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COMPONENTS OF PSYCHOPHYSIOLOGICAL STATUS, DETERMINING THE SUCCESS OF STUDENTS IN CONDITIONS OF EDUCATIONAL AND SPORTS ACTIVITY

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Key words: student athletes, dual-career, psychophysiological status, academic success, sports success, risk groups, attention deficit hyperactivity disorder.

Annotation. The purpose of the research was to study the components of students' psychophysiological status, which determine success in conditions of educational and sports activities. 183 full-time student athletes voluntarily participated in the research. Among the applied methods are the "Self-regulation style of behavior" questionnaire, the simple visual motor response (we analyzed the integral indicator "functional level of the system"), adaptive potential (according to R.M. Baevskij). It was determined that the success in the educational activity of students correlates with the analyzed indicators. The success of sports activity correlates at the average level with the neurodynamic component of the functional level of the system. A weak correlation was registered with the indicators of "self-regulation style of behavior" and adaptive potential.

Introduction. Educational process in physical culture universities and sports faculties allows active athletes to combine their sports career with higher education. In foreign publications, we find the term "dual-career", which is a process of achieving comprehensive development of talented and elite athletes, aimed towards their future role in a society when they end their sports career [1].

Recently, a number of scientific articles that study success both in educational and sports activity increased [1-10, 15]. Studies, presented abroad, reveal following topics according to their authors [1]: motivation and competence of student athletes in regard to academic and sports careers; dynamics, management and organizing dual-career, based on graphs of competitions and examination periods. There is also a need to reveal gender and age differences, taking into account specificity of the type of sports and the level of sports qualification [1].

The next research [2] also lays an emphasis on studying dual-career, since student athletes are exposed to stress factors (colloquiums, examination periods,

pre-competitive and competitive periods). A development of acceptable support mechanisms “can support to a positive adaptation to potential sources of stress” [2].

The systematic review [3], which shows parents’ opinion on dual-career, presents strategies of student athletes’ behavior. These are “linear”, “convergent” and “parallel” ways. In case of the linear way, student athletes are focused on the athletic career only; in case of the convergent way, sports career dominates over the academic one; the parallel is the most favorable for developing a member of society, since preference is given equally to both education and sports [3, p. 2].

Russian scientists, considering the analysis of results of psychological and sociological questionnaires, separated three groups of difficulties that student athletes face in the process of implementing dual-career, i.e. temporal, territory-based, difficulties in communication, cognitive and emotional difficulties [4].

Another group of researchers [5], which studied issues that student athletes of non-major universities face, lay an emphasis on the personalized approach, “in order to achieve maximum comfortable and high-quality combination of academic life and sports career” [5, p. 62].

In the scope of our subject, works, aimed at psychophysiological understanding of combining educational and sports activity are of interest. For example, some researchers [6] revealed gender differences in emotional stability. A following regularity was noted: students who complete tasks with high results demonstrate better values of psychophysiological parameters, compared to less productive students [6, p. 35].

Authors of the other scientific work [7] describe in detail the origin of the “sports success” term. Then, as a result of their experiment, they conclude the following: “success in sports activity is defined to a greater extent by the functional state and performance of the central nervous system (CNS), focus on success and acceptable level of situational anxiety. Therefore, in order to predict success in sports activity, it is important to note these indicators of individual psychophysiological potential [7, p. 108].

When forming the term “athletes’ success”, E.P. Il’in defined it as the “result of showing emotional and volitional qualities” [8].

When studying volitional regulation of sports activity, researchers discovered a contradiction: on one hand, there is a theoretical justification of relationship between personal and professional (sports) success, on the other hand – gaps in studies in the field of examining volitional aspect of student athletes [9].

While analyzing publications on selection criteria and biomedical support of children, talented in sports, we found contradictions in their “dual-career path”, a

solution for which can be found in case of “implementing observation with integral technologies of selection, diagnostics and support, based on a digital platform, at each stages of training the Olympic Reserve” [10].

All the aforementioned information defined a direction of this research, i.e. success in dual-career of student athletes.

The purpose of the research was to study the components of students' psychophysiological status, which determine success in conditions of educational and sports activities.

Methods and organization. The research was carried out in the Scientific Research Laboratory “Adaptation to Extreme Conditions” of the Ural State University of Physical Culture, in the Department of Physiology.

Students of the second and third year, studying in the Ural State University of Physical Culture, voluntarily participated in the research (n=183). The participated students combine active sports and educational activities, study full-time, appropriately attend educational and training classes.

The survey was conducted in compliance with ethical requirements and hygienic conditions [11]. In order to carry out reliable measurements, a prepared expert provided briefing on the test and explained the point and value of the research.

