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PSYCHOLOGICAL INDICATORS ENSURING EFFICIENCY OF A CHESS PLAYER'S COMPETITIVE ACTIVITY

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Abstract

Background. The paper is based on the discussion of psychological problems in modern chess, which are significantly related to the rapid growth of chess competitiveness in recent years, the frequency of participation in competitions, the intensity of competition and other similar manifestations.

Study purpose. We aimed to identify the most important psychological indicators that ensure the effectiveness of a chess player's competitive activity, to describe their correlational relations and the peculiarities of their manifestation.

Materials and methods. The research process was carried out with the use of interconnected laboratory-instrumental and non-instrumental methods, which are of great practical importance in psychology: questionnaires, tests, observations, mathematical statistical methods as well as self-developed "psychodiagnostic multifactorial" equipment. The research was organized among 30 grandmasters in the National men's chess team of the Republic of Armenia through different years, winners of the World Olympiad, World team tournaments, and the World Cup. It targeted the study of the four main areas of a chess player's psyche: competitive mental reliability, individual psychological characteristics, emotional states and emotional abilities.

Results. As a result of the analysis of correlations, the following 8 patterns were singled out from 52 examined psychological indicators: resistance to internal uncertainty stressors, competitive emotional endurance, personal anxiety, energetic sphere of competitive motivation, psycho-regulation, mobilization preparedness, attention features and complex motor reaction speed. We consider the selected indicators as the leading psychological factors that ensure the competitive process of a chess player.

Conclusions. Effective manifestations of the selected psychological indicators can enable a chess player to perform in a more stable and effective way during decisive competitions. The selected indicators can also describe the level of sports training of a highly qualified chess player and serve as model characteristics of psychological service.

Keywords: model characteristics, psychological indicators, leading factors, chess player, correlations.

Introduction

In the history of world chess the significant increase in the competitive load recently is unprecedented, in terms of both quantity and quality of competitions. Recently, the competitive load in chess has undertaken an exceptional growth, increasing almost 2-3 times compared to the past. Chess players, participating in 15-20 and more international tournaments, do not have time and possibility to recover and prepare for the next plays. The intensity of the competitive

struggle has reached the maximum: in the ranking presented by reliable sources (International Chess Federation; Live Chess Rating), the competitions of the grandmasters taking the 1-100th places are held in an almost equal struggle, often their own rating or 0.5 points become decisive. The professional abilities, the quality of the game and the level of training of a chess player in the 100th place do not yield the level of the chess players included in the top 10. In the same way, in every major international tournament, there is an almost equal struggle between chess players in the first and the last places (Schinke, Smith, & McGannon, 2013; Swann, Moran, & Piggott, 2015). Constantly changing regulations raise new issues like participation of chess players in

simultaneous competitions of different ages and genders, matches with different regulations: classic chess, blitz, armageddon, etc. All this in turn increased the competitive struggle as well leading to an extremely persistent, tense chess "military" battle.

The above-mentioned and other similar manifestations set new psychological problems for the chess player, demanding maximum willpower, high emotional endurance, stress resistance, ability to self-normalize negative mental states, high degree of development of psycho-cognitive processes, as well as individual psychological peculiarities (Schinke, McGannon, & Smith, 2013; Tod, 2017).

In the manifestations of a chess player's different mental phenomena, the study of the relations of personal features unity is very important. The facts show that high competitive results in chess achieve those players, who has unique psychological traits, as targeted goals, appropriate competitive motivation, assurance of positive mental state, etc (Holding, & Pfau, 1985; Gobet, & Simon, 1998; Campitelli & Gobet, 2008).

The disclosure of psychological indicators that ensure the effectiveness of competitive activities will enable to deepen scientific and practical approaches to the mechanisms of the chess player's mental regulation and also to develop appropriate models and tools for their further development and improvement.

Research hypothesis: It is assumed that the psychological indicators ensuring the efficiency of highly qualified chess players' competitive performance have unique correlations and mechanisms of development, as the chess player's activity is highly conscious, which is expressed in solving tactical problems, analyzing situations, making effective decisions and in action plan of the game.

The study purpose is to reveal the most important psychological indicators ensuring the effectiveness of a chess player's competitive activity and to characterize their correlations and peculiarities of manifestation.

Materials and methods

Study participants

The research was organized among 30 grandmasters in the National men's chess team of the Republic of Armenia through different years, winners of the World Olympiad, World team tournaments, and the World Cup.

The studies were carried out in the laboratory of the Sports, Pedagogy and Psychology Department in the State Institute of Physical Culture and Sports of Armenia in accordance with the requirements of the Declaration of Helsinki. The research results were approved by the Ethics Committee of the State Institute of Physical Culture and Sports of Armenia.

Study organization

In order to diagnose the leading psychological indicators ensuring chess player's competitive activity and organize the research process more effectively, it is required to invest modern high sensory technologies and to do selection of methods. The current process of the chess players psychological support offers more perfect ways

and interconnected methods to psychologists (Benko & Hochberg, 1991; Rowson, 2001; Stewart, 2013).

Guided by the modern applied principles of sports psychology, we have implemented interconnected and result-compensating laboratory-instrumental and non-instrumental methods during the research.

