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# RESEARCH AND EVALUATION OF INDIVIDUAL PSYCHO-PHYSIOLOGICAL PROPERTIES OF GAME INTELLIGENCE OF FOOTBALL PLAYERS

*"Intellect" computer program for research and evaluation of psychophysiological properties of game intelligence of football players have been theoretically grounded, developed and experimentally tested. Its essence is that the football player was offered cognitive tests on processing information of varying degrees of complexity on a computer. The following psychophysiological properties of football players' game intelligence have been determined: information perception time (PT), speed of solving one ($SST_1$) and two ($SST_2$) of three alternative tasks, maximum switching speed (MSS) of complex motor actions, intellectual productivity (IP), predictability (IPred) and task performance accuracy (TPA). Scales of evaluations of qualitative and qualitative psychophysiological characteristics of intellectual tasks have been developed. The statistically significant correlations of the psychophysiological properties of intelligence of IP, MSS, IPred and $SST_2$ with expert evaluations of football players' game activity have been determined. A method of determining the coefficient of psychophysiological properties of game intelligence of football players and its quantitative values has been proposed.* ***The results*** *of the study using the proposed "Intellect" computer method and the criteria for evaluating the psychophysiological properties of the game intelligence of football players will help in solving theoretical and practical issues of training and competitive activities.*

***Keywords:*** *game intelligence, psychophysiological properties, football players, expert evaluation.*

In the last decade, research aimed at creating artificial intelligence has intensified [1]. The world has seen significant progress in the creation of intelligent Chat Generative Pre-trained Trans

systems, ChatGPT, an open model of AIs GPT-3, which is a vivid example of such progress. Artificial intelligence systems began to be used in physical education and sports [2]. However, in various kinds of sports, achieving high sports results is possible not only due to physical, functional, technical and tactical capabilities and the manifestation of willpower, but also through the realization of psychophysiological, not artificial intellectual properties of sportsmen [3, 4, 5]. Therefore, the educational and training process must be directed to improving the intellectual capabilities of sportsmen [6, 7, 8]. V.N. Platonov [3] notes that intellectual training should be aimed at ensuring the sportsman's creative analysis of the educational and training process and competitive activities.

Specialists believe that the main type of training in game sports is special intellectual training, which should include theoretical, psychological special-practical components, as well as components of thinking and logic, formation of techniques of mental activity, abstraction and generalization [9, 10]. Indicators of intellectual training can be such psychophysiological properties as: analysis, synthesis and comparison; inductive and deductive conclusions, as well as understanding, assimilation of connections and relations, formation of concepts, classification and systematization of knowledge [11, 12]. It should be emphasized that the processes of perception, analysis, comparison, generalization and prediction effectively affect the quality of competitive activity. M.P. Pitin [10] points out that theoretical training, on the one hand, is an independent structural unit, on the other hand, it is a component of intellectual activity and forms the basis of special game activity.

Another aspect of a sportsman's intellectual training in game sports is the training of intellectual abilities as the highest degree of cognitive activity. The sportsman's intelligence is realized in the strategy he/she chose depending on the game role. Since football is the most popular game in the world, the constant changes in game tactics lead to the fact that the intellectual psychophysiological properties of the players must ensure quick and effective action in the game situation. So, there is an understanding that modern world-class football is an intellectual game that requires quick, specific game thinking in conditions of limited space and lack of time to adopt and successfully implement the most effective actions. Therefore, high-level competitive activity and preparation for it can be considered, first of all, as an intellectual duel of individual players, teams, coaching staffs [4, 13]. It is clear that this does not reduce, but on the contrary, increases the requirements for the level of technical, tactical, physical, psychological and other areas of football players' preparedness. That is why the founders of the concept of intellectual football [5, 14, 15] rightly considered intellectual training to be a promising direction of the future. The validity of this approach is confirmed by the fact that in recent years training of football intelligence and tactical training has become increasingly valuable and is spreading from children's and youth academies to the level of elite football players [16].

