PSYCHOPHYSICAL SECURITY AND ADEQUATE SOCIAL ADAPTATION OF STUDENTS: TRAINING COURSE

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Abstract

Increasing numbers of people have been falling victims to "biosocial" overreactions to extreme situations all over the world. Educational institutions tend to overlook the problem. It was **the Goal** of this research to study psychophysical functions in university students, following the adoption and embedment of psychophysical security course into the academic curriculum. The program included a theoretical course in psychophysiology of the central nervous system and psychological training sessions to teach students psychophysical self-regulation techniques and normal behavior. **The Results** of our research suggested that students had enhanced functional levels of the central nervous system, psychoemotional status, reduced anxiety, and normalized bioelectric processes in the brain upon completion of the course. In **the Conclusion**, we suggested that psychophysical security course be adopted and embedded into the academic curriculum in order to increase tolerance and accelerate social adaptation in students.

Keywords: psychophysical security course, students, psychoemotional state, psychophysical self-regulations, tolerance, normal behavior.

1 INTRODUCTION

Human psychics and behavior are determined by multiple factors. Increasing numbers of people have been falling victims to incidents involving abnormal behavioral reactions to life situations all over the world. Cases, to mention but a few, were reported by the media earlier this year: 1) Massachusetts, the USA: bearing a grudge against his neighbors, a local fetched a shotgun to shoot dead 6 of his neighbors in three apartments; 2) the Tver Oblast, Russia: male, aged 45, after a quarrel with an acquaintance, fetched a shotgun and shot dead 8 neighbors, including a 92-year-old lady. These tragic situations were caused by so-called "biosocial" reasons, and the death toll is on the increase, the figures ranking second to traffic accidents.

Why do thing like that happen? While underlying causes of social tensions in all countries may include worsening standards of living, increased unemployment rates, environmental issues, armed conflicts etc, causes of biological and psychophysical nature also contribute to the problem. When the worldview undergoes changes, the human psychics tends to eliminate the deformation, but the uncontrolled process, more often than not, disorganizes the psychics in such a way that one fails to find a solution to even a simplest problem. In everyday life, abnormal behaviors and overreactions are observed in those suffering from neuropsychological disorders, dependent on alcohol or illegal drugs, as well as in adolescents – as behaviors divergent from socially accepted norms. Impulsivity is related to aggression, hyperactivity, and proneness to make rash decisions in business, to compulsive gambling, and other socially unacceptable behavioral patterns [1].

Excessive emotions may result in a negative state of emotional tenseness [2, 3], characterized by excessive motivation, violent outbursts of sthenic emotions, ungrounded deep anxiety, sometimes a sense of fear. The limbic systems – one of the deep-seated brain structures – plays a key role in formation of emotional states, and the amygdala, a part of the limbic system, enhances an emotional reaction when any incoming information appears contrary to stereotypical expectations. In other words, whenever something new and unexpected happens, which is in contrast to pre-programmed expected actions, the amydgala may trigger an emotional reaction of hatred, fear, anxiety, fear, and other negative emotions. This is how excessively emotional responses occur.

The problem is that early humans eliminated adverse effects of hormonal bursts by fighting or running, while present-day humans have no possibility of doing so; emotional overreactions are kept pent-up, having a deleterious effect on both health and emotional equilibrium. The septum, which is another part of the limbic system, contributes to reduction of emotions. Activating this area, one can relieve excessive emotional tenseness. Most psychological relief sessions are aimed at learning to suppress automatically many unnecessary and harmful emotional reactions that exceed the stimulus in terms of intensity.

Unfortunately, most people are inexpert in reacting to aggressive environments, stressful or otherwise adverse situations. While teaching first aid course, most educational institution tend to overlook psychophysical relaxation techniques. On the other hand, the modern educational system takes its toll on students, causing pronounced tension of the functional state and impaired workability caused due to neuro-regulatory function disorders [4].

Chronic fatigue in young students caused by increasingly intensified academic load, increasingly sedentary lifestyle, circadian disorders, and other factors (including changeable living standards, increased psychoemotional tenseness, consumption of high-calorie food, and decreased exercise) involves exertion of adaptive mechanisms, depletes adaptive capabilities, resulting in a negative effect on students' health.

