

## ORIGINAL SCIENTIFIC PAPER

# Psychological Readiness of Elite and Well-Trained Billiard Players for the Main Competitions of the Macrocycle

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## Abstract

Planning of integral preparation for athletes of national billiard teams should be carried out comprehensively, taking into account the level of psychological preparedness of players for the main competitions of the macrocycle. The aim of the study is to determine the model indicators of elite billiards players' psychological readiness for the main competitions of the macrocycle. Research methods: to analyse and generalize special scientific and methodological literature, surveys, psychological, pedagogical, methods of mathematical statistics. Results: our study allows us to determine the model characteristics of the athletes' psychological preparedness during competitive stress and to assess the billiard players' mental state before and after undergoing a course of autogenic training. The psychological parameters' dynamic of the billiard players' functional state such as "mental activation", "interest", "emotional tone", "tension" and "comfort", which significantly correlates with the special preparedness of athletes for the main competitions of the macrocycle. Scientifically substantiated indicators of balance function with and without visual control, productivity, stress resistance, volume of voluntary attention, efficiency of attention, and coefficient of motivational, volitional and typological component of elite athletes who show high sports results at main competitions of macrocycle. The obtained data allows to improve the psychological control system of athletes while taking into account their individual characteristics.

**Keywords:** *billiard players, psychological preparation, psychological preparedness, stressful situation*

## Introduction

Modern researchers recognize that nowadays worldwide society is under pressure from a systemic crisis, which manifests itself in a negative impact on the physical, moral and mental health of the population (Bjelica, Popović, & Gardašević, 2016; Eime, Young, Harvey, Charity, & Payne, 2013; Laaksonen, Finkenzeller, Holmberg, & Sattler, 2018; Romanova, & Astaf'ev, 2014; Ziv & Lidor, 2013). In the context of socio-political transformations in Ukraine, the physical and mental health of individuals are getting the most acute acknowledgment. And in the field of sports, effective

psychological training becomes a prioritization for achieving the highest results. Special attention has to be paid to solving the problem of organizing effective psychological training for athletes of the national teams. The question of psychological readiness, first of all, relates to sports with intellectual and difficult-coordinating components. Above-mentioned sports - are the types of billiards and its disciplines.

Billiard game requires the player to have precise movements and total control of his emotional state during a long period of competition. That is why, a fairly homogeneous lev-



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el of technical and tactical training of the best billiard players from different countries at international competitions, the advantage is given to those athletes who show the optimal level of psychological readiness for the main competitions. To determine the player's "optimal state", it is necessary to assess the impact of competitive stress on the athlete's psycho-emotional state and to develop a monitoring method for the psychological readiness of well-trained billiards to the main competitions of the macrocycle (Baich, Polischuk, & Nagorna, 2014). This analysis will determine the model characteristics of the well-trained billiards players' psychophysiological state at the time of the technique implementation in a stressful situation.

The work's purpose is to determine the model indicators of elite and well-trained billiards players' psychological readiness for the main competitions of the macrocycle.

## Methods

The total of 40 athletes, members of Ukrainian National Team of billiards, were examined. The first group – 20 elite billiard players (masters of sports of national and international class), aged 22-38, the second group – 20 well-trained players (candidates for masters of sports of Ukraine), aged 16-21. Methods of research: theoretical analysis and generalization, pedagogical observation, pedagogical testing, the study of psychophysiological parameters of the players, methods of mathematical statistics.

The permission for information usage was received from all athletes before the research started. Written authorization has been received in accordance with the recommendation of ethical committees.

Survey was conducted among 40 billiard players of the national teams of Ukraine on psychological preparation for the main competitions of the macrocycle. We developed and put into practice in December 2019 a specialized questionnaire for billiards to determine the subjective indicators of the mental state of players before the main tournament of the macrocycle. The respondents' answers in the questionnaires in a special form, which was provided to each participant of the training camp just before the competition of the Ukrainian pool championship and the final pyramid Cup of Ukraine in December

2019, were determined by points and provided for the probability assessment of the obtained results using the methods of non-parametric statistics. Therefore, the nonparametric Mann-Whitney method was used, and the Spearman rank correlation method was used to study the interdependence between the respondents' conclusions on each question. Determining the influence of a single cause on the final result, each respondent's answers to the formation of a single model of the billiards player's mental state before the main tournament, the coefficient of determination was calculated, which can have a value from 0% to 100%, the cause does not affect the result and only this cause causes the result.