Concerning the psychophysiological properties of football players' intelligence, it should be noted that playing football forms cause-and-effect relationships, activates mental processes, improves thinking, develops memory, attention, accuracy, and perception [4, 11]. A football player constantly calculates the combinations that arise, plans and tries to play the game as best as possible, anticipates actions and hinders the opponent's plans. The understanding of the game essence is that football has a unique combination of elements of the game, scientific knowledge and, even, a kind of art. The sportsman's attention is constantly in close connection with thinking [9]. Specific psychophysiological properties of the intelligence of football players can be components of mental activity that include separate components that are not inherent in other sports. They include the principles of the organization of educational and cognitive activities, the peculiarities of the means and methods of sports training aimed at the development of intellectual properties, the formation of knowledge and skills of playing a competitive game, the use of modern information technologies (video films, computer games, GPSport systems). The authors [4, 17] studied the mechanisms underlying successful decision-making in football players of various qualifications. It was found that the analysis of visual search did not reveal differences in football players of different qualifications. While the use of the Brain Kinetic training method has a positive effect on the intellectual properties of football players and increases the result of the game. It should

also be noted that some foreign specialists share the opinion regarding the connection between agility and intellectual abilities, in particular, the speed of visual perception and prediction [4, 5, 7]. Another part of specialists limits the ways of development and understanding of the essence of agility, in particular, in football, only by the speed of movements of the whole body with a change of direction in response to a certain stimulus [18].

It should be noted that an important factor for football players is spatial intelligence, as the ability to quickly perceive visual and spatial information, modify it and reproduce and construct images. This is nothing but the ability of football players to see the field, read the game situation, model and calculate the future most effective individual or team actions in attack and defense [19]. Therefore, the connection of spatial intelligence with the player's tactical thinking is a relevant issue.

In addition, body-kinesthetic intelligence, according to specialists, is a property of the player that allows the use of all parts of the body when solving a motor task [5, 6, 7, 19]. Football theorists and practitioners are convinced of the unity of bodily-kinesthetic and spatial types of intelligence in players. Therefore, game intelligence of a football player can be represented as a complex psychophysiological property, which is a synthesis of bodily-kinesthetic and spatial types of intelligence of the player, the level and manifestations of which allow solving technical and tactical tasks of varying complexity in conditions of strictly limited space and time. In the study of Bondarenko S.V. [19], it is emphasized that the situation we have in domestic football encourages the search for new approaches to improving the intellectual training of football players. A reserve of football players' game intelligence can be emotional intelligence [20]. Emotional maturity of an individual, emotional intelligence, emotional-social intelligence, emotional competence, emotional stability, reliability, regulation, ensure the competitiveness of sportsmen during competitions [21, 22, 23].

Other authors [24] have analyzed modern research and believe that psychomotor properties, such as bodily-kinesthetic, emotional, volitional, communicative and moral, best determine the intelligence of a football player. The authors note that verbal-linguistic and kinesthetic properties prevail among different types of intelligence in the intellectual profile of sportsmen. The authors established the existence of a positive correlation between indicators of kinesthetic intelligence and indicators of emotional (EQ) and cognitive intelligence (IQ). Other researchers [25] indicate that the executive functions of the brain are innate mechanisms for regulating intellectual behavior and show how they are related to the ability to read the game and react quickly.

Thus, the analysis of the literature shows that among the intellectual properties of football players, it is necessary to highlight such psychophysiological properties as the speed of perception of the game situation and cognitive information, the speed of processing and making one, two or several correct decisions, the maximum speed of forming a program of actions and the ability to evaluate their implementation in complex game situations [8]. Besides, intellectual productivity is important for football players; it characterizes the sportsman's ability to solve cognitive tasks efficiently, with a small number of errors, during a long-playing time, at high speed. In addition, the ability to predict changes in the game situation and correctly and timely perform offensive and defensive actions is also important [9, 11]. Therefore, in connection with the above, the task of the study included theoretically substantiating and developing a methodology for research and assessment of individual psychophysiological properties of football players' game intelligence.

