



Psychophysiological characteristics of cybersportsmen during intense game activity

UDC 796.334.2

Yu.A. Karvounis¹

N.A. Karvounis¹

PhD, Associate Professor **Yu.G Kalinnikova¹**

Dr. Med., Professor **L.V. Kapilevich¹**

¹National Research Tomsk State University, Tomsk



Corresponding author: juliakarvounis@gmail.com

Received by the editorial office on 16.05.2023

Abstract

Objective of the study was to conduct a comparative analysis of the psychophysiological characteristics of cybersportsmen and unprepared persons during intense gaming activity.

Methods and structure of the study. A comparative analysis of the psychophysiological characteristics of e-sportsmen and unprepared persons during intense gaming activity was carried out. In total, 40 athletes took part in the work, 20 of them are cybersportsmen and 20 athletes of various sports, who are students of the Faculty of Physical Education of the National Research Tomsk State University. The study was aimed at the primary assessment of the stress resistance of athletes and the specifics of their reactions in order to predict and further prevent the "tilt effect".

Results and conclusions. According to the psychophysiological study, cybersportsmen showed a low level of anxiety and lack of discomfort, which is explained by their presence in their own environment, while beginners were partially unstable and felt anxiety and discomfort. According to the test for noise immunity, a fairly high level of the average reaction time of cybersportsmen was established, but a large number of errors were also revealed, primarily errors of lead.

The inclusion of psychological practices in the training regimen will also reduce the level of stress among esports athletes and will allow developing individual methods for getting out of the "tilt effect" state for each athlete.

Keywords: *cybersport, digital sports, psychophysiology, stress.*

Introduction. The modern era of digitalization of society dictates new formats for the implementation of all spheres of human life. Sport, as one of the important components of social interaction, does not remain aloof from these changes. Recently, more and more attention is paid to sports with the use of the latest technical means and the inclusion of elements of digital reality in sports and training activities [1, 3]. An example characterizing these trends is the International Multisport Tournament planned for February 2024 in the concept of digital "Games of the Future", which will be held in Kazan. The concept of digital in a generalized sense refers to the unification of competitive activity in the physical and digital dimensions [2, 4]. Competitions of the new format actualize for science and practice a lot of issues related to the training of cyber - and digital - athletes [5, 6].

Objective of the study was to conduct a comparative analysis of the psychophysiological characteristics of cybersportsmen and unprepared persons during intense gaming activity.

Methods and structure of the study. The work represents the first preparatory stage of an interdisciplinary study of digital sports activities. This stage was implemented from September to December 2022 at the National Research Tomsk State University, with the involvement of teams of e-sportsmen of the city and students of the Faculty of Physical Education of this educational institution. In total, 40 athletes took part in the study, 20 of them are e-sportsmen and 20 athletes of various sports, who are students of the Faculty of Physical Education of the National Research Tomsk State University. At the same time, the students were offered to master gaming activities similar to eSports for the duration

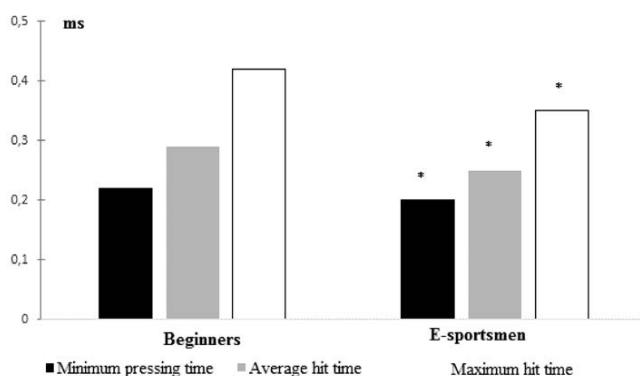


of the experiment, and further in the work they will be designated as "beginners".

It should be noted that in the absence of experience in e-sports, the subjects of this group were all active athletes of various sports, such as football, athletics, swimming, and others. Differentiation by sport and gender were not considered at this stage. The age of all participants corresponded to the period from 18 to 22 years.

One of the central tasks of the research stage was identified - the search for solutions to prevent such a condition as the "tilt effect", which is most often manifested in team cyber and digital sports disciplines. The very concept of "tilt" is now part of the slang in eSports, borrowed from the language of poker players. In the future, a theoretical study of this definition is required; at the time of the study, we adopted the terminology "tilt effect" to denote the considered state of the player. In the team disciplines of digital sports, victory equally depends on each of the players. A mistake by one of the participants can lead to the fact that other members of the team begin to follow the actions of the allies, and not their own game. First, emotions capture the e-sportsman, and then the "tilt effect" makes him focus too much on details and specific actions. The course of the game does not fit into the framework of prepared plans, causes a negative reaction from the player, additional resources are spent in order to build a new strategy of behavior. All this greatly affects the performance of the game.

