

Вестник психофизиологии. 2023. № 2. С. 65.-68  
*Psychophysiology News. 2023. No. 2. P. 65-68*

Краткое сообщение

УДК: 159.91

doi: 10.34985/b4846-1018-7772-s

## СИНЕРГЕТИЧЕСКИЙ ЭФФЕКТ ПСИХОФИЗИОЛОГИЧЕСКОГО СОСТОЯНИЯ КОМАНДЫ КАК ПРЕДИКТОР УСПЕШНОЙ СПОРТИВНОЙ ДЕЯТЕЛЬНОСТИ

Александра Анатольевна Банаян<sup>1</sup>, Наталья Евгеньевна Водопьянова<sup>2</sup>

<sup>1</sup> Санкт-Петербургский научно-исследовательский институт физической культуры, Санкт-Петербург, Россия

<sup>2</sup> Санкт-Петербургский государственный университет, Санкт-Петербург, Россия

<sup>1</sup> abanayan@spbniifk.ru, ORCID 0000-0002-9934-5919

<sup>2</sup> vodop@mail.ru, ORCID 0000-0001-9645-6018

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Short message

## SYNERGETIC EFFECT OF THE PSYCHOPHYSIOLOGICAL STATE OF THE TEAM AS AN EXCELLENCE SPORT PERFORMANCE PREDICTOR

Alexandra Anatolievna Banayan<sup>1</sup>, Natalia Evgenievna Vodopyanova<sup>2</sup>

<sup>1</sup> Saint-Petersburg Scientific-research Institute for Physical Culture, Saint-Petersburg, Russia

<sup>2</sup> St. Petersburg State University, Saint-Petersburg, Russia

<sup>1</sup> abanayan@spbniifk.ru, ORCID 0000-0002-9934-5919

<sup>2</sup> vodop@mail.ru, ORCID 0000-0001-9645-6018

**Abstract.** The article presents the experience of using the gas-discharge visualization method to determine the psychophysiological state of athletes from two teams before a joint match. The planning of psychological preparation and carrying out targeted measures, based on individual typological characteristics of athletes, contribute to higher average values of the integral indicator of psychophysiological readiness of the entire team is shown. This fact confirms the presence of a synergistic effect as predictor of an excellence sport performance at the level with statistical significance  $p < 0.0005$ .

**Keywords:** elite sports, GDV method, sport psychology, psychophysiological state, monitoring of training loads

**Ключевые слова:** спортсмены высокой квалификации, метод ГРВ, спортивная психология, психофизиологические состояния, мониторинг тренировочных нагрузок

There is a lot of evidence about the influence of psychophysiological states on the effectiveness and reliability of sports activity in the works of domestic scientists A. C. Puni, E. P. Ilyin, A. V. Alekseev, G. D. Gorbunov, V. A. Taymazov, Ya. V. Golub, N. E. Vodopyanova, A. O. Prokhorov. In their research, authors shows that the psychophysiological state of an athlete depends on a large number of external and internal factors, which in turn determines the effectiveness of his performance. Thus, the quality of sports activity can be affected not only by the emotional exhaustion of the player, poor nutrition, overtraining at the preparatory stage for responsible competitions, but also by factors seemingly unrelated to his professional activity, such as troubles in his personal life, etc. [2]. Therefore, even elite athletes have unsuccessful performances. This fact is of particular importance in team sports, where the effectiveness of the

entire team is largely determined by the unity of all its members. Including the level of their psychophysiological state in the context of the synergetic effect formation.

In his monograph "Psychophysiology of human states", E. P. Ilyin notes that "... when it comes to functional states, it means the level of functioning of a person as a whole or his individual functional systems (sensory, intellectual, motor), and when it's goes about a mental state, that means qualitative specifics (modality of experiences) a person's response to a particular situation (without taking into account the level of functioning). But, since in reality, both level and modality characteristics are combined in mental states, then we should be talking about psychophysiological states" [5, p. 11].

The problem of diagnosing methods of athletes' conditions is very relevant. They should not be only reliable, valid, but also fast to use, considering the sports training schedule intense. The survey methods used are not able to provide objective data, since they are focused on a persons' subjective assessment of his condition. And biochemical studies suggest invasiveness (blood sampling), which can have a negative impact on the athletes' emotional state. Along with survey and biochemical methods, hardware methods aimed at determining the functional state of individual systems, departments and organs are currently being actively used [6; 7]. The most promising methods are based on measuring the psychoenergetic component of the athletes' psychophysiological state to determine the characteristics of the of athletes' organism adaptation to various external training conditions, including high altitude, and to carry out the necessary corrective measures in a timely manner [4]. One of them is the method of gas-discharge visualization (GDV) [4; 3], the advantages of which are ease of use, high expressiveness and non-invasiveness, the absence of negative effects on the athletes' psycho-emotional state.

#### Research methods

The current state of psychophysiological readiness for sports activity was assessed on the basis of an integral indicator (IP) using the GDV method according to the methodology developed by the author by means of a digital bio electrographic software and hardware complex "Bio-Well" [1]. The application of this method is based on the psychophysics principles, stating the intimate connection of physiological and bioenergetic athletes' states with their feelings, emotional and volitional experiences, motivation and consciousness states [2]. This measurement method takes less than one minute to take readings from one person and allows to determine the energy potential and the level of stress background, which together characterize the psychophysiological state of a person - an integral indicator. The energy potential indicator is measured in Joules ( $\times 10^{-2}$ ) in the range from 0 to 100 J ( $\times 10^{-2}$ ) and characterizes the level of a person's energy reserve (values above 70 are favorable). The stress background indicator reflects the level of anxiety, physiological stress and is measured in conventional units from 0 to 10, where 10 units correspond to the maximum level of stress background and are characterized as unfavorable. The values of the integral indicator of the psychophysiological state (IP) above 20 J ( $\times 10^{-2}$ ) are assessed as favorable.