**Materials and methods.** To obtain experimental material of the intellectual psychophysiological properties of football players, we developed a computer complex and the "Intellect" program package with a control panel for the patient and keys for the left and right legs of the football player placed on it.

Guided by the principles of the Helsinki Declaration and biomedical ethics and on the basis of informed consent, 52 professional football players aged 24.1±0.9 years were studied and evaluated for the individual psychophysiological properties of game intelligence.

In this study, we focused on the development of the "Intellect" computer complex with a foot control panel. The methodology made it possible to investigate and evaluate the intellectual psychophysiological properties of football players. The study was conducted in two modes of

"optimal rhythm" and "feedback". In the "optimal rhythm" mode, the following intellectual properties were determined: information perception time (PT, ms), speed of solving one ($SST_1$, ms) and two correct tasks ($SST_2$, ms) of three alternative ones. Using the "feedback" mode, the diagnostics of speed and qualitative-quantitative intellectual properties was performed, namely: maximum switching speed (MSS, s) of solving complex visual-motor tasks, intellectual productivity (IP, number of signals), predictability (IPred, ms) and task performance accuracy (TPA, quantity). These tests determine and evaluate the psychophysiological properties of football players' intelligence and the ability of the higher parts of the brain to ensure the maximum possible pace for each player of a fast and error-free motor reaction with the legs to cognitive positive and braking signals.

The intellectual property PT was determined in a sitting position in front of a computer monitor, the subject's feet were placed on the remote control. The subject was offered the instruction: "When any signal (red, yellow or green) appears on the monitor screen, you need to press and release the key on the remote control as quickly as possible with your right foot". The average value of PT was recorded, as well as other statistical indicators: mean square deviation, error of the mean, coefficient of variation. To determine PT, 30 signals were used with an exposure of 0.7 s. The PT property was assessed by the average motor reaction time in ms. The shorter the visual-motor reaction time, the better the PT score.

To obtain the value of the psychophysiological property of $SST_1$, the subject was offered the instruction: "When a red signal appears on the monitor screen, you need to quickly press the right key with your right foot. Do not respond to other signals". The device registers and displays on the screen the average value of the time of $SST_1$ with the same indicators as when determining PT and indicates the number of false reactions. The property of $SST_1$ was assessed by the average reaction time of the response in ms. The shorter the motor reaction time of the choice, the better the result of $SST_1$.

To determine the intelligence property of $SST_2$, the football player had to perform the task with two legs. The subject was offered the instruction: "When a red signal appears on the monitor screen, you need to quickly press the key with your right foot. When the green signal appears, press the left key. Do not respond to yellow signals". The device registers and displays on the screen the same list of statistical indicators as in the previous modes. When determining the intelligence properties of $SST_2$ in both recent tests, we also presented 30 signals with an exposure of 0.9 s. The property of $SST_2$ was assessed by the average reaction time of the response in ms. The shorter the time of the visual-motor reaction of differentiating signals and motor action, the better the result of $SST_2$.

To determine the psychophysiological properties of the MSS to solve complex tasks, as well as the IP according to the indicators of speed, quality and quantity of information processing, the football players were examined in the "feedback" mode. In this mode, under the condition of performing a cognitive task, the exposure of the signal changed automatically depending on the nature of the subject's answers: after a correct answer, the exposure of the next signal was shortened by 20 ms, and after an incorrect one, on the contrary, it was extended by the same value. The fluctuation range of the signal exposure during the work of the subject was within 900-20 ms. The instruction for the subject under the condition of conducting examinations using this mode is the same as in the "optimal rhythm" mode with SST2.

The intelligence property of the MSS was evaluated by the time of the task. In our research, football players were presented with a cognitive task of 120 signals and the level of MSS was evaluated based on the performance result. The following indicators are displayed on the computer screen: the indicator of the level of MSS, the minimum exposure and the time to achieve it, the speed of correct answers for the right and left legs. The property of MSS was evaluated by the time it took to complete the task in seconds. The shorter the time required to complete the task of processing 120 signals, the better the result - MSS.