An expert and scientifically justified sexual education program for children and teenagers is still nonexistent. Sexual illiteracy of the general public leads not only to health issues but to mental disorders also. Many researchers tend to relate personality properties, behaviors, and sexual experience in subjects between 15 and 17 years of age [5]**.**

No psychophysical security course embedded into academic curricula leads to the development of stereotypical overreactions to external stimuli, which become anchored in grownups. The fact necessitates a fundamental and a complementary course in psychophysical security to be included in psychophysical self-regulation courses, involving teaching psychophysical self-regulation techniques.

Self-control and self-cultivation are the qualities that should be cultivated from an early childhood so that one is able to control their behaviors in contradictory social environments and to suppress their biological mechanisms, in order to curb their impulsions, compulsions, and reduce heavy dependence on external influences.

We have developed a psychophysical relaxation regulatory program [6] based on psychophysical relaxation (PPRS) sessions aimed at fast and deep relaxation in practitioners and providing a therapeutic and restorative effect.

It was **the goal** of this research to study psychophysical functions in university students, following the adoption and inclusion of psychophysical security course in the academic curriculum.

2 METHODOLOGY

We have examined 125 freshers and sophomores majoring in the humanities – pedagogy, management, and social work. The apparently healthy and generally fit individuals formed the observation group (OG, 58 people). The control group (CG, 67 people) was made up of students of the same age and sex who did not practice psychophysical security sessions. The research was conducted on voluntary informed consent of the subjects, in compliance with the protocol approved by the Ethical Board of the Russian Academy of Sciences.

The psychophysical security course included the lecture charts on fundamentals of the central nervous system structure and function, psychological defense techniques, and behavior in aggressive situations. Practical classes were psychological training sessions where psychophysical exercise (PPE) techniques were taught to achieve relaxation, improve concentration; visualization and autosuggestion techniques according to [7] were used; self-regulation techniques of physical states and emotions, ways to achieve goals, and psychological defense techniques were also taught. Psychophysical self-regulation is a set of exercise that involves methods and means based on the self-control and self-cultivation capabilities, and includes practical course in building immunity to verbal aggression and information threats.

Four-hour-long classes were held once a week; the total course duration was 72 hours, of which 20 hours were earmarked for self-tuition.

EEG measurements were taken in compliance with the 10-20 systems; psychomotor reactions were recorded by NS Test 2003 suite [8]; heartbeat rate and blood pressure measurements were also taken. The subjects also did the following tests: the Spielberger state-trait anxiety inventory [9], neuroticism test, and stress tolerance test. The tests were done and the measurements were taken at the beginning and at upon completion of the psychophysical security course. Statistical processing of the results was done by MSExcel and STATISTIKA (V.6) suite. The significance of differences was assessed by means of Student's t-criterion.

This document must contain a description of your research and must be structured into various sections, including Summary, Introduction, Methodology, Results, Conclusions, Gratitude (if applicable) and References. It is important that the title and the list of authors should be the same as in the abstract submitted.

3 RESULTS

Our research results suggested that personal anxiety figures were higher in the sophomores during end-of-semester exams than throughout the rest of an academic year, and higher anxiety was observed in male than in female students. Statistically significant situational anxiety values increased in all of the subjects throughout end-of-semester exams, and they were highest in the female group (see Table 1). All of the subjects had had rather high initial figures, which indicated that students felt psychoemotional tenseness caused by their adaptation to academic load.

Table 1. *Anxiety in sophomores during end-of-semester exams and throughout a semester*

Groups observation group	Personal anxiety	Personal anxiety [1]	Situational anxiety	Situational anxiety [1]
Males n=23	42,15±5,52	47,21±6,05	40,46±4,34	50,07±3,02*
Females n=35	41,18±4,01	46,25±4,20	38,01±3,10	**57,71±3,61*
Groups control group	Personal anxiety	Personal anxiety [1]	Situational anxiety	Situational anxiety [1]
Males n=28	41,26±4,84	51,17±4,22*	42,23±4,14	53,27±5,12*
Females n=39	39,31±5,10	**56,51±5,21*	40,54±4,32	58,26±4,84*

Note: [1] are the figures for an end-of-semester exams; * significant differences from the initial figures have been found; initial values being $p<0.05$.

