the amplitude of theta and beta waves increases, but the amplitude of alpha waves decreases. The amplitude of delta, theta, and alpha waves decreased weakly, while the amplitude of the beta waves increased slightly. Comparing the AE period with ND, the amplitude of EEG delta waves increased by 1.8% and alpha by 6.9% in LNP, but theta and beta decreased. Compared to the BE period, the amplitude of delta and theta waves in LNP decreased, but the amplitude of alpha and beta waves increased significantly in the AE period.

Thus, the comparison of indicators of the amplitude of EEG waves in the left and right nape of the brain of 21-year-old melancholic students observed on ND, BE and AE shows that it changes in the direction of increase and decrease.

Compared to the BE period, the amplitude of EEG delta and theta waves in LTP decreased, while the amplitude of alpha and beta waves increased in the AE period.

Compared to ND, the amplitude of delta waves did not change, theta increased by 4.9%, alpha by 9.0%, but the amplitude of beta waves decreased by 6.3% in the BE period. Comparing the AE period with ND, the amplitude of EEG delta waves in the right temporal lobe changed weakly, the amplitude of theta and beta waves decreased weakly and of alpha waves increased in the AE period. The amplitude of EEG delta and theta waves relatively reduced in BE, while alpha- and beta- are increased.

In SBP, the frequency of alpha waves in melancholic students was significantly lower ($p<0.01$). The frequency of alpha waves in the right forehead lobe was 11.0±0.7 on ND, 9.8±0.5 Hs in the BE period and 8.7±0.4 Hs in the AE period. The frequency of beta waves in SBP was 15.9±1.1 Hs, decreasing in the AE period compared to ND and BE. The frequency of beta waves in the right forehead lobe increased in the BE and AE periods compared to ND.

The frequency of delta waves increased in the LNP and right nape area AE. In the right nape of the brain, the frequency of theta waves was 5.8±0.4 Hs on ND, 5.9±0.3 Hs BE and 5.6±0.3 Hs AE. The frequency of alpha waves in the LNP and right nape was significantly higher ($p<0.01$), which is a significant change. As it can be seen, the frequency of alpha waves in both parts is significantly different. The frequency of beta waves in LNP significantly decreased ($p<0.01$). The frequency of beta waves in the right nape area changed according to the frequency of beta waves in the left nape area of the brain.

In LSL, the frequency of alpha waves in decreased BE and truly decreased AE ($p<0.01$). The frequency of beta waves in LSL of the brain sharply reduced.

In LTP, the frequency of delta waves changed little on ND, in the BE and AE periods. In LTP, the frequency of theta waves significantly increased ($p<0.01$), while the frequency of alpha waves decreased significantly ($p<0.01$), which are significant changes. The frequency of alpha waves in the right temple part of the brain was significantly reduced ($p<0.01$).

Based on the analysis of the results of the conducted research, it can be concluded that there are certain differences in the rhythm of the frequency of all EEG waves in the parts of the brain of 21-year-old students in the BE and AE periods.

15. Dynamics of EEG amplitude-frequency changes in the left and right parts of the brain due to the effect of anxiety caused by the emotional tension of the exam process in sanguine temperament type students

Compared to the BE period, on ND the percentage ratio of the amplitude-frequency rhythm of all waves increased in the left and right forehead-sinciput distributions in 17-year-old sanguine type students. The BE and AE periods have the same effect on the rhythm of the amplitude of EEG waves in the left-right forehead distribution[40]. The amplitude of alpha waves increases truly ($p<0.005$). The amplitude of EEG delta waves in the right forehead lobe truly increases ($p<0.005$) in the AE period compared to ND. SBP truly increased ($p<0.01$) in the BE period (Figure 7). The frequency of beta waves in LNP was 17.9±1.9 Hs on ND, itt increased to 19.4±0.8 Hs in the BE period. In the AE period it decreased to approximately the level observed on ND and was 18.3±0.8 Hs. In the right nape region, the frequency of beta waves was 16.0±1.1 Hs on ND, it increased sharply and became 18.6±0.5 ($p<0.01$) Hs BE, and decreased to 16.9±0.8 Hs AE. The frequency of beta waves in the right sinciput region was 15.8±1.2 Hs on ND, 20.6±1.1 Hs BE and 17.3±0.7 Hs AE. The frequency of beta waves in the right sinciput region changed according to the frequency of beta waves in the left sinciput region (Figure 7). In the BE and AE periods the frequency-amplitude of delta-theta-alpha waves in the left-right occipital-sinciput divisions increases, while the frequency-amplitude rhythm of beta waves decreases. The changes in the absolute and relative values of the amplitude of these waves were similar. Thus, the changes in the right occipito-sinciput distribution are more noticeable in sanguine type students. The frequency-amplitude rhythm of delta-theta-alpha-beta waves in the left temporal lobe increased BE and AE[41]. Only the amplitude and frequency of EEG delta waves decreased in the right

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[40]Рустамова Т.В. Сравнительный анализ амплитудно-частотных характеристик ЭЭГ у молодых людей в возрасте 17 лет в зависимости от типологических особенностей нервной системы. //Теоретические и прикладные аспекты развития современной науки и образования. Материалы III Всероссийской научно-практической конференции. Чебоксары.- 2020, с.-21-25

[41]Rustamova, T.V., A.Kh. Kazimov. Changes in the frequency of EEQ waves in the cerebral cortex of sanguine students. // Світ медицини та біології.2022, 4 (82), pp.157-160