The agreement of opinion of 40 athletes, members of Ukrainian National Team of billiards, was calculated by the reliable expert opinion and was determined using the standard deviation and the coefficient of variation. The consistency of the experts' opinions was determined using the concordance coefficient and amounted to  $W=0.78$ , which indicates the homogeneity of the group of specialists.

## Results

Over the last decade, Ukrainian billiard players have made significant achievements in the international arena, both in the pyramid and in the pool. And 2020 was a significant year for the national snooker team - our athletes won the gold medal at the European Championship and the silver medal at the World Championship.

A survey of 40 billiards players from the national teams, on psychological preparation for the main competitions of the macrocycle, revealed problematic components of athletes' training, namely: low mental readiness of most respondents to the tournament, which leads to a negative trend. At the same time, we determined that more successful athletes either use the services of a sports psychologist or perform special exercises to correct their mental state under the guidance of their coach. Continuing the analysis of the obtained data, we determined the main subjective indicators of the players' mental state during billiards competitions (Table 1). It was found that during the tournament the majority of respondents have a feeling of "sports excitement" (32.5%).

**Table 1.** Subjective characteristics of psychological training of elite and well-trained billiards players for the main competitions of the macrocycle (in % to the number of respondents)

	Mental state	%
1.	Feeling of "sports excitement", the desire to win	32.5
2.	Feeling of aggression	0.5
3.	Feelings of apathy	12.5
4.	Feelings of insecurity, tremor	7.5
5.	Feeling irritated	7.5
6.	Optimal level of mental readiness	17.0
7.	Low level of mental readiness	17.5

The results of the expert assessment and literature data's analysis allowed to identify the following psychophysiological criteria that affect the quality of competitive activities of billiard players: attention (speed of information processing, switching); memory (operational); speed of mental processes; latent period of complex visual-motor reaction; latent period of simple visual-motor reaction; strength and mobility of nervous processes; differentiation of muscular efforts.

As can be seen in Figure 1, the dominant qualities of the psychological preparedness of billiard players to compete, women and men results do not have significant differences. However, emotional stability, according to female experts, has greater importance in competitive activities (2.5 points), while according to male counterparts it is less important (4 points). From this we can conclude that women are more emotional because of their physiological properties and allot more weight to the emotional state.

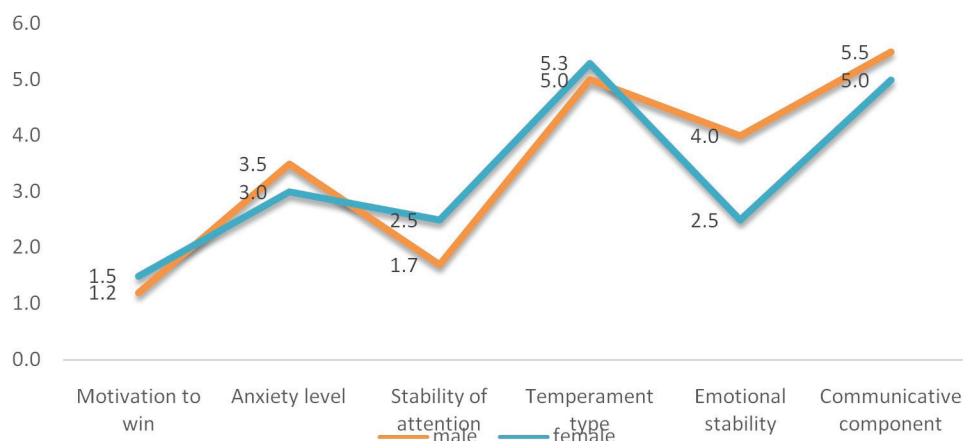


FIGURE 1. Dominant qualities of psychological preparedness of billiard players for competitions according to athlete's opinion (n=40)

As we can see in Figure 2, with amplification of special training's level, and more specifically, the effectiveness of the billiards player's competitive activities, the time spent searching for the first ball (when using a specialized billiard test for attention) decreases. Athletes underwent three stages of test-

ing: the first was conducted before the introduction of special autogenic exercises in the training process, the second - after a month of experimentation, the third - just before the main competitions. Henceforth, the focus of billiard players improves as the results grow.