Among implemented methods are the “Self-regulation style of behavior” questionnaire (Morosanova et al, 2000) [12], simple visual motor reaction, obtained using the NS-Psycho-Test hardware and software complex (Neurosoft, Ivanovo) [13] and calculation of adaptive potential (R.M. Baevskij) [14].

In the course of monitoring studies, we also implemented methods for assessing psychophysiological indicators that were compared with individual results of academic success and achievements in sports.

Academic success was assessed according to the grade average of the examination period. Results of sports competitions were transferred to points: 1 point – participating in competitions without getting a prize place, 2 points – participating in competitions and getting a prize place, 3 points – participating in competition, getting a prize place and upgrading sports qualification. We did not consider sports qualification and area of study of students.

We used the Jamovi program to process statistically the obtained data. In particular, the main instrument of analysis was descriptive statistics. Significance of differences was identified with the Mann-Whitney U-test.

Results and discussion. The psychodynamic component of the psychophysiological state was analyzed with the “Self-regulation style of behavior” questionnaire. Results, demonstrated in the figure 1, show a balanced profile of the self-regulation style of student athletes' behavior. The analyzed

features of regulatory processes were mainly within a range of average and high values.

The results obtained show a level of maturity of regulatory psychological capabilities of students as a specificity of important qualities in educational and sports activity.

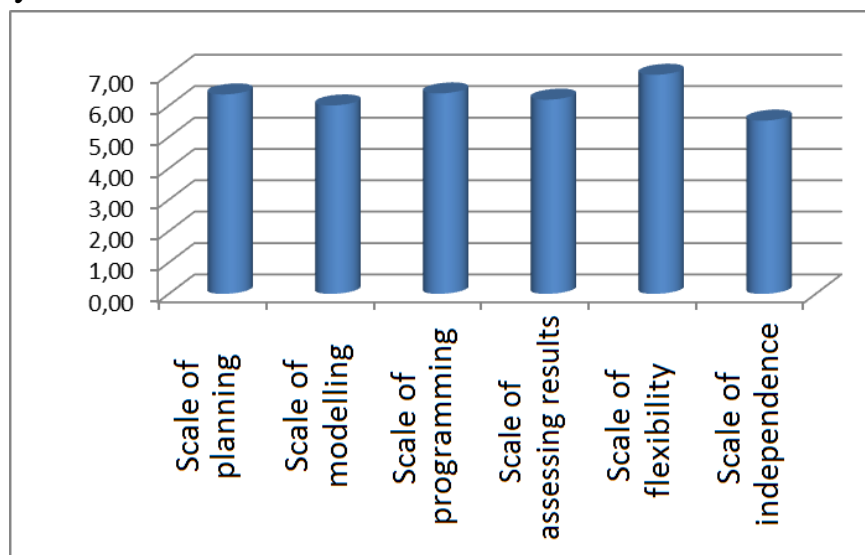


Fig. 1. Mean values of the level of self-regulation style of students' behavior in conditions of educational activity (X-axis – the questionnaire's scales, Y-axis – points)

A total level of self-regulation of student athletes amounted to 32,12 points, which corresponds to an intermediate result (from average to high) and demonstrates features of an individual system of self-regulation of students' behavior. It was established that 53,6% of students have a high level of self-regulation, 34,9% – mean level, 11,5% – low level (fig. 2).

The neurodynamic component of the psychophysiological state was assessed with the functional level of the system (FLS, c.u.), the integral indicator of the simple sensorimotor reaction. It was revealed that mean values of these indicators are within the range of low values, which indicates stress of the central nervous system. It is known that exposure to external effects is primarily evidenced in the CNS's functional state.

Distribution of examined students, according to the functional level of the system (fig. 2), demonstrated that 39,3% of students have the low functional level, 55,4% – the mean level, 5,3% – the high level.

The energy component of the psychophysiological state was analyzed using the integral parameter of the blood circulation system – adaptive potential (AP). Distribution of students according to AP levels (fig. 2) indicates a predominant satisfactory adaptation in most students – 68,3% ($p > 0,05$). Stress of adaptation was registered in 26,2% of students, 5,4% of students were characterized by unsatisfactory adaptation and its failure.