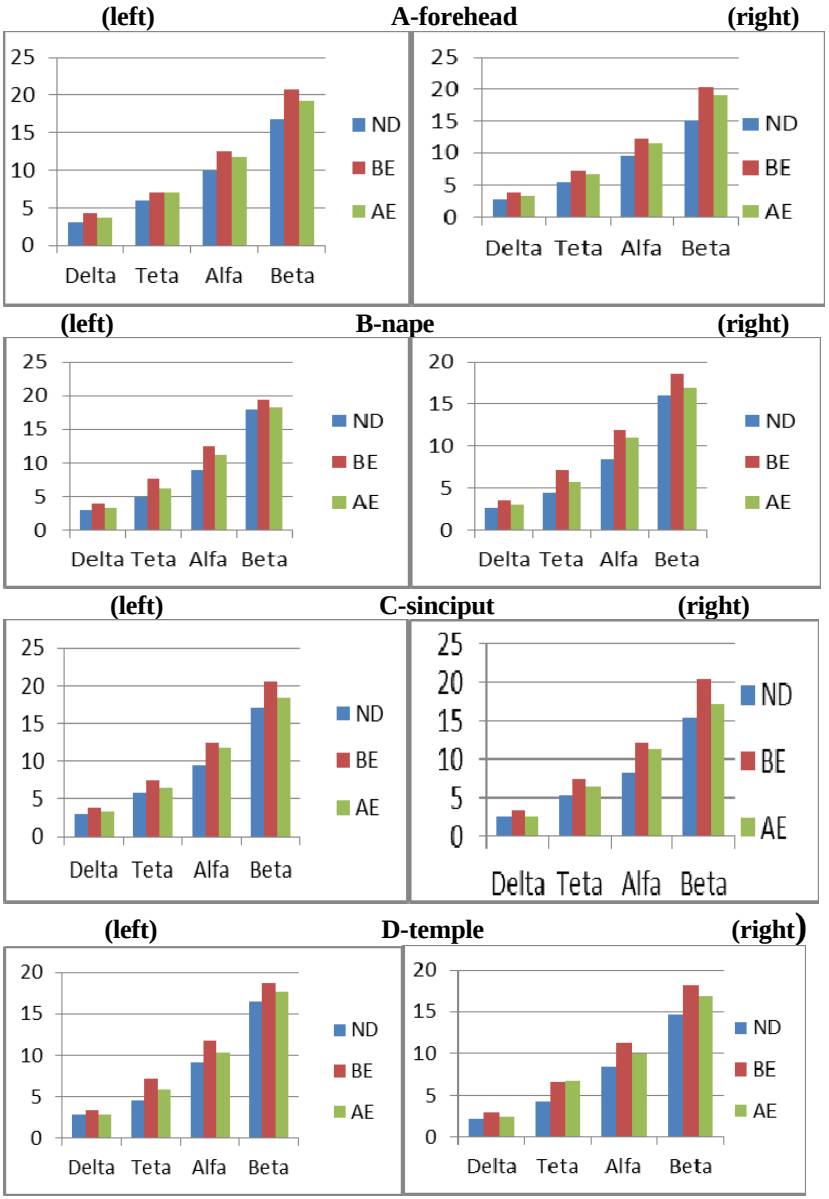

Figure 7. Dynamics of EEG wave frequency changes (Hs) in the left and right forehead (A), nape (B), sinciput (C) and temple (D) parts of the brain in 17-year-old sanguine type students in connection with ESEP

temporal lobe of brain AE, while the amplitude of other waves increased. When the EEG delta rhythm in the right temporal lobe. Decreased, the amplitude of theta-alpha waves increased, but the amplitude of beta waves did not change in the BE period Only the amplitude and frequency of EEG delta waves decreased in the right temporal lobe of brain, while the amplitude of other waves increased in the AE period. Our results show that there was a different change in the amplitude of EEG waves in both parts of the 1st semester exam period in 17-year-old students. During the examination process, the frequency-amplitude of the waves in the position of waiting for the result was strongly affected by the level of anxiety[42].

Compared to ND, the frequency of alpha and beta waves changes truly in different parts of the brain in the BE and AE periods in 18- and 19-year-old sanguine type III-year students. The frequency of other waves decreases. These results show that the effects of both ESEPs have different effects on the left and right parts of the brain. Therefore, different parts of the brain affect the EEG frequency rhythms to a different degree.

In 20-year-old sanguine type students, theta-alpha waves weakly increased, and beta waves sharply increased, when the EEG did not change the percentage of the rhythm of the amplitude of delta waves and then left-right forehead divisions BE. Exam stress had a different effect on waves in left-right forehead parts in the BE and AE periods. The frequency of delta waves decreased in the left-right forehead, and the opposite result occurred in the frequency of theta waves in the forehead. The frequency of alpha-beta waves did not change in the BE and AE periods. Compared to ND, in the BE and AE periods when the delta-theta waves in the nape changed, the amplitude of the alpha-beta waves in the left and right nape increased. The comparison of the

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[42]Рустамова, Т.В. Влияние экзаменационного стресса на амплитуду волн ЭЭГ в теменной доле головного мозга у студентов факультета биологии-химии с различными индивидуально-типологическими особенностями // Красноярск: Siberian Journal of Life Sciences and Agriculture, 2020, № 5, с.97-112.

amplitudes shows that the EEG waves change differently in both parts of the nape in the BE and AE periods. But the changes in the right nape are more noticeable. In the left and right nape, the frequency of delta waves increased in the BE and AE periods, the frequency of theta and beta waves decreased BE, but did not change AE and the frequency of alpha waves decreased both in the BE and AE periods.