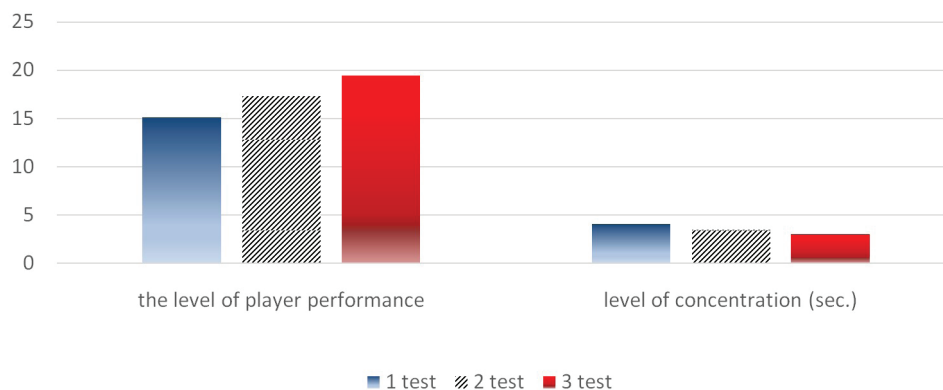


FIGURE 2. Characteristics of the impact of increasing the level of performance of the player on the concentration of his attention (n = 40); 1 - the first testing; 2 - the second testing; 3 - the third testing;

In billiards, technical training is closely linked to the tactics of the game. Therefore, individual plans for the preparation of athletes for the main competitions of the macrocycle should contain technical and tactical elements in combination with exercises that regulate the athlete's optimal mental state. We would like to make a tentative suggestion of setting the duration of classes as two meetings in competitions, the usage of the optimal number of breaks for rest (filled with theoretical material) between specific exercises, a large number of approaches to one exercise, as well as the introduction of competitive and game elements in the training process. We believe it will help psychological and physical loads in billiard training sessions.

Peculiarities of athletes' psychological adaptation to competitive loads are covered in the subjective state of billiard players, which we analyzed by using the methodology of well-being (W), activity (A) and mood (M).

We found that the billiards players' emotional state in the period of adaptation to the competitive process is subjected to specific burdens associated with the tournament environment and limited time to transform old or develop new tactical patterns of behavior. During the study of the well-trained billiard players' emotional states with dynamics in the period of adaptation to the competitive mesocycle, we conducted a series of

experiments.

At the beginning and at the end of the training session, with the autogenic exercises to correct emotional state, the analysis of athletes' responses was registered indicators of well-being, activity, mood according to the method of WAM (used the principle of Osgood semantic differential). It was determined that the dynamics of the athlete's mental state is reliably correlated with the dynamics of their special preparedness. The assessment method of mental states like "emotional tone", "mental activation", "interest", "stress" and "comfort" is based on the evaluation of athlete's definitions using modified stimulant material to the method of WAM.

There is a reliable pattern of changes in well-being, activity, mood, depending on the stage of testing. We obtained the following results:

Stage I: the average score of the well-being category a month before the start of billiards competitions is 3.78, which indicates a slight level diminishment; activity category - 5.86; mood category - 4.68.

Stage II: well-being after a course of training sessions with the use of autogenic exercises increased to 7.58; activity - 6.48, a slight increase; mood - 8.42, but this indicator cannot be considered an objective criterion of effectiveness for the study period.

The method of expert assessments of the characteristics of well-trained billiard players' (n=40) psychophysiological state at the time of technical action during competitive pressure allowed to determine the dominant qualities of psychological readiness to win: anxiety, stability of attention, motivation (Klestov et al., 2020). The concordance coefficient (W=0.76) confirms the homogeneity of the athletes' group. Players were asked to simulate the situation during the tournament: a billiards player must play a "match ball" with an equal score on frames with his opponent.