To determine the properties of IP, the football players performed tasks with their feet for 3 minutes. The total number of processed signals is a measure of the IP property evaluation. The result of the task performance was recorded on the screen: the number of processed signals, the minimum exposure and the time of exiting it, the percentage of correct answers for the right and left

leg. The property of IP was evaluated by the number of processed signals. The more the football player processed the signals, the higher the IP score was.

The properties characterizing the sportsman's ability to IPred and TPA were determined and evaluated as the timeliness and accuracy of motor reactions of the subject to an object moving at a constant speed. The football player's task was to predict when in space and time, it was necessary to press a key with his foot in order to stop an object moving as close as possible to a stationary marker. This version of the research methodology of IPred and TPA allows to register the movement responses of football players (in a given place and in time) to the movement of a moving object. The moment of movement of the object is set by the program. The number of trials after training was set by the experimenter (usually 30 trials, 2-3 series). The subject's reaction was considered accurate if the moving object deviated from the stationary marker within ± 5 ms and was an exact match. Before the start of the study, the subject was familiarized with the testing conditions. The subject was offered the instruction: "Press the key with your right (or left) foot, try to stop the moving object exactly against the stationary marker. Continue the test until the screen shows that "test completed". After performing the test, the indicators were displayed on the monitor screen: the number of accurate reactions, the number of reactions that were delayed and ahead of them, and their average time. The property of IPred was evaluated by the average time of deviation of motor acts in ms, and TPA by the total number of accurate reactions.

Statistical data processing was conducted using statistical packages for medical and biological research (SPSS, version 22, IBM, USA). The analysis of the studied indicators shows that their distribution differs from the normal one. Accordingly, in the further statistical analysis, non-parametric criteria were applied and descriptive statistics (mean and error of the mean) and the Wilcoxon test were used. Tukey's test with Bonferroni correction was used to determine significant differences ($p<0.05$) between mean values.

RESULTS. We used the study of PT, SST1, SST2, MSS, IP, IPred, TPA indicators to assess the individual psychophysiological properties of football players' intelligence. It was assumed that the successful mastery of the skills and abilities necessary for football and the effectiveness of the game would depend on these psychophysiological properties.

The value that was the smallest in the three tasks should be considered as an indicator of the PT property of an individual football player. The need to perform the same task three times is due to the fact that the most optimal and stable value of the PT indicator is achieved during the first three examinations. This approach to assessing the time of perception of intellectual information is determined by the results of the analysis of experimental data obtained on the same subjects who performed the same task several times (Fig. 1).