Compared to ND, the amplitude of delta, alpha and beta waves of the EEG in the right sinciput lobe increases BE, but a decrease in theta wave amplitude is observed. Compared to ND, the amplitude of delta, alpha and beta waves of EEG increased and the amplitude of theta waves decreased truly ($p<0.05$) AE. Comparing the BE period with AE period, the amplitude of delta and beta waves increased, but the amplitude of theta and alpha waves decreased.

The percentage of beta rhythm increased when the frequency of delta-alpha-theta waves in the left-right sinciput segment changed weakly both in the BE and AE periods. The frequency of delta-alpha-beta waves in the left sinciput portion did not change, but theta waves decreased. The frequency of delta-theta waves decreased and the frequency of other waves increased AE. In the right sinciput lobe, the frequency of delta-theta waves did not change, the frequency of alpha waves has decreased, and the frequency of beta waves increased sharply BE, but in the AE period the frequency of delta waves was stable, the frequency of alpha-beta waves increased weakly, and the frequency of theta waves decreased.

Compared to ND, in the BE period the amplitude of all waves of EEG in the right temporal lobe increased in the amplitude of theta and beta waves ($p<0.05$).

The amplitude of theta-alpha-beta waves in the left temporal lobe increased weakly BE. And the waves in the left-right temple portion did not change AE. In the left-right temple area, the frequency of delta waves did not change BE, the frequency of alpha-theta waves increased, and the frequency of beta waves decreased. Although the frequency of alpha waves decreased slightly AE, the frequency of other waves increased BE. In the AE period, the frequency of delta and beta waves reliably increased, and theta waves did not change.

The results show that the effects of both exams stress on the left and right lobes of young people are of different nature. Change in electrical activity was detected in the right temporal region, which, according to the authors, indicates activation of the right frontal cortex during anxiety[43].

These results show that the amplitude of EEG waves of both temporal lobes of the brain during the examination period changes differently in the last semester of 20-year-old students. Similar regularities in EEG amplitude and frequency indicators in 20-year-old sanguine type were similar in 21-year-old sanguine types. It is based on the fact that both age groups are in their final year[44]. Some of the students of this year have a higher level of emotional anxiety during the exam process. Therefore, the rhythms of the EEG waves reliably increase in association with the anxiety observed in the BE and AE periods in the brain lobes of sanguine students[45,46]. Therefore, individual anxiety situation in V-year students varies in the range of high scores BE.

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[43].Грибанов А.В. Спонтанная и вызванная электрическая активность головного мозга при высоком уровне тревожности. / А.В. Грибанов, И С. Кожевникова, Ю.С. Джос [и др]. // Экология человека, Санкт-Петербург: 2013, № 1, с. 39-47.

[44]Rustamova T.V. Comparison of changes ln the situational anxiety level due to the effect of emotional stress of the exam process In 21-Year-Old Students With different temperament types. South Asian Journal of Experimental Biology. India 2022, том 12. № 6, pp.890-895.

[45]Rustamova T.V. Kazimov, A..Kh. Change of EEG frequency in the frontal and occasional part of the cerebral cortex due to the influence of the examination process in 21-year-old students with sanguivinic type // Міністерство охорони здоров'я України Полтавський державний Медичний Університет Наукове товариство анатомів, гістологів, ембріологів та топографоанатомів України. Полтава: 11-12 october, 2022, p.144.

[46]Rustamova T.V., Cəfərova Q.K. Səlimli T.A İsmayılov Y.B. 21 yaşligənclərin temperamentindən asili olaraq baş beyinin təpə və ənsə payinda EEQ –nin tezliyinə emosional gərginliyin təsiri.//4 uluslararasi uygulamali bilimler kongresi Diyarbakir. 25-26 Temmuz s.117-127.

DISCUSSION

In the study, after determining the HNA temperament type in the age dynamics of students, we investigated the effect of emotional tension of exam stress on autonomic indicators, anxiety levels and brain electrical activity. The emotional tension of the examination process in the educational system can seriously damage the health of students. Thus, depending on the type of HNA, physiological age, adaptability and degree of severity of the examination process can cause psychophysiological changes in these students[47.48]. Therefore, in order to comprehensively assess the impact of emotional stress on students of different ages and courses, there are certain differences between temperaments and age periods in the number of heart beats, the number of systolic and diastolic arterial pressure in the BE and AE period compared to the ND level, the main hemodynamic indicators (ANS indicators), that is, these sharp rises and falls between indicators are obtained. The dynamics of changes in hemodynamic parameters during the exam characterizes the tense state of the regulatory mechanisms of the blood-vascular system[49].

In 17-21-year-old students, VIK shows the predominance of the sympathetic tone of ANS on ND and in the AE period, but this indicator is in the case of the predominance of the parasympathetic tone in the BE period. In the AE period a tendency to return to the level of ND due to the removal of the stress factor was observed in students, the main reason for which is the decrease in ANS tone associated with fatigue.