Having analyzed the athletes' answers to the questionnaire, we were able to identify well-trained billiards players' mental state's main features at the time of precise technical action's implementation in the tournament stressful conditions: nervous processes (strength and mobility); concentration of attention; mental processes; coordination of movements; differentiation of muscular efforts during impact.

Most billiard players say that they have felt or still feel

strong psychological pressure in preparation for the implementation of precise technical action - 83%. At the same time 73% of athletes note objective changes in the psychophysiological state at the time of the "match ball", among which 27% experience an increase in heart rate, anxiety, negative thoughts. 17% of billiards players, on the other hand, think only about victory, which leads to sport aggression. Feel the fear of defeat, tension in the muscles of the neck and shoulders, tremor of the hands - 13%. Elite athletes (33%) feel confident, focusing only on performing the technique as effectively as possible. Athletes of lower qualification, unfortunately, are dominated by negative thoughts, how not to make a mistake (Borysova, Nagorna, Shutova, & Mytko, 2019; Klestov et al., 2020). At the same time, 87% of athletes use means of mental state's correction at the critical moment of the match. The most popular means of regulation for respondents are: analysis of technical action for concentration on the impact, the usage of a special key word, modeling a positive result (Figure 3).

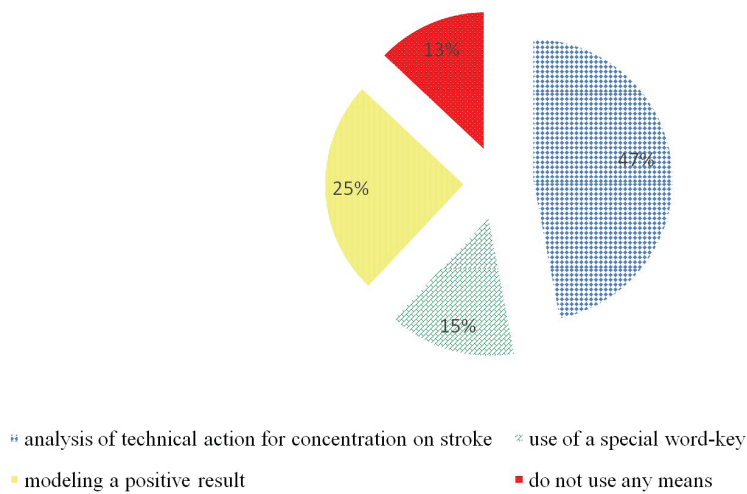


FIGURE 3. Means of mental state regulation:

We used a modified test of the balance function's quality without visual control for billiard players with simulation of the game situation "match ball". The quality of the bal-

ance function in a stressful situation is significantly higher for elite billiard players than for the well-trained sportsmen (Figure 4).

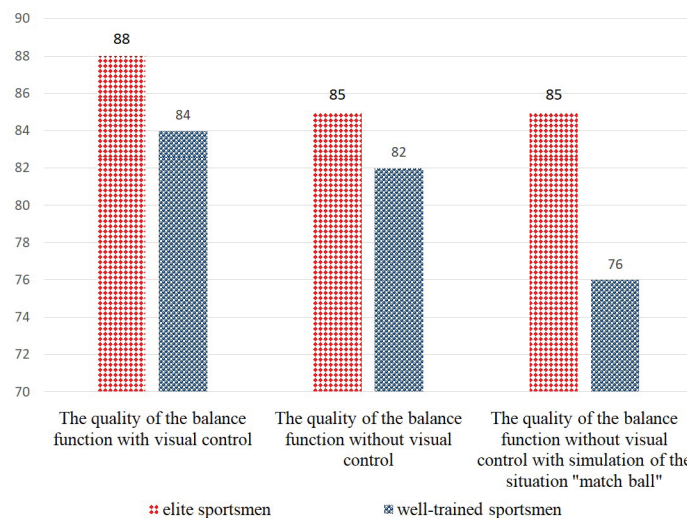


FIGURE 4. The quality of the balance function with and without visual control of billiard players:

The psychological component was also determined by assessing the motivational component of billiard players to win, namely: the most significant contribution to ensuring high performance in main tournaments with a predominance of

motivational, volitional and typological components of readiness - 71%. The analysis of the questionnaire's results indicates sufficient motivation for the victory in the athletes who participated in our study.