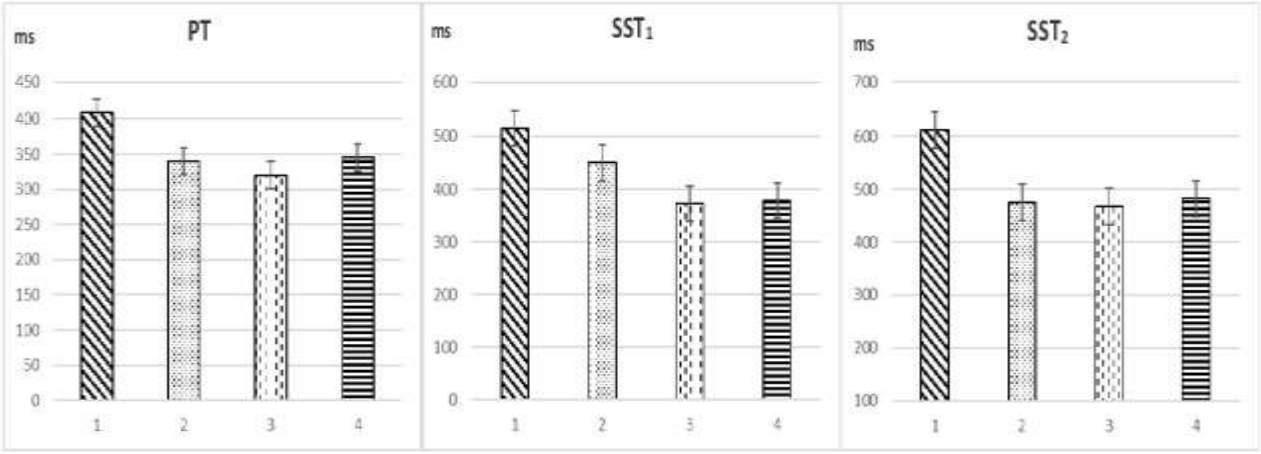


*Fig.1. Average values (x±SD) of motor reaction time indicators aimed at identifying the intellectual properties of PT, $SST_1$ and $SST_2$ of football players using the Intellect computer device: 1 – the first, 2 – the second, 3 – the third and 4 – the fourth examination.*

It was found that the time characteristics of PT, $SST_1$ and $SST_2$ stabilize and reach their optimal value, mainly during the first three examinations. Therefore, we recommend to use three repetitions of the same test in order to identify the individual psychophysiological properties of PT, $SST_1$ and $SST_2$, and to use the best result from three tests in order to evaluate these intellectual properties.

We have developed and proposed a scale for the quantitative and qualitative characterization of the psychophysiological properties of PT, $SST_1$ and $SST_2$. These psychophysiological properties have five gradations according to this scale (Table 1).

Table 1.

**Rating scales of the level of intellectual properties of information perception time, speed of solving one and two correct out of three alternative tasks in football players (n = 52)**

| *Property Level* | Studied Intellectual Properties | | |
|---|---|---|---|
| | PT, ms | $SST_1$, ms | $SST_2$, ms |
| *High* | ≤ 291 | ≤ 360 | ≤ 415 |
| *Above mean* | 292-314 | 385-361 | 439 – 416 |
| *Mean* | 333-315 | 411-386 | 475 – 440 |
| *Below mean* | 359-334 | 412-436 | 510 – 476 |
| *Low* | ≥ 360 | ≥ 437 | ≥ 511 |

The division into five levels was conducted on the basis of the results of processing a large number of digital arrays, considering the mean values of PT, $SST_1$ and $SST_2$. The values given in Table 1 can be used to evaluate the state of intellectual psychophysiological properties of PT, $SST_1$ and $SST_2$ of persons aged 9 to 45.

Determination of the football players' psychophysiological properties of the intelligence of MSS, IP, IPred and TPA was conducted according to the indicators of speed, quality and quantity of information processing in the "feedback" mode.