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[47]Rüstəmova T.V. İmtahan stresinin təsiri altında tələbələrdə psixoloji göstəricilərin tədqiqi. // Naxcıvan: Naxcıvan Dövlət Universiteti. Elmi əsərlər. Humanitar elmlər seriyası. 2018, №1(90), II Cild, s. 32-35.

[48]Barmola K.C. Effect of Examination Stress on Adolescents' Health Edited book on Healthcare Management. / S.K. Srivastava New Delhi: Publisher: New Century Publication, 2010, pp. 289-303.

[49]Надежкина Е.Ю. Влияние экзаменационного стресса на функциональное состояние сердечно-сосудистой системы и уровень тревожности у студентов с различными типами высшей нервной деятельности. / Е.Ю. Надежкина, Е.И. Новикова, М.В. Мужиченко [и др.] // Вестник Вол. ГМУ. Волгоград: 2017, №2 (62), с. 115-118.

This is reflected in some works. Thus, there may be acceleration of the retardation processes in the CNS, development of the body's defence reactions and the full activation of adaptive processes[50]. Based on the vegetative indicators and the Kerdo index, SNS advantage was observed in students, which is the result of how important the exam is for young people, the responsible approach to the exam and the activity of adaptation processes. It shows that the changes in SEL and IEL during the psychoemotional activity of the exam process in students of different ages and temperament types during the entire exam period have the advantage of SNS tone over ANS indicators. The analysis of the results of the hemodynamic changes we obtained from the effect of exam stress by groups also shows that the VIK was aggravated in all groups. An increase in the anxiety level correlates with an increase in the activity indicators of the sympathetic branch of the ANS[51]. Under the influence of neuro-emotional stress, psychophysiological changes in students studying in the lower course are higher than those studying in the upper course, and this is explained by the relatively weak adaptation of students to the teaching process. Exam stress and stress resistance depend on the individual characteristics of students. In this regard, students studying in different courses are recommended to approach according to the nature of the type of the nervous system during the educational process. In this regard, one can prevent these or other neurotic changes that may occur in them. In the studies conducted on students studying in different courses, it was found that the changes in the psychophysiological indicators of the students compared to the semester period are manifested in the increase of the anxiety level and the disturbance of the vegetative balance.

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[50]Wenjun B. Autonomic Nervous System Response Patterns of Test-Anxious Individuals to Evaluative Stress / B. Wenjun, Z. Xiaocong, D. Yunying // Frontiers in Psychology, 2022, vol 13, p. 824406.

[51]Будукоол Л.К. Харрасов А.Ф., Ховалыг А.М. Вариабельность ритма сердца студентов с разным уровнем тревожности. //Белгород: Успехи современной науки. 2017, том 1, № 6, с. 31–33.

According to M. Fateyeva (2015), this leads to decrease in the body's adaptive capabilities[52].

At the next stage of our research, changes in the level of situational and individual anxiety during ESEP were detected in 17-21 year old male students with different temperamental characteristics of the nervous system. In 17-year-old students of different temperament types, the anxiety level is weak on RD, but SEL and IEL increase in parallel BE and IS at the same age. Their high level continued to remain AE[53].

We found that in the BE period in 17-year-old melancholic type students SEL is slightly higher than those observed in the AE period. In IEL, there is a difference between choleric type students and melancholic type students. It is known that in the melancholic type students, sensitivity is extremely high and self-confidence is extremely low. In this regard, SAL and IEL increase in the BE period. Since choleric type people are depressed, an increase in IEL was observed. In all cases, on the eve of the exam session, students work to achieve their goals, and this process results in increase in psychophysiological tension, as it is rich in questions that create uncertainty for students[54].

In 18- and 19-year-old students, SEL and IEL were weak among types on ND, while they increased in the BE and AE periods.

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[52]Фатеева. Н.М., Арефьева А.В. Экзаменационный стресс и психофизиологические показатели студентов.//Калининград: Образовательный Вестник «Сознание», 2015, №3, с. 34-38.

[53]Надежкина. Е.Ю. Влияние экзаменационного стресса на функциональное состояние сердечно-сосудистой системы и уровень тревожности у студентов с различными типами высшей нервной деятельности / Е.Ю. Надежкина, Е.И. Новикова, М.В. Мужиченко [и др.] //Вестник Вол. ГМУ. Волгоград: 2017, №2 (62), с. 115-118.

[54]Rustamova T.V. Comparison of changes in the level of situational arousal under the influence of emotional stress in students with different temperament types // Міністерство охорони здоров'я України Полтавський державний медичний університет Наукове товариство анатомів, гістологів, ембріологів та топографоанатомів України. Полтава: 11-12 october, 2022, p. 145-146.

However, SAL was higher in sanguine type, while IAL was at an average level in other types[55,56].

Thus, the difference in indicators in IEL in the AE period was only in phlegmatic and choleric types. At these ages, SEL and IEL increases and decreases BE and AE. The average and low level of anxiety in 18 and 19-year-old students, that is, in II and III years, is the result of their adaptation to ESEP.

In our study, the last year of the educational process was IV and V (20 and 21 ages). This study was related to the presence of dual majors in some faculties of the University where we conducted this research.

As the 20-year-old students were in their final year, they had different results. In these students, SAL and IAL BE and AE were at the medium level of anxiety. SAL elevation was higher in phlegmatic type students and weaker in choleric type students compared to ND[57,58]. There is a sharp difference in IEL in different types in the AE period and it was slightly higher in two types (phlegmatic and sanguine) in particular. According to the indicators we have received, the motives for the development of EG in the exam situation are different for different types of students. Its main reason is the lack of confidence in obtaining the necessary results.