Decreased heartbeat rate figures and a tendency to blood pressure reduction were found in all of the subjects, following psychophysical relaxation sessions. E.g., heartbeat rates decreased in the OG from 74.2 ± 2.1 to 68.4 ± 1.9 bpm in the males and from 75.3 ± 2.4 to 69.5 ± 2.0 bpm in the females after relaxation sessions.($P<0.05$), while no significant changes were observed in the CGs.

Generally improved psychomotor reaction rates after relaxation sessions, all of the reaction rates being higher in the males than in the females. It is worth noting that simple optic motor reaction rates were lower in the males than in the females before they took the course (see Table 2).

Changes in bioelectric activity of the cerebral cortex, which occurred while in a state of relaxation, are of particular interest. At the initial stage of relaxation, there was an increase in the alpha wave power and the index in all deflections (the average frequency being 10.5 Hz); that was when the second frequency area of alpha-wave activity formed (the average frequency being 7.8 Hz).

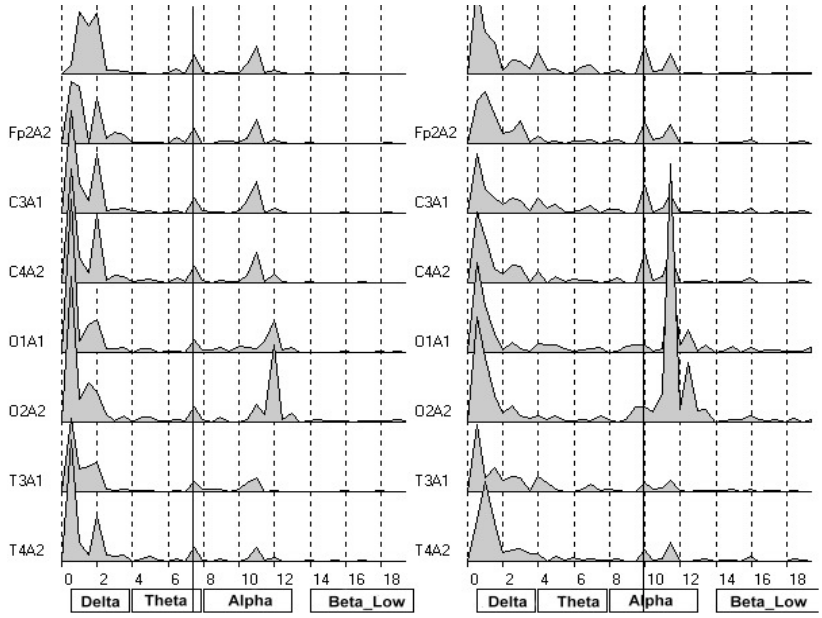
Table 2. *Changes in psychomotor reaction rates after taking the course that involved relaxation sessions*

Period	Sex	Psychomotor reactions					
		SOMR rate, m/s	CR, m/s	DR, m/s	SOSOMR, m/s	DOSOMR, m/s	AD, m/s
Before the course	m	302,3±17,5	324,7±22,2	405,6±31,9	306,5±25,2	382,3±17,9	1833,5±31,9
	f	284,6±14,4	361,8±15,3	415,7±25,8	327,8±27,2	399,3±21,8	1956,5±43,6*
After taking the course	m	263,6±15,8**	314,6±18,3	407,8±22,2	299,4±17,3	338,5±19,4**	1825,8±29,5
	f	273,4±16,8	323,4±14,2**	396,0±20,1*	312,8±17,9	337,8±18,2**	1921,4±25,5

Note: SOMR is simple optic motor reaction rate, CR is choice reaction, DR is distribution reaction, SOSOMR is static obstacle simple optic motor reaction, DOSOMR is dynamical obstacle simple optic motor reaction, and AD is attention distribution; * significant differences between males and females, ** significant differences from the initial values, at $p<0.05$

Certain changes were found on EEGs taken as the subjects were doing relaxation session. E.g., alpha-wave activity was observed in all deflections, predominantly in the occipital area(O1A1), in K-v (age 20) while he was taken a EEG in the background mode. Closed eyes record found that there were an increased alpha-wave intensity in the frontal, central and occipital deflections (see Fig.1).

At the second stage (the start of visualization), there was a considerable increase in the alpha wave power in the occipital area, while the power of the alpha-wave low-frequency area continued to increase also. In the final period of relaxation onset, pronounced generalization of alpha-wave and theta-wave within a low-frequency area of 8 Hz were observed, the process being slightly predominant in the right hemisphere. It is worth noting that the subjects described this state as a state of euphoria. Upon completion of relaxation, the subjects said they felt refreshed, fit, and energetic again.