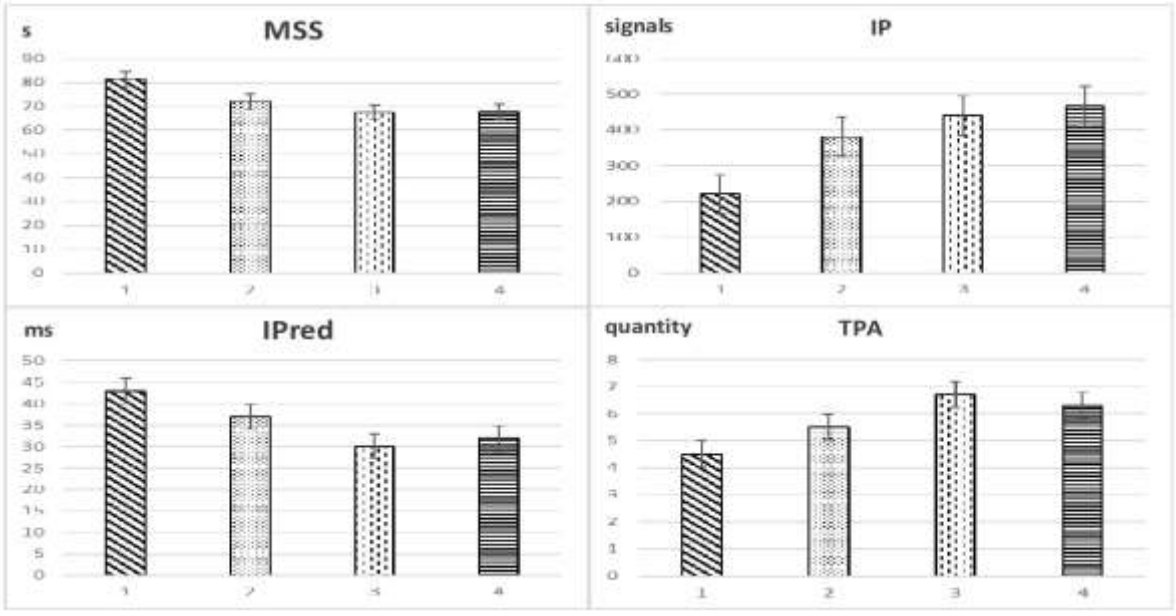


*Fig.2. Mean values (x±SD) of psychophysiological indicators aimed at identifying the football players' intellectual properties of the MSS, IP, IPred and TPA of on the "Intellect" device: 1 – the first, 2 – the second, 3 – the third and 4 – the fourth examination.*

It was found that psychophysiological indicators of MSS, IP, IPred and TPA stabilize and reach their optimal value in the first three examinations. Therefore, we can recommend using three

repetitions of the same test to identify the psychophysiological properties of MSS, IP, IPred and TPA. The best result from three measurements was used to evaluate the above-mentioned psychophysiological properties of football players' intelligence.

We have proposed rating scales that have five gradations (Table 2) for the quantitative and qualitative characterization of the intellectual properties of MSS, IP, IPred and TPA.

Table 2.

**Rating scales for the level of maximum switching speed, intellectual productivity, predictability and accuracy of task performance in football players (n = 52)**

| Property Level | Studied Intellectual Properties | | | |
|---|---|---|---|---|
| | MSS, s | IP, signals | IPred, ms | TPA, quantity |
| *High* | ≤ 60 | ≥ 570 | ≤ 20 | ≥ 10 |
| *Above mean* | 61 – 64 | 569 – 531 | 21- 25 | 8-9 |
| *Mean* | 65 – 68 | 500 – 530 | 26 -31 | 6-7 |
| *Below mean* | 68 – 71 | 499 – 451 | 32-36 | 4-5 |
| *Low* | ≥ 72 | ≤ 450 | ≥ 37 | ≤ 3 |

The division into five levels was conducted on the basis of the results of processing a large number of examinations and considering the mean values of MSS, IP, IPred and TPA for football players aged from 9 to 45.

Presented in this work, the research methods of PT, $SST_1$, $SST_2$, MSS, IP, IPred, TPA, as well as scales for evaluating the quality and quantity of information processing are used, first of all, to determine the intellectual psychophysiological properties of football players. Knowledge of individual psychophysiological properties can be used in various studies, including the study of the peculiarities of forming neurophysiological and psychomotor functions of football players. This, in turn, opens the way to understanding the biological basis of game activity and individual psychophysiological differences of football players.

To confirm that the investigated quantitative and qualitative indicators of the intellectual psychophysiological properties of PT, $SST_1$, $SST_2$, MSS, IP, IPred, TPA are related to the game activity of football players, we conducted its expert evaluation and developed an assessment scale. The coaches used a scale where 5 was the mean result, 1 – the lowest, and 9 – the highest value (Table 3).

Table 3.

**Expert evaluation of football players' game activity (n = 52)**

| N | Game Activity Level | Index of football players' game activity, scores |
|---|---|---|
| 1 | High | 9 |
| 2 | Above mean | 7 |
| 3 | Mean | 5 |
| 4 | Below mean | 3 |
| 5 | Low | 1 |

Experts, experienced coaches (6 people), found that 11% of football players (5 people) belonged to the group with a high level of game activity, 24% (17 people) had an above-mean level, and the majority of players – 57% (27 people) had the mean level. Four football players (8%) were assigned to the group with a below-mean level of game activity. The experts did not find football players with a low level of playing activity (1-2 points).