This study was aimed at the primary assessment of the stress resistance of athletes and the specifics of their reactions in order to predict and further prevent the "tilt effect".



The results of the test "pressure reaction"

* – significant difference between groups, $p < 0.05$

As the main methods, three standard training tests of e-sportsmen were used: exactaiming, flickaiming, press reaction and their indicators were studied. The selected set of neurophysiological studies was aimed at identifying the differences between professional e-sports athletes and athletes "beginners" of e-sports. Techniques such as the Luscher test, tapping test, noise immunity tests, and simple visual-motor reaction were used.

Results of the study and their discussion. According to the results of tapping testing, the beginners were found to have a pronounced weakness of the nervous system, while the performance of e-sportsmen was better. At the same time, the average number of strokes among the respondents differed slightly. According to the results of testing a simple visual-motor reaction, a higher speed of sensorimotor reaction was observed in e-sportsmen, but a slightly lower level of functionality. In our opinion, this may be due to the depletion of reserves for excessive fussiness in some actions. The test "flickaiming" allows you to evaluate the speed of hand movement with a reverse return to the point of origin of movement. The respondent must hit the target and return with the cursor to the center of the screen.

Based on the results of testing, it was found that e-sportsmen have a fairly high rate of hitting a target and a high percentage of hits, but the number of misses and losses of targets remained high. This is due to the rather high speed of response to the appearance of targets, but not sufficient accuracy of its destruction.

The next test was precision aiming, where you need to hit an increasing target that can appear anywhere on the screen. As a result, a high level of misses among professionals was confirmed with a fairly high speed of hitting targets.

In the "pressreaction" test, the speed of pressing the buttons of a computer mouse is calculated when a target suddenly appears, and cybersportsmen also showed a high level of response in it (see figure).

According to the psychophysiological study, cybersportsmen showed a low level of anxiety and lack of discomfort, which is explained by their presence in their own environment, while beginners were partially unstable and felt anxiety and discomfort. According to the test for noise immunity, a fairly high level of the average reaction time of cybersports-



men was established, but a large number of errors were also revealed, primarily errors of lead.

Conclusions. Based on the results of the study, the main hypotheses about the behavior of cyber-sportsmen in the framework of the training process were put forward. Recommendations were given on the further development of the training process, namely the inclusion of additional means of physical activity in the training regimen, such as table tennis, basketball, aerobics, and training using VR technologies. The inclusion of psychological practices in the training regimen will also reduce the level of stress among esports athletes and will allow developing individual methods for getting out of the "tilt effect" state for each athlete. Adding new methods to the further stages of the study, such as oculography (eye tracker), photoplethysmography (assessment of the level of anxiety and stress), EEG (synchronization within the team), CIG (excessive reaction tracking) will significantly improve the training process of cyber and digital athletes and increase efficiency application and accuracy of diagnosing the upcoming "tilt effect".

The study was supported by the Development Program of Tomsk State University (Priority 2030).

References

1. Karvunis Yu.A., Karvunis N.A., Kapilevich L.V. Sravnitel'naya otsenka sportivnoy deyatelnosti v realnom i virtualnom prostranstve [Comparative evaluation of sports activity in real and virtual space]. *Teoriya i praktika fizicheskoy kultury*. 2022. No. 11. pp. 40-42.
2. Pleshakov V.A. 13 pozitsiy kompendiuma fidzhitelnosti v sporte. *Sovremennyye tendentsii, problemy i puti razvitiya fizicheskoy kultury, sporta, turizma i gostepriimstva* [13 positions of the compendium of figurativeness in sports. Modern trends, problems and ways of development of physical culture, sports, tourism and hospitality]. *Proceedings International scientific-practical conference*. Moscow, 2022. pp. 20-24.
3. Al-Badri M.T., Hussein H.M., Abdel-Jubouri A.H. The Effectiveness of Digital Sports Communication in Mental Motivation and Some Volleyball Skills For Female Students. *Indian Journal of Forensic Medicine & Toxicology*. 2021. 15(3). pp. 4777-4781. doi.org/10.37506/ijfmt.v15i3.16205.
4. Margret R. Hoehe & Florence Thibaut Going digital: how technology use may influence human brains and behavior, *Dialogues in Clinical Neuroscience*. 2020. 22:2. pp. 93-97.
5. Sandhya U., Graham B., Fraser O.D., John R., Scott O.D. Efficacy of a Digital Sports Vision Training Program for Improving Visual Abilities in Collegiate Baseball and Softball Athletes. *Optometry and Vision Science*. 2021. 98(7). pp 815-825, DOI: 10.1097/OPX.0000000000001740.
6. Yüce A., Aydoğdu V., Yüce S., Katırc H. Phytically Yours: Examination of Virtual Reality Experiences in Digital Sports and Recreational Games. *Jurnal The Messenger*. 2011. Vol 13 (1). DOI 10.26623/themessenger.v13i1.2481.