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[55]Rüstəmova T.V. 19 yaşlı xolerik tipli gənclərin sitiativ həyəcan göstəriciləri // Ümummilli Liderimiz Heydər Əliyevin anadan olmasının 98-ci ildönümünə həsr olunmuş gənc tədqiqatçilarin V beynəlxalq elmi konfrans, Bakı, 29-30 aprel, 2021, s. 1114-1117.

[56]Rüstəmova T.V. 18 yaşlı gənclərdə situativ həyəcan vəziyyətinin göstəriciləri // Azərbaycan Texniki Universiteti "Azərbaycan və Türkiyə Universitetləri: təhsil, elm, texnologiya" I Beynəlxalq elmi-praktiki konfransın materialları III hissə, Bakı, 18-20 dekabr, 2019, s. 138-141.

[57]Рустамова Т.В. Сравнительный анализ влияния экзаменационный стресса на индивидуальные показатели студентов первых и четвертых курсов, обладающих различным типом темперамента. // Баку: Advances in Biology & Earth Science, 2020, №2 (5), с. 151-159.

[58]Rustamova T.V. Comparative analysis of exciting indicators of 19- and 20-years old sanguine types // Achievements & Challenges in Biology, 11th International Conference Baku State University, Baku: 13-14 october, 2022, p. 274.

As mentioned in the work of Y.Sherbatykh (2000), the anxiety level of most students increases while waiting for of the exam[59].

Thus, since differences are observed between different types and groups, in the teaching process approaches according to the nature of the type of nervous system of these students are recommended.

On ND, SAL change in the type of 21-year-old students is at the medium level of anxiety. In the BE and AE periods $p<0.05$ was significant in comparison with ND in other types except choleric type[60]. As SEL was high in phlegmatic, sanguine and melancholic types out of four temperament types in the BE and AE period in comparison with ND, it was weaker in choleric type.

In addition to all these analyses, neuropsychological regulation and self-regulation of individual activity play a major role in 21-year-old SAL and IAL students. An increase in the level of emotional tension among senior students is noted again, which is explained by the fact that it is the last year of education, and that final exams are decisive in life.

The difference between groups and temperament types in 17-21-year-old I-V year students, consisting of four temperament types, was not statistically reliable in some cases. As we mentioned based on the results of our research and bibliographic data, SAL and IAL increase because waiting for the results of the examination process causes emotional tension in most students[61]. As a result, disturbance of the regulatory mechanism of the mental, vegetative, hormonal and other systems and finally, such conditions as changes in the dynamics

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[59]Щербатых Ю.В. Влияние показателей высшей нервной деятельности студентов на характер протекания экзаменационного стресса//Москва: Журнал ВНД им. И.Павлова, 2000, № 6, с. 959-965.

[60]Rustamova T.V. 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 Tempe rament // Bulletin of Science and Practice, 2020, 6 (8), pp. 55-64.

[61]Rustamova T.V. The characteristics of the Psychological Excitement Performance of the Students Before the Exam / Belarusian State University The 3rd international symposiumon euroasian biodiversity. Minsk: 5-8 july, 2017, p. 489.

of perception and memorization processes, weakening of the functions of adaptation to stress conditions are manifested[62].

It was determined in the study that in the conditions of modelling the negative emotions of the exam, the integral EEG-characteristics of 17-21-year-old I-V year male students of different temperament types have a number of significant similarities, as well as specific characteristics in terms of the percentage of rhythms and amplitude-frequency characteristics[63]. Exam stress caused to increase in alpha and beta waves of the EEG frequency-amplitude the left and right forehead-occiput-sinciput-temple sections in first-year (17-year-old) phlegmatic students in the BE and AE periods in comparison with ND. This can be explained by the incomplete formation of the brain's adaptation to the stress of the first exam. The increase in the level of both types of anxiety during the exam period and the emotional tension about the future result has also affected the frequency-amplitude of these waves[64]. The dynamics of EEG changes in the parts of the brain in students with different temperament types were very similar in 18-19-year-old II and III year male students in the BE and AE periods. At the same time, students are characterized by an average level of individual and reactive anxiety in studies. High levels of anxiety refer to types of weak higher nervous activity[65]

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[62]Мусина А.А. Сулейменова А.К. Сакенова А.К Значимость эмоционального стресса в развитии девиантных состояний. //Уфа: Инновационная наука, 2015, № 10-2, с. 210-230.

[63]Rustamova T.V. 21 yaşlı gənclərin temperamentindən asılı olaraq baş beynin təpə və ənsə payında EEQ-nin tezliyinə emosional gərginliyin təsiri. // Anadolu kongresi 4. Uluslararasi uygulamali bilimler kongresi, Diyarbakir, 25-26 temmuz, 2020, s. 32-33.

[64]Джебраилова Т.Д. Индивидуальные особенности взаимодействия функциональных систем при целенаправленной деятельности человека в услових эмционального напряжения. / Дисс. доктора биологических наук. / Москва, – 2005, 242 с..

[65]Привалова Т.Г. Иванова Т.Г. Встречаемость типов высшей нервной деятельности у студентов. /Брянск: Ученые записки Брянского государственного университета, 2019, №2 (14), с. 69-71.