The conducted correlation analysis of the success of game activities with the studied psychophysiological intellectual properties of IP showed high values ($r = 0.38$; $p=0.034$). The

correlation coefficients were within the limits of statistical probability for MSS, IPred and $SST_2$ (respectively, r = 0.33; p=0.041, r = 0.31; p=0.047 and r = 0.30; p=0.049). Correlation coefficients did not reach the level of statistical significance with indicators of PT, $SST_1$, TPA of psychophysiological properties and expert evaluation of game activity (r = 0.23; p=0.071, r = 0.19; p=0.076 and r = 0.24; p= 0.059). This indicates that football players with a high and above-mean game activity score were characterized in most cases by high values of the studied psychophysiological intellectual properties of IP, MSS, IPred and $SST_2$. The study [25] also established a correlation between creativity and game intelligence of the football players, ability to rationality, problem solving and decision-making.

**Discussion.** In our study, the evaluation of game intelligence is based on the expert opinion of coaches and the psychophysiological properties of elite football players. The results show that football players with high values of psychophysiological properties of intellectual productivity, maximum speed of solving complex intellectual tasks, predictability and speed of solving two correct cognitive tasks out of three alternative tasks are also characterized by higher expert assessments of game intelligence. This strengthens our initial hypothesis that the game intelligence of football players consists of a complex of psychophysiological properties: (1) basic executive functions and (2) properties of a higher order. The first ones are responsible for the behavioural reactions of football players: reactivity, braking, control of obstacles, speed of information perception. They include the psychophysiological visual-motor properties studied by us: PT, $SST_1$ and TPA. The second ones, in elite football players, are related to solving complex tasks that include higher-order properties. They determine the speed, quantitative and qualitative characteristics of psychophysiological properties of the highest level: MSS, IP, IPred and $SST_2$. These intellectual properties that we have studied are fundamental for the successful game activity of football players. The importance of various components of the psychophysiological properties of game intelligence for football players is obvious, for example, braking movement for a feint or using working memory and attention to remember the location of the position of other players on the field, repeating previous combinations, constantly using scanning skills, programming new tasks, anticipating new strategic plans, to achieve a general level of stability due to high requirements for inhibition of reactions, as well as to constantly switch movements, to combine divergent and convergent creativity under the pressure of space and time, which requires a high level of cognitive flexibility [4, 22, 25]. We should mention that the morpho-functional basis of these executive functions and higher-level psychophysiological properties is the prefrontal and parietal cortex, which coordinately interact with the basal ganglia and specific neuromodulating systems of the brain [26, 27, 28]. Considering the above and the theoretical concepts of J. Guilford's intelligence [29], R. Sternberg's 'triple intelligence' [30], H. Gardner's 'multiple intelligence' [31], as well as the results of our research, we formulate theoretical approaches and propose a method of definition and assessment of integral indicator of football players' game intelligence according to the formula: IF = IP + MSS + IPred + $SST_2$. The maximum value of the individual indicator of game intelligence among football players was 33, and the minimum - 22 points. According to G. Vain [5, 6], high values of the game intelligence of a football player can characterize high indicators of motor learning and cognitive processes. This allows the football player to quickly perceive and correctly make game decisions.

We believe that based on the results of this test and theoretical ideas about the formation of neurodynamic properties, we can state that the properties of football players' game intelligence that we studied are determined not only by the psychophysiological characteristics acquired during training, but also by innate highly genetically determined properties of the higher parts of the brain and memory functions, thinking, perception and attention [32].

