

# Studying Interactions Between Exam Stress And Cognitive Processes

Karamova NY

Institute Of Physiology, Western Caspian University, Azerbaijan

## ABSTRACT

This paper analyzes the psychophysiological changes that occur when exam stress affects healthy and mentally retarded schoolchildren aged (14-16) years. Psychological and cognitive indicators were studied. The experiments were conducted in three stages: on a normal school day (control), before the exam, and after the exam. The analysis of the obtained data showed that during the exam, healthy schoolchildren experience psychophysiological changes, i.e. the level of stress indicators (anxiety) increases and cognitive indicators weaken. After the exam, there was a tendency for these indicators to return to the control level. In contrast to healthy children, mentally retarded schoolchildren had a high level of anxiety index during the control examination, and their cognitive indicators were 35% lower than normal. During the examination period, these indicators remained at a relatively constant level. A comparative analysis of the data showed that depending on the level of mental development of students, exam stress leads to stress in the psycho-emotional state of students and this can have a serious impact on their health.

**Keywords:** Exam stress, Emotional stress; Anxiety indicators; Cognitive indicators; Psychoemotional state; Oligophrenics.

## INTRODUCTION

The role of the regularities of formation of cognitive processes in the perception of the environment serves as one of the most essential problems. The adequacy of this type of activity ensures the survival and stability of the organism in the environment. Manifested through these psychophysiological indicators in humans, it identifies adaptive, individual-psychological abilities and different features that arise in the process of personality development. However, the integration features of psychophysiological mechanisms under the influence of emotion depend on the individual's ability to perceive the environment. Modern research in this area is mainly based on the provisions of cognitive theory. According to this theory, cognitive processes ensure the quality and intensity of emotional reactions by correctly assessing the nature of real conditions that have arisen. The analysis of the studies conducted to address this problem at the present time proves that the main focus is on the study of the organizational factors and the characteristics of the functions of the body in the context of various stressors. Psychophysiological aspects of emotional stress, its processes of formation of brain mechanisms have been less

studied. In such conditions, the regularities of the reflection of adequate information equivalence in brain activity, as well as the characteristics of personal determination and the development of cognitive processes in emotional stress of various etiologies have not yet been fully studied. In this regard, it is of interest to experimentally study the effect of emotional stress on the psychophysiological indicators of two groups of adolescents, depending on the level of mental development. The aim of the research is to study cognitive processes in students during exam depending on the level of emotional tension. Along with the study of cognitive processes, anthropometric, vegetative and psychological indicators in adolescents were studied. The aim is to comprehensively assess the mechanisms of action of emotional tension. The reason for choosing two groups of adolescents is to understand and emotionally assess the stress, depending on the level of mental development. The aim of the study is to determine the psychophysiological changes caused by exam stress and to clarify the relationship between cognitive processes and emotional stress.

**Correspondence to:** Karamova NY, Institute Of Physiology, Western Caspian University, Azerbaijan, E-mail: jayalakshminalvar@gmail.com

**Received:** July 20, 2020; **Accepted:** August 2, 2020; **Published:** December 31, 2020

**Citation:** Karamova NY (2020) Studying Interactions Between Exam Stress And Cognitive Processes. *Anat Physiol.* 10:340.

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The exam process is a classic model of emotional tension. The aim of the experiments was to determine the effect of emotional stress on the cognitive, psychological and autonomic indicators of adolescents, depending on the level of mental development. The studies were conducted among 120 healthy schoolchildren from the Ecology Lyceum No. 291 in Baku and 60 schoolchildren of the special boarding school in Sumgayit for children with mental and physical disabilities, who were diagnosed with dementia (oligophrenia), aged . Psychotests have been used in the study of psychological indicators: Spielberger - Individual and situational anxiety through the Khan's test, general anxiety through the Taylor test, depression test on the depression scale. Among cognitive processes, short-term memory (through the "Memory by number" test), visual memory (through the pictorial visual memory table), voluntary attention (through the "Placement of numbers" test) were mainly studied. The experiments were conducted in three stages: on one of the usual school days (1-1.5) months before exam; pre-exam period (45 minutes before exams); 2 hours after exam. The results of the study of psychological and cognitive indicators are presented in (Table 1). The results of research show that under the influence of emotional stress, changes occur depending on the level of mental development. At present, the psycho-emotional changes observed are assessed as the body's adaptive response to situation. It is known that emotional tension allows for the emergence of adaptive behavior as a reinforced purposeful reaction in the process of evolution, and enhances the reception of information, accelerates the course of neurophysiological processes. The integration of psychophysiological mechanisms of body is a decisive factor for the emotional state, allows body to adapt to different extreme conditions, to develop adequate response, and thus leads existing conditions to common psychological level [1-10].