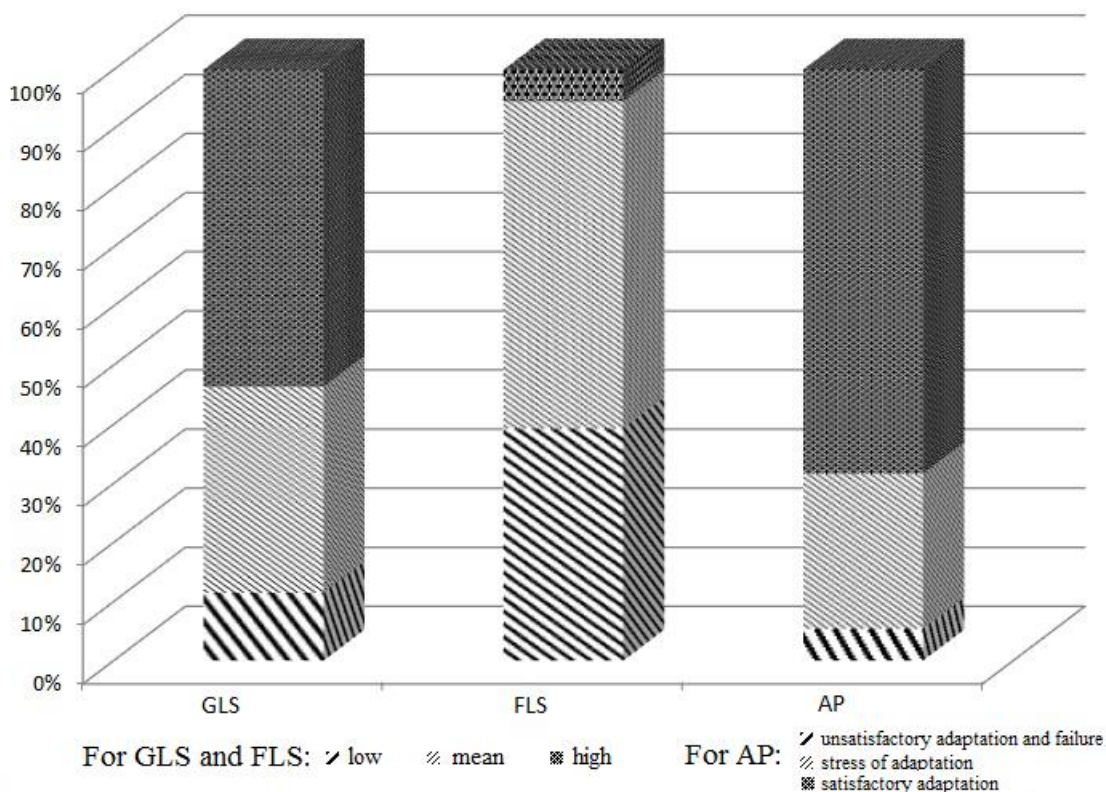


Fig. 2. Distribution of student athletes according to components of the psychophysiological state (%)

The next task of the research was identifying relation between components of the psychophysiological state and success of educational and sports activity of students. To solve the set task, we conducted correlation analysis of relations between analyzed parameters.

Table 1 shows correlation indicators of success in educational and sports activity with components of the psychophysiological state of students. It was established that for educational activity there is a high level of relation with components of self-regulation style and AP, the FLS parameter has a mean level of correlation. For sports activity, self-regulation style and AP have weak correlation, FLS – average correlation.

Table 1
Correlation between indicators of success in educational and sports activity with components of the psychophysiological state of students

Indicators	Educational activity	Sports activity
Self-regulation style of behavior	-0,99	0,06
FLS	0,66	0,74
AP	0,98	0,19

Therefore, the developed adaptive mechanisms of the psychological component show a strategy of students' behavior and support to favorable reactions of the energy component of adaptation in dual-career conditions.

However, as it was established in the course of the research, the neurodynamic component of the psychophysiological state demonstrates a degree of loads in these conditions.

Correlations approved a significant role of the psychological component according to the self-regulation style indicator, of the energy component according to the AP indicator and an average effect of the FLS indicator on success in educational activity of students.

Success in sports activity correlates on an average level with the FLS indicator, a weak correlation is registered with the “self-regulation style of behavior” and AP indicators.

Scientific works present various approaches to study psychophysiological correlates of success in sports [7, 16] and academic activity [6]. Results of the research prove that the “self-regulation style of behavior”, which contributes to an adequate function of the energy component of the psychophysiological state, forms, and the neurodynamic component due to its significance for academic and sports activity, shows stress of the functional level of system.

We established earlier that in the selection of student athletes, there are 8,7% students with signs of the attention deficit hyperactivity disorder (ADHD) [16]. Neurophysiological features of students with ADHD signs define a specificity of adaptive mechanisms and correlation significance of the physiological state’s components in a support of academic and sports success. We also planned to study this hypothesis in the future.

Conclusion. Relevance of the research is due to a development of student sports as a top-priority state task of national projects. In order to conduct scientific and methodological support of student sports, theoretical and fundamental studies on adaptive mechanisms and identification of success predictors are needed when combining academic and sports activity.

In this research, in terms of dual-career, we justified components of the psychophysiological state of student athletes in conditions of sports and academic activity. We also established an uneven distribution of adaptive loads between the psychophysiological state’s components.

We identified significant correlations between studied components of the psychophysiological state and success in academic activity. There is an average correlation between success in sports activity and indicators of the FLS’s neurodynamic component of the psychophysiological state.

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