.In 20-year-old phlegmatic students, due to exam stress, the percentage of theta-rhythm increased, while the percentage of spectral power of the delta rhythm of the BE EEG in the left and right forehead-occiput-sinciput-temple divisions did not change. In the AE period this change was in the direction of increasing and decreasing. This brain wave usually occurs when we are in a state of mental relaxation and transition to sleep. Although there was an increase in the relative strength and percentage of the alpha rhythm in the left and right forehead lobes, there was no increase or decrease in the rhythm of other lobes. A sharp increase in the relative strength and percentage of the beta rhythm was noted in the right and left forehead lobes BE. The predominance of low or high alpha-rhythm bands in EEG can be considered as a prognostic criterion that allows for analysis and comparison, as well as for assessing the ability to be exposed to logical constructions, for performing both visuospatial tasks and more complex activities.

In phlegmatic 21-year-old students, the percentage of theta rhythm increased in the left and right parts of the EEG, while the delta rhythm did not change in the right forehead-occiput-sinciput-temple parts of the left forehead part BE due to exam stress. The change of its rhythm was different in these shares. In both cases, an increase in the relative strength and percentage of the alpha-rhythm was achieved in the parts of the brain BE, but different changes in the direction of increase or decrease in the rhythm of waves were noted AE. A sharp decrease in beta-rhythm was noted in the right-left parts of the brain BE and AE. Exam stress had a different effect on the frequency-amplitude of EEG waves in the left and right parts of the students' brain BE and AE.

Due to exam stress, in 17-year-old choleric students, in the AE period, the left-right forehead-occiput-sinciput-temple divisions, when the percentage of IS EEG-alpha wave rhythms increased compared to ND, the rhythm changed weakly BE.

However, even though the frequencies in the parts practically increased, they did not differ from each other. Although the frequency of delta- and theta-waves in the left-right forehead division increased BE, it decreased by this amount AE. The amplitude of EEG waves in the left and right forehead lobes of choleric students is enhanced and decelerated in the BE and AE periods. Changes in low-range theta- and delta-waves in highly anxious individuals during exam stress characterize the situation when a person cannot control himself and does not adequately respond to environmental signals[66]. However, other authors show that delta-rhythm increases during cognitive activity, especially in the forehead part of the brain[67].

In 18 and 19-year-old Choleric students, the results of the changes in the amplitude-frequency indicators of the ND, BE and IS EEG waves in the left and right parts of the brain show that the excitation of delta waves in all parts is higher than other waves. This happens in connection with the fact that students are in the middle course. Thus, the excitability ESEP is low in these elderly choleric type people.

It was determined that the frequency-amplitude of EEG waves in both parts of the brain during the exam period changed differently in 20-year-old choleric students, as in other age groups. The rise in the level of anxiety during the exam and the emotional tension about the result had a sharp impact on these waves[68].

Although the amplitude of BE delta-alpha-beta waves in the left

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[66]Рослякова Е.М., Бисерова А. Г., Байжанова Н.С. Успеваемость студентов медицинского университета в зависимости от высших психофизиологических функций.//Международный журнал прикладных и фундаментальных исследований, 2016, № 12(5), с. 845-848.

[67]Harmony T., Fernandez T., Silva J [et al.] EEG delta activity: an indicator of attention internal processing during performance of mental tasks // International Journal of Psychphysiology, 1996, 24 (No1-2), pp. 161-171.

[68]Rustamova T. V. Indicators of anxiety in young people 18 years of age./ Proceedings of the XIX International Scientific and Practical Conference Social and Economic Aspects of Education in Modern Society.Warsaw: 25 november, 2019, p.33.

forehead portion of 21-year-old choleric type students decreased, the percentage of theta rhythm increased.

The percentage of the amplitude of delta- and -theta waves in left and right forehead did not change in the BE and AE periods. Although alpha-waves increased in the BE and AE periods, beta-rhythms decreased. In students, the frequency of beta-waves in the left and right forehead part of the brain did not change BE, while it increased AE. Since exam stress has a serious effect on the electrical activity of EEG waves in the cerebral cortex, certain differences have been observed in the transition of waves from one to another.

Due to the effect of EG, the EEG shows high alpha waves because they are mentally relaxed and able to cope with the situation. However, when their attention was focused on the exam, during the examination with mild and moderate stress subjects, the level of vigilance and anxiety was replaced by beta-wave when the level of alertness and anxiety increased for alpha-wave[69]. When the students were exposed to the stress levels of the exam during the study with the curriculum, the preference was in the beta wave during EEG examination[70]. This shows itself in concentration. But EEG theta wave was active AE. This can lead to disappointment on the basis of the exam result. In the BE and AE periods, the frequency of delta-waves decreased by the same amount, while the frequency of theta-waves changed weakly, the frequency of beta-waves increased even more sharply than other waves, and the frequency of alpha-waves decreased in the left and right temple lobe, while it sharply increased BE. It is known that the temple part is involved in the regulation of emotions and memory[71].

[69]Rustamova T.V. 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 Tempe rament // Bulletin of Science and Practice, 2020, 6 (8), pp. 55-64.

[70].Həsənov H.H., Hacıyev Ş.M., Qəribov A.İ. Mərkəzi sinir sisteminin fiziologiyası. ”Maarif” nəşriyyatı, Bakı, 1998, s.188-244.