Onset of relaxation *A state of relaxation*

Figure 1. Spectral analysis of EEG when doing relaxation sessions

The psychological testing data suggested that there were significantly lower neuroticism values observed in the OG than in the CG (see Table 3), which indicated that the OG had developed higher emotional tolerance, which contributed to retaining more organized behaviors in both ordinary and stressful situations. Those practicing psychophysical self-regulations also had lower neoru-psychical tenseness (NPT) values.

Table 3. *Psychological test results for university students*

Control group

nn	Full name	NPT, points	Neuroticism
1	K-va	50	16
2	L-va	49	14
3	B-va	47	15
4	K-ko	50	14
5	L-aya	54	19
6	Kh-na	47	15
7	K-aya	47	14
8	P-in	49	11
9	D-ov	51	15
	M±m	49,5±	16,3±2,1

Observation group

nn	Full name	NPT, points	Neuroticism
1	Sh-va	49	4
2	T-ak	41	5
3	M-va	42	8
4	V-na	44	11
5	K-ev	42	6
6	K-iy	45	8
7	K-ov	41	6
8	K-in	41	6
9	D-ko	40	9
	M ±m	*42,6 ±2,3	*7±1,9

Note: * - significant differences from the control group at $p<0.05$.

The questionnaire survey and polling results suggested that the students who had mastered self-regulatory skills had become more confident, took a deeper interest in the majors, and tended to more advanced studies. A poll of five student cohorts found that the respondents had lower overall vulnerability to diseases, and developed better mood, better health, improved relationships with their family members and friends, a sense of unity with the nature, and higher tolerance.

4 CONCLUSIONS

Teaching students psychophysical self-regulation techniques primarily teaches them to control their emotions. Overreactions are the most pronounced of all manifestations of emotions. Overreactions are caused by formation of a strong excitation focus in the brain, weakening inhibitory processes and disabling the control of subcortical impulses by the cerebral cortex. Mastering self-regulation techniques helps students to use emotion refocusing technique to cope with the state.

Literature data suggest that PPE not only normalize psychic functions but also produced a healthy effect on the body. PPE is indicated to boost immunity in those suffering from neuroses; doing PPE enhances reserve of doing motor tasks and improves motor skills that involve both narrow and wide amplitudes of vegetative nervous tone [10, 11].

Psychic self-regulation means and techniques are being used on an increasingly wider scale in teaching of children and teenagers. American scientists have justified the necessity of providing “pediatric mental health services” [12]. Psychophysical correction is of special importance to, e.g., children with hearing or visual impairment [7]. Various relaxation exercises to correct psychoemotinal state were also suggested by [13]. It was proven that stress was often accompanied by anxiety and depression [14], which also contributed to somatic disorders, complications, and worsened prognoses

[15], as well as impaired memory and attention [16]. Stress works not only on the physical but also on the cellular level, affecting, e.g., cerebral neurons [17].

Anyone can fall a victim to impulsive behavior, the fact that has become a matter of public concern in all countries. The time is ripe for embedment of a psychophysical security and self-regulation course into academic curricula to be a basis under the formation of adaptive behavioral patterns and social adaptation in students. Implementation of such educational programs would *improve* psychoemotional status of students, their confidence, creative capabilities, stress tolerance, and overall tolerance; and *reduce* temporary and general vulnerability to disease, amounts of psychosomatic disorders, overreactions to stressful stimuli, and minimize fatal accidents.

The results of out research suggest that classes that involve psychophysical self-regulation methods improve the functional level of the central nervous system, which, as many researchers believe [18] is one of the mechanisms that underlie prevention of stress onset.

More and more people have been falling victims to overreactions caused by extreme situations, a fact that has become a matter of public concern and is often attributed to inability to control emotions and behavior. Immunity to, e.g., verbal aggressions should be instilled into children at an early age. Psychophysical self-regulation techniques are manifold; using them, anyone can create a psychophysical security system tailored to their needs to provide successful social adaptation. The results of our research have proved that psychophysical security course embedded into academic curriculum has contributed to improvement of psychoemotional status of students, their good health, and tolerance.

ACKNOWLEDGEMENTS

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.0011

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