Thus, the presented results and data from the literature show that the criteria for the successful football activity can be not only indicators of the physical, technical, and functional readiness of football players, the playing role of players, body types, biological age, individual characteristics [33, 34, 35, 36], but the intellectual properties of the players are of particular

importance. It should be considered that individual psychophysiological intellectual properties are informative in terms of predicting the success of football players' game activities [4, 13, 37]. According to the results of our work, psychophysiological indicators of intellectual productivity, maximum speed of solving complex intellectual tasks, predictability and speed of solving two correct out of three alternative intellectual tasks correspond to such criteria. These psychophysiological properties are characterized by a strong and stable biological nature. According to the results of the study of game intelligence in a football player, prediction and decision-making play a decisive role [38, 39]. The ability of players to predict the intentions of opponents and make appropriate decisions depends on a number of processes related to perception and cognition [7]. Differences in tactical task performance are supported by differences in visual search strategy. Elite players are more likely to record shorter durations on more discrete and informative tasks than less experienced players. They also make more verbal reports, indicating a more developed subject-specific memory for the current game situation compared to less skilled players. Our results confirm and extend previous works [7] and emphasize the importance of perceptual-cognitive and spatial and kinesthetic processes [19]. In order to better determine the expectations and effectiveness of decision-making in football, correlations were established between indicators of kinesthetic intelligence and the properties of emotional (EQ) and cognitive intelligence (IQ) [24]. The results of comparing the data of the quantitative assessment of the effectiveness of game activity with a set of indicators of psychophysiological intellectual properties can be used in solving a number of practical issues of sports selection and scientific organization of the training process. The proposed method of research and evaluation of psychophysiological intellectual properties can be useful in solving issues when it is necessary to establish the influence of various factors of competitive and training activities on the functional state of the cortex of the large hemispheres of the brain. This applies to fatigue, exhaustion, rest, physical and mental stress, the action of various pharmacological substances, hypoxia or hyperoxia, temperature, emotions, etc. In all these cases, fluctuations in the level of IP, MSS, IPred and $SST_2$, in one direction or another, can be used along with their application to evaluate individual psycho-functional differences of players, as sensitive and objective indicators of the functional state of the sportsmen's body. This technique and packages of adapted programs on the computer, automation of experiments can bring a lot of new things to the results of examinations of the game intelligence of football players, significantly expand the possibilities of obtaining higher quality and diverse material.

**Conclusions.**

1. The innovative computer technique and program "Intellect" is theoretically grounded and proposed for determining individual psychophysiological intellectual properties of football players. Its high efficiency and reliability are demonstrated.
2. The Scales for evaluating the level of quantitative and qualitative psychophysiological properties of intelligence are presented; they can be used in the process of training and competitive activities of football players.
3. Statistically significant correlations between the expert evaluation of game activity and the psychophysiological properties of intelligence of the IP, MSS, IPred and $SST_2$ of football players are established.
4. The methodology and formula for determining the integral psychophysiological coefficient of the intellectual properties of football players are proposed.

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***Дослідження та оцінка індивідуальних психофізіологічних властивостей ігрового інтелекту футболістів***

*Теоретично обґрунтовано, розроблено та експериментально перевірено комп'ютерну програму «Інтелект» для дослідження та оцінки психофізіологічних властивостей ігрового інтелекту футболістів. Її суть полягає в тому, що футболісту пропонувалися когнітивні тести на обробку інформації різного ступеня складності на комп'ютері. Визначено такі психофізіологічні властивості ігрового інтелекту футболістів: час сприйняття інформації (СІ), швидкість розв'язання одного (ШР1) та двох (ШР2) з трьох альтернативних завдань, максимальна швидкість переключення (МШП) складних рухових дій, інтелектуальна продуктивність (ІП), передбачуваність (ІПпер) та точність виконання завдань (ТВЗ). Розроблено шкали оцінок кількісних та якісних психофізіологічних характеристик інтелектуальних завдань. Визначено статистично значущі кореляційні зв'язки психофізіологічних властивостей інтелекту ІП, МШП, ІПпер і ШР2 з експертними оцінками ігрової діяльності футболістів. Запропоновано методику визначення коефіцієнта психофізіологічних властивостей ігрового інтелекту футболістів та його кількісних значень.*

*Результати дослідження з використанням запропонованого комп'ютерного методу «Інтелект» та критеріїв оцінки психофізіологічних властивостей ігрового інтелекту футболістів допоможуть у вирішенні теоретичних і практичних питань тренувальної та змагальної діяльності.*

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