[71]Кулганов В.А. Психоэмоциональное напряжение и утомление учителя: механизмы, диагностика и профилактика. //Санкт-Петербург: Известия Российского государственного педагогического университета им. А.И. Герцена, 2009, №100, с. 131-142.

. This shows that the emotional stress caused by exam anxiety does not significantly affect the electrical activity of EEG waves in the cerebral cortex of V-year choleric students, and little difference is observed in the crossing of waves from one to another. In fact, the exam is a psycho-emotional stress that has various effects on the functional state of the whole body. The emergence of emotional tension during the exam is the price of both the subjective and objective state of the student[72]. The increase in the activity of different parts of the cerebral cortex due to the influence of ESEP in V-year students is weaker than in I-year students. In students with high anxiety reactivity, the EEG rhythms in the cerebral cortex are reliably high BE. Since students studying in the first year have a low level of adaptation to emotional stress in the exam situation. As shown in the literature and according to our results, the state of anxiety increases while waiting for the results of the exam in all the lower year students[73].

Compared to ND, in the BE and AE periods, the rhythm of the frequency-amplitude of EEG delta-theta-alpha-beta waves in the right occipito-sinciput parts are more noticeable in 17-year-old sanguine type students. The rhythm of waves in the left temple portion increased BE and AE. When EEG delta- and theta-rhythms decreased in the right temporal lobe, the amplitude of alpha-waves increased, while the amplitude of beta-waves did not change BE. This is explained by the increased level of anxiety while waiting BE[75]. In 18-year-old and 19-year-old (III year) students of Sanguine type, the frequency of alpha- and beta-waves truly changes in different parts of the brain in the BE and AE period compared to ND. The frequency

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[72]Белоус В.В. Место и роль темперамента в структуре интегральный индивудальности / И.В. Боязитова. // Москва: Психологический журнал, 1989, № 4, с. 87-93.

[73]Rustamova T.V., Kazimov A.Kh. Dynamics of EEG amplitude and frequency changes in the left and right parts of the brain in 17 year-old students with sanqvine temperament.// World of Medicine and Biology. України. Полтава, 2024, №2(88), pp.134-138.

of other waves decreases. These results show that both ESEP effects have different effects on the left and right parts of the brain.

In 20-year-old sanguine students, the change of the amplitude of EEG waves in both temple lobes during the exam period is different from that of other parts of the brain during the last semester period. The results show that the effect of exam stress has a different nature on the frequencies of waves in the left and right lobes of young people. Changes in amplitude-frequency indicators of EEG in 21-year-old sanguine types were similar to those in 20-year-old sanguine types. This is based on both age groups being in their final year. The rhythms of EEG waves reliably increase due to the anxiety experienced by students of the 5th year of in the parts of brain in the BE and AE periods. In fact, the exam is a psycho-emotional stress that has various effects on the functional state of the whole body. Based on it, unlike the AE period, individual and situational anxiety varies in the range of high scores in V-year students in the BE period[74.75].

EEG in first-year melancholic students has specific characteristics in terms of the percentage of rhythms and frequency characteristics. A number of differences are obtained in the rhythm of the frequency of all EEG waves in the parts of the brain of 17-year-old students in the BE and AE periods. According to our results, the reasons for the development of emotional tension in the exam situation are different for different students[76]

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[74]Rustamova T.V. Kazimov A.Kh. Changes in the frequency of EEG waves in the cerebral cortex of sanguine students.// Світ медицини та біології.України, Полтава, 2022, №4(82) , pp.157-160.

[75]Rustamova T.V., Kazimov A. Kh. Change of EEG frequency in the frontal and occasional part of the cerebral cortex due to the influence of the examination process in 21-year-old students with sanguivinic type // Міністерство охорони здоров'я України Полтавський державний Медичний Університет Наукове товариство анатомів, гістологів, ембріологів та топографоанатомів України. Полтава: 11-12 october, 2022, p.144.

[76]Рустамова Т.В. Влияние экзаменационного стресса на вегетативные показатели у 17-21-летних студентов с меланхолическим типом высшей нервной деятельности. // Калининград: Образовательный вестник «Сознание», 2021, №6, с. 18-29.

. Due to the effect of ESEP, a number of changes occurred in the amplitude of the EEG waves of the left and right parts of the brain in 20-year-old (IV course) melancholic students. The increased level of anxiety during the exam process and the emotional tension about the result have a dramatic effect on the amplitude of these waves. This is also associated with poor memory, thinking and attention in melancholiacs.

A comparison of change in the amplitude of EEG waves in the left and right napes of the brain of 21-year-old (V year) melancholic students shows that the amplitude of EEG waves in both nape lobes of the brain changes relatively weakly in the direction of increase in the BE and AE periods. However, in both cases, the right of the brain changes in the nape share are more noticeable. At this age, regardless of whether the process of adaptation to the exam has been fully formed in the students of this age, the fact that it is the last year shows the effect of obtaining a different result from the effect of exam stress on the amplitude of the EEG waves in the parts of the brain of the 5th year students.

In addition to all this, the level of anxiety caused by the effect of emotional stress students on ND, BE and AE periods leads to increase in vegetative indicators and change in the amplitude-frequency characteristic of the EEG. Therefore, there is a correlation between the level of anxiety and the change in the neurophysiological mechanism of these students during the examination process. During the exam period, by determining the temperament type and different types of the anxiety levels of the students of different courses during the exam, by determining the ANS activity change and the amplitude and frequency of the EEG rhythms in different parts of the brain, students studying at the bachelor's degree can achieve their goals.