Summarizing the above, to determine the "ideal" mental state of a billiard player, we selected athletes with high quality of balance function without visual control to the experimental group.

To determine the model characteristics of the well-trained billiard player's psychophysiological state during the imple-

mentation of the technique under stress, we used the quality indicators such as the balance function with and without visual control, attention efficiency, attention, productivity, motivational, volitional and typological components, stress resistance (Figure5).

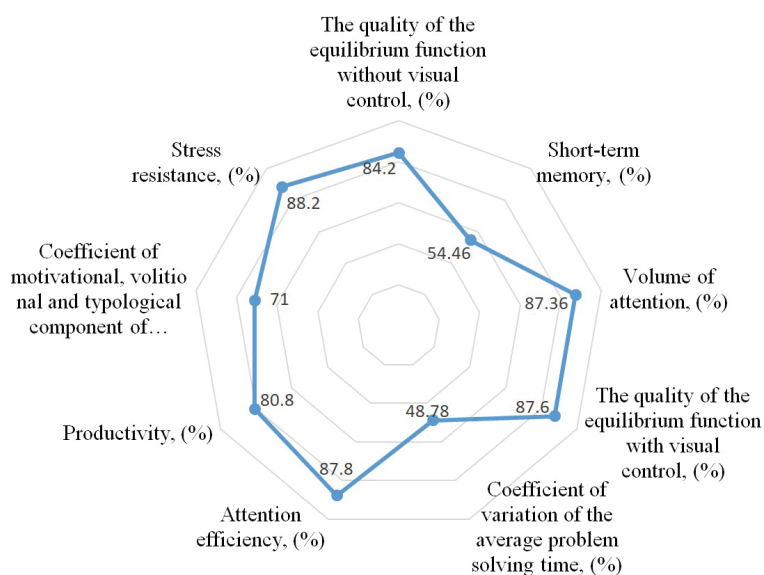


FIGURE 5. Model characteristics of the psychophysiological state of elite athletes in billiard sport at the time of the "match ball"

The conglomeration of individual features of each athlete's technical and tactical preparedness and the calendar's task of his competitive activity in comparison to the model data of mental state allows to determine the athlete's level of preparedness' reserves and means of further improvement. But in the analysis of the athlete's competitive activity effectiveness, the reliability of the billiard players' productive performances in the main tournaments is important, which indicates a high level of integral training: functional, mental, physical, mobilizing qualities of the athlete.

## Discussion

The analysis of the literature sources indicates the effectiveness of the billiard players' competitive activity to a greater extent due to the analyzers' activity and the mobility of nervous processes that ensure the accuracy of movements in time and space. In the process of psychological control for a wide range of impartial indicators that is characterized by the accuracy of reproduction force and spatial movements parameters, the ability to process information effectively, well-being, mood, activity, rapid decision-making.

Assessment of well-trained billiards players' mental health before and after the course of autogenic training according to the method of WAM showed the dynamics of functional state's psychological parameters such as "mental activation", "interest", "emotional tone", "stress" and "comfort", which is reliably correlates with the special preparedness of athletes for the main competitions. At the same time, it was found that

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### Conflict of Interest

The authors declare that there are no conflicts of interest.

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women are more emotional due to the physiological properties of their body and attach more importance to the emotional state.

We determined the average quality indicators of the balance function with and without visual control, productivity, stress resistance, volume of voluntary attention, attention efficiency, and the coefficient of motivational, volitional and typological component in highly well-trained athletes who show high sports performance at main competitions, psychophysiological condition of elite billiard players for the effective implementation of the technique in conditions of stress in the game situation.

The scientific novelty of the work is that for the first time the influence of autogenic exercises during training sessions on billiard sport on the psychophysical condition of well-trained athletes is substantiated; the influence of autogenic exercises on the functional, emotional state of well-trained billiard players in the process of competitive loads is theoretically substantiated and tested in practice; the data of complex control of the level of psychological preparedness of well-trained billiards players for the main competitions of the macrocycle have been supplemented.

The obtained results of these researches can be used in the process of theoretical and methodical approaches' development on preparation of well-trained billiard players for the main competitions of a macrocycle. The obtained research materials can be used in the practice of national teams' training sessions in billiard sport.

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