## MATERIALS AND METHODS

Psychophysiological changes in adolescents due to emotional stress can have a negative impact on their development, laying the groundwork for neuropsychiatric and somatic illnesses that are likely to occur in the future. Adolescents form a special group in society: they are at a faster stage of development of the emotional sphere and cognitive processes, as they are at the end of childhood and the beginning of the future independent life. During adolescence, a child's belief system and personal qualities are developed. In particular, the effects of emotional stress at these early stages of development can lead to more serious complications and adaptive disorders, resulting in changes in behavior, psychological state, temperament, and in loss of health. It is known from the literature that under the influence of emotional stress, first, the normal course of cognitive and intellectual processes change. In stress conditions occurred, normal human activity depends on the course of adaptation processes. It is known that the end product of adaptation processes in brain is the formation and fixation of new functional system. Adaptive processes include the interaction system, serving as the basis of memory, and the adequate change of the system during times of stress. On the other hand, the inability of the human body to meet its basic social or biological needs as a result

processes which, if persist, can lead or aggravate hypertension and insulin resistance. Visceral fat but not peripheral fat mass was of long-term adverse conditions caused by various conflict situations also creates emotional stress. This, in turn, leads to change in behavior and disruption of inter-system communication. During the experiments, along with the methods of psychological testing, the behavior of students during exams was observed. A feeling of excitement was observed visually among the majority of practically healthy schoolchildren. Thus, changes in psychological parameters and cognitive indicators during exam process, and changes in vegetative indicators once again prove the tension of the body's regulatory systems during this period. It is known that the body's close contact with the external environment is carried out by homeostasis self-regulatory systems, which reveal the ability to control and combine various functional processes. Changes in the environment cause tension in homeostasis, which, at best, creates a new functional state corresponding to all parameters or conditions. As a result, the emotional tension is eliminated. Thus, the stress process can be considered as a normal physiological adaptation response aimed to compensate homeostasis in emotionally tense situations. The results of personal studies showed that during exam, under the influence of emotional stress, depending on the level of mental development, adolescents develop psychophysiological reactions that are clearly manifested. In this case, the degree and duration of emotional arousal depends on the degree of perception of the factor influencing objectively and the psychophysiological characteristics of the personality. It is known from the literature that stress affects the whole organism, and the reaction of living things is different in such situations. People are extremely sensitive to the effects of stress, and an interesting feature is the ability to respond adequately to changes in the external environment. The most common response to stress is fear, anxiety, and so on. While the results of our personal experiments revealed that healthy adolescents had a moderate level of anxiety during psychological testing on a normal school day, a high level of anxiety was observed before exam process. After exam, the anxiety dropped to a medium level. Unlike healthy adolescents, mentally retarded adolescents showed lower levels of anxiety in all three cases.

## DISCUSSION

Interesting facts were obtained during the study of visual memory among cognitive indicators. Thus, among practically healthy adolescents, visual memory was approximately (40-52) % higher than normal in all experiments. The relative changes that occurred during exam were unreliable and remained within norm. This result is due to the fact that healthy adolescents have the opportunity to remember familiar images without any difficulty, and the normal functioning and perception of vision analyzers. Similar results were obtained in mentally retarded adolescents. Thus, it is known from literary sources that the perception of vision is of special importance and has its own significance for mentally retarded adolescents. Most of this group of people perceive the environment through their perception of vision. Unlike healthy adolescents, the increase in testing time allows mentally retarded adolescents to fully comprehend and remember the object being described.