CONCLUSION

1. In the comparison of 17-year-old, 17-year-old, 18-year-old, 19-year-old, 20-year-old bachelor's degree students studying in the I, II, III, IV, and V years, 17-year-old sanguinis were 26.1%, choleric type

students were 26.1%. 34.8%, phlegmatic type students were 12.5%, melancholic 25.0%, 18-year-old phlegmatic 24.7%, choleric 34.7%, sanguine 26%, melancholic 17.3%), 19-year-old phlegmatic 47.8%, choleric 34.7%, sanguinis 26%, melancholic 17.3%, 20-year-old sanguinis 34.6%, choleric 26.9%, phlegmatic 19.2%, melancholic 19.2% and 21-year-old sanguinis 30.5%, choleric 36.1%, phlegmatic 13.9%, and melancholic 19.4%. In this comparison, it was found that sanguine and choleric temperament type students of HNA are the majority in all age groups. In students with such a temperament type, the awakening process prevails over the slowing down process in the dynamic balance of the CNS.

2. Compared to heart rate observed on ND, BE and AE, systolic and diastolic pressure levels in 17, 20 and 21-year-old students of different temperament types due to the influence of emotional anxiety factors arising during the examination process, depending on the type of nervous system, individual and situational anxiety level and the formation of the ability to adapt to the examination process difference is obtained. In all studied age groups, the result of CVI is characterized by the dominance of sympathetic tone, which indicates that the sympathetic nervous system is dominant throughout the entire examination period.

3. Due to the influence of emotional anxiety factors that occurred during the exam period, individual anxiety increased to the maximum level in 17, 20 and 21-year-old students of different temperament types, in the BE and AE periods compared to ND, a sharp increase in the situational anxiety level is also observed during that process. Such changes occurring in students depend on the expectation of the results of the examination process and the weak development of the ability to adapt to the examination in some students. On the other hand, it depends on the weak restoration of the ability to adapt to the examination process in the students of the 1st year, and on the results of the final exam in the 20 and 21-year-olds.

4. As compared to ND, due to the effect of ESEP in students with different temperament types BE and AE, the changes in the level of individual and situational anxiety and in the autonomic nervous

system, as well as the emotional tension the result, lead to the emergence of new features in them, the right and left occiputs of the cerebral cortex, a number of different directional changes are obtained in the percentage of the amplitude rhythms of alpha-, beta-, theta- and delta-waves of the EEG in the temple, sinciput and forehead regions. However, there is a partial decrease in the percentage of the amplitude of most waves of rhythms AE. Therefore, compared to 17-year-olds, 20- and 21-year-olds have sharp differences in the amplitude rhythm of their waves.

5. Changes in the level of individual and situational anxiety and in the autonomic nervous system due to the emotional stress of the exam process BE and AE, as well as the emotional stress about what the result will be, caused a number of changes in the percentage of the frequency rhythms of EEG waves in the parts of the cerebral cortex. happens. However, changes in the percentage of frequency rhythms of waves are observed in the AE period.

6. Depending on the strength, mobility and stability of the temperament type of the nervous system, the percentage changes of the amplitude-frequency rhythms of the EEG waves of brain are sharper in 17-year-old students than in 20- and 21-year-old students in the BE and AE periods.

7. Compared to 17-year-old students, 20- and 21-year-old students have higher level of adaptation to the emotional stress of the exam, so the level of anxiety in them is weakened in the BE and AE periods.

8. Depending on the HNA temperament type, there is a relationship between psychophysiological-anxiety level, bioelectrical activity of the brain and vegetative indicators caused by the effect of emotional tension of the exam process in students of different ages and courses. This relationship changes depending on the formation of the student's ability to adapt to the exam.

PRACTICAL RECOMMENDATIONS

It is necessary to implement the following measures in order to achieve the goal set by students of different temperament types studying at the bachelor's degree under curriculum:

a) to determine the student's temperament type.
b) to determine the level of anxiety (situational and individual anxiety) and changes in the activity of the autonomic nervous system in students under ESEP conditions.
c) To determine the electrophysiological (EEG electrical activity in different parts of the brain) indicators in students depending on different temperament types during the emotional stress of the exam process.

Using this method as a forecast in their personnel selection based on these indicators. The results of the research can be used to optimize teaching activities, correct exam stress and protect students' health.

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LIST OF ABBREVIATIONS

ND	–	Normal day
HNA	–	Higher nervous activity
DAP	–	Diastolic arterial pressure
EEG	–	Electroencephalogram
ES	–	Emotional stress
İA	–	Indicator of anxiety
LA	–	Level of anxiety
BE	–	Before exam
EP	–	Examination process
ESEP	–	Emotional stress of the examination process
AE	–	After exam
VIK	–	Vegetative index of Kerdon
PSS	–	Parasympathetic nervous system
LFL	–	Left forehead lobe
SBP	–	systolic blood pressure
LNP	–	left nape part
LTP	–	left temple part
SAL	–	situational anxiety level
NS	–	nervous system
SNS	–	sympathetic nervous system
ST-	–	sympathetic tonus
LSL	–	left sinciput lobe
IAL	–	individual anxiety level
HBM	–	Number of heart beats
HB	–	Heart beats
ANS	–	autonomic nervous system
SPSS	–	Statistical Package for Social Science

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