#### Research results

In order to confirm the synergistic effect presence of the current athletes' psychophysiological state and its influence on the effectiveness of team competitive activity, we compared the average IP values of two para-hockey teams before their joint match. The game was held at a training event on the seventh day after the first microcycle between the experimental Team 1 and the control Team 2. It should be noted that in Team 1, while the training event, group and individual sessions were held during the psychological preparation of players according to the program developed by the authors based on the identified individual typological characteristics of the players and daily monitoring of IP [3]. In the first microcycle, tests of the physical fitness of athletes and technical and tactical skills were carried out. Large volumes and high intensity of the training process led to a significant decrease in the integral indicator values of the players' psychophysiological state ( $< 0$  J ( $\times 10^{-2}$ )), while the planned psychological preparation and rehabilitation measures contributed to successful recovery during the night rest, which indicated an adequate response of athletes' organisms for training loads. Group sessions on psychological

preparation during this period were aimed at building confidence in recovery after physical and psycho-emotional stress. The author's suggested rest program was used, aimed at developing and improving the skills of mental self-regulation, relieving psycho-emotional stress, increased anxiety and improving concentration. In the second half of the microcycle, the loads gradually decreased; group psychological training sessions were aimed at building combat confidence. The sixth day was a day off and was completely devoted to recovery activities, which allowed the athletes to effectively recover by the seventh day, when the control game took place. The value of the integral indicator of the psychophysiological state of the players of the experimental team increased to the average level ( $1.87 \text{ J} (\times 10^{-2})$ ).

In the control team, psychological preparation was not carried out in the training process.

On the day of the match, measurements of the current psychophysiological state were carried out before the start of the players from both teams. The players from team 1 had higher values of IP with less variability compared to the players from team 2. As a result of comparing the average integral indicator values of the current psychophysiological state in the two teams, a statistically significant difference was found at the level of  $p < 0.0005$  (Fig. 1 and Table 1).

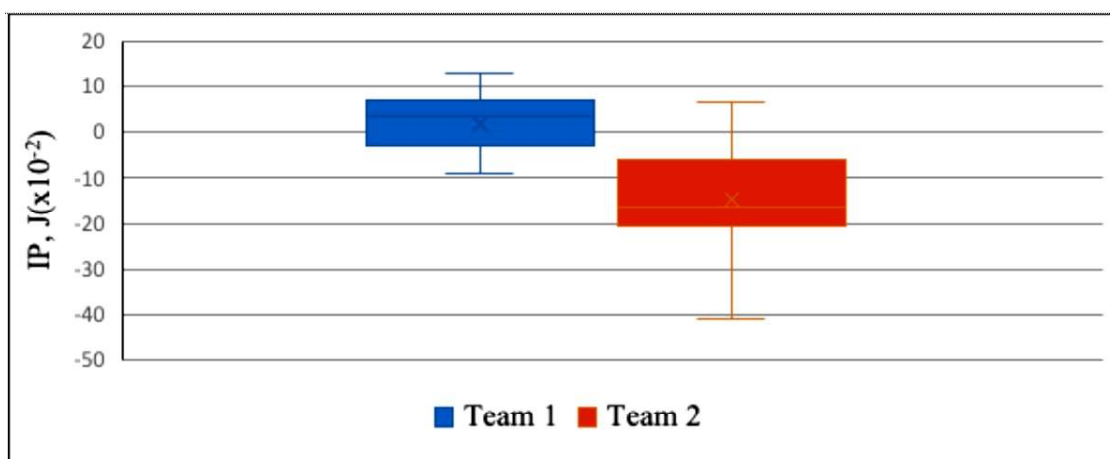


Fig. 1 - Comparison of the average values of the integral indicator of the current psycho-physiological state of the players of the two teams before the joint match

The friendly match between the experimental and control teams ended with a score of 3:1 in favor of team 1. Thus, the confirmation of the presence of a synergistic effect of team interaction and its influence on competitive activity was obtained. Namely, higher values of the indicator of the current psycho-physiological state of the players of team 1 corresponded to a higher playing efficiency.

Table 1 - Comparison of the average values of the integral indicator of the current psychophysiological state of players in two teams before a joint match

Index	Team 1 (n=16)	Team 2 (n=11)	Level of statistical significance, t-Student
$IP_{av}, M \pm \sigma, J(\times 10^{-2})$	$1,9 \pm 6,8$	$-14,7 \pm 14,6$	0,0005

### Conclusions

The results of the study showed the following:

1. The GDV method is an effective tool for monitoring the athletes' current psychophysiological state to control and correct training loads (in terms of magnitude, intensity,

volume), as well as timely implementation of measures to optimize the states of psychophysiological readiness;

2. The data of express-assessment of the psychophysiological state before a sports competition by the gas-discharge visualization method allows to determine the team interaction synergistic effect with a high degree of probability;

3. The level of the team psychophysiological state is a predictor of the success competitive activity and a prognostic indicator of the sports competition outcome.

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Статья поступила в редакцию 08.03.2023; одобрена после рецензирования 14.04.2023; принята к публикации 01.06.2023.

The article was submitted 08.04.2023; approved after reviewing 14.04.2023; accepted for publication 01.06.2023.

Заявленный вклад авторов: все авторы сделали эквивалентный вклад в подготовку публикации. Авторы заявляют об отсутствии конфликта интересов.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.