**Table 1:** The effect of emotional stress on the psychophysiological indicators of practically healthy adolescent.

Age of schoolchildren	14 years			15 years			16 years		
	a	b	c	a	b	c	a	b	c
Indicators studied	30,82 ± 1,02	45,87 ± 1,33	40,29 ± 0,26	31,92 ± 1,55	46,18 ± 1,86	34,83 ± 0,92	31,88 ± 2,05	46,53 ± 1,94	33,76 ± 1,05
Situational anxiety	40,47 ± 0,66	45,93 ± 0,55	43,26 ± 1,92	44,78 ± 2,04	46,04 ± 1,88	45,29 ± 1,04	46,98 ± 2,13	48,94 ± 1,86	45,92 ± 1,74
Individual anxiety	25,27 ± 0,73	42,82 ± 0,75 ***	38,34 ± 0,79	26,78 ± 1,73	45,74 ± 0,89	34,76 ± 1,96	29,89 ± 1,15	48,33 ± 0,94	38,69 ± 1,24
General anxiety	42,03 ± 1,23	41,57 ± 0,96	40,27 ± 1,24	42,44±0,77	44,83 ± 1,24	41,36 ± 1,09	44,02 ± 0,84	45,49 ± 1,33	44,26 ± 1,83
Short-term memory	7,25 ± 0,23	5,91 ± 0,25	5,97 ± ,08	7,55±1,28	5,93 ± 0,29	7,09 ± 1,05	5,87 ± 0,34	5,01 ± 0,34	6,29 ± 1,04
Visual memory	9,55 ± 0,57	7,03 ± 0,54	8,22 ± 0,19	11,54±0,57	9,67 ± 0,94	10,23 ± 0,77	10,88 ± 0,86	9,28 ± 1,02	10,23 ± 0,94
Voluntary attention	22,16 ± 0,49	20,29 ± 0,43 **	20,33 ± 0,46	23,64±0,84	21,44 ± 0,74	22,14 ± 0,76	23,38 ± 0,67	21,17 ± 0,77	22,27 ± 0,46

The main reason for this is the delay in the processes of analysis and synthesis due to the weakening of the functions of the cerebral cortex, which is peculiar to oligophrenics have found in specific experiments that the analysis of sensory information in mentally retarded adolescents is very slow and selective. Based on the results of our personal studies, we can say that the number of errors in the memory of familiar objects is minimized in mentally retarded adolescents. Due to the fact that the images used in the test were familiar to mentally retarded adolescents and the duration of time was increased, the results were within the norm. It is known from the literature that as a result of emotional stress, significant change occur in attention processes . Thus, voluntary attention plays an important role in the regulation of cognitive processes. It is through voluntary attention that a person concentrates and seeks a way out of the emotional situation and acts purposefully. Voluntary attention protects the CNS from receiving excessive information and facilitates the perception of necessary information. The results of our personal studies prove that voluntary attention in healthy adolescents remains within the norm, despite a significant decrease and change due to emotional stress. Cognitive impairments in mentally retarded adolescents were once again reflected in the results of voluntary attention. A relative change was observed which resulted from the effect of emotional tension. Thus, the literature states that voluntary attention disorder is one of the main symptoms in mentally retarded adolescents. Low levels of voluntary attention are characterized

by a number of disorders: small memory span, poor endurance and easy shift of focus from one object to another, lack of interest in focusing on areas of interest and unfamiliar objects, and so on. Even the slightest irritation can lead to diversion of attention. Their weak voluntary attention has a negative effect on purposeful activity and ability to work . The lack of reliable change during exam can be explained by the poor assessment of condition. The main role as a dominant factor in the regulation of intellectual activity in the context of emotional tension is the harmony of personality, the degree of compatibility between desired and real work and the achievement of goals. As practically healthy adolescents aimed to achieve high results during exam, they also had high levels of emotional tension, which negatively affected the course of cognitive process.

## CONCLUSION

All of the abovementioned and the literature once again prove that the main role in the emergence of emotional tension plays the activation of cognitive processes, the ability to understand the real situation and emotional evaluation. Cognitive processes play a key role in the development of emotional stress, depending on the level of mental development under the influence of test stress that we used experimentally, leading to the development of psychological and autonomic reactions, cognitive and perceptual processes, the results of which is reflected, as in our example, in the learning process and life activities of adolescents (difficulty in mastering learning material, fatigue, headaches, insomnia,

sometimes unreasonable aggression and depression, sometimes loss of appetite due to the development of autonomic dysfunction, diarrhea, vomiting, fever, hand tremor, etc.). Taking into account the above-mentioned, it is possible to increase the self-confidence of teenagers before exam period, to adapt them to real exam process by creating conditions similar to exam process, and to reduce the level of emotional tension that can arise through a series of psychological conversations. And this is the basis for ensuring the development of healthy future.

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