In order to make the research process more effective, we used the "Psycho-diagnostic Multifactorial" self-made complex device of modified laboratory research methods (Babayan & Geghamyan, 2010), which is designed for psychological research and is widely applied in the field of sport psychology. The device is a complex battery of diagnostic various methods of motivational indicators and mental states with modern high-sensory technical equipment.

Laboratory-instrumental researches were performed by the following methods:

1. Reactometry – types of motor reaction (Prună, & Ionescu-Tirgoviste, 1987).
2. Tremometry – features of voluntary regulation of tremor (Eakin, Francis, & Spirduso, 2001).
3. Tapping test – This method has many varieties of application with appropriate modifications due to the goals and problems of the research. Our research includes studies of the athlete's neuropsychological concentration and the ability to voluntarily regulate the pace of motor actions (Ilyin, 2003).
4. Electro-skin resistance – emotional tension (Jyh-Jier Ho, 2002).

Non-instrumental methods were performed according to:

1. V. E. Millman Competitive Mental Reliability Questionnaire.
2. V. E. Millman's Pre-start Mental Diagnosis Questionnaire.
3. Spielberger anxiety self-assessment scale (Spielberger, 2010).
4. Eysenck Self-Assessment Test (EPI version) (Eysenck, & Eysenck, 1993).
5. Schulte's table of diagnostic features of attention.
6. Evaluation of the effectiveness of competitive activities.
7. Mathematical statistical methods – the processing of numerical data was directed to the analysis of correlational indicators, based on the results of which several psychological characteristics were given as primary indicators to ensure the effectiveness of the chess player's competitive activity. The methods of mathematical statistics were implemented by StatPlus 2009 computer program.

The research was organized and carried out with the following stages:

In the first stage professional literature sources were studied and analyzed.

In the second stage, research was carried out among 30 grandmasters, included in the National men's chess team of the Republic of Armenia through different years, winners of the World Olympiad, World team tournaments and World Cup.

In the third stage, comparative-correlational analyzes were performed based on the results of the research.

Researches targeted the study of the four main areas of the chess player's psyche:

1. Competitive mental reliability (Gould, Dieffenbach, & Moffett, 2002).
2. Individual psychological characteristics of a person (Batchelder & Bershad, 1979; McGannon & Smith, 2020).
3. Emotional states (Hanton, Neil, & Mellalieu, 2008; Groot, 2008).
4. Psychomotorik abilities (Tod, Andersen, & Marchant, 2009).

The studied indicators, according to the studies of different authors, are the main and leading indicators of showing high competitive results in sports (Dunnington, 2003; Fletcher, Hanton, Mellalieu, & Neil, 2012; Tod, 2017).

Statistical analysis

In order to reveal the primary and essential psychological indicators, out of 52 studied indicators we have selected the most closely related to each other, which can be the main psychological factors ensuring the effectiveness of a chess player's competitive activity. Mainly the indices with $r = 0.50$ and more eigenvalues were selected. Comparative-correlational analyzes were performed based on the results of the research.

Results

As a result of the analysis of correlations, the following 8 patterns were singled out from the whole of the examined psychological indicators, which manifested direct, mediated and reliable connections both with each other and with other examined psychological indicators. They are the following:

1. Internal uncertainty stressors, which are related to the chess player's health and mood swings, being in a good shape, failures during the competition, getting in a bad position, not being able to carry out the planned tactical task, fears and doubts about failing one's own initiatives, which reduce the level of self-confidence.
2. Competitive emotional endurance, which provides "mental freshness" in competitions, thus supporting to other mental phenomena being more effective: a chess player is able to fully express his own abilities.
3. Personal anxiety, in the presence of a high index of which, a chess player experiences fear and lack of self-confidence.
4. Energetic sphere of competitive motivation: it is manifested in a chess player's conscious and subconscious spheres, formulating desires, aspirations, motives, interests, goals, persistence tendencies for victory.
5. Psycho-regulation: the ability of self-regulation for negative emotions.
6. Neuropsychological concentration: it allows to concentrate on the game in the face of time shortness, negative mental states, various other disturbing circumstances (thoughts, fatigue, etc.).
7. Attention features: creates an opportunity to effectively distribute attention on the board, quickly transform from thoughts to chess pieces and vice versa.
8. Complex motor reaction: ensures precise, effective decision making and actions in a short period of

time (blitz, tiebreak, armageddon or classic when time is running out).

We consider the following indicators as the leading psychological factors ensuring the competitive process of a chess player, which is evidenced by the reliable correlation and can be used as model characteristics.

The analysis of the correlations of the mentioned leading indicators also proves that the index of internal uncertainty stressors occupies a central place in the structure of the internal mechanisms of the highly qualified chess players' personality. This indicator manifested direct and mediated reliable correlations with competitive emotional endurance, psychoregulation, competitive motivation, attention features, neuropsychological concentration, personal anxiety and complex motor reaction indicators (see Table 1).

Analyzes of correlational relationships testify that the internal uncertainty stressors, which can arise during every competition and manifest in different nature and degree, require from a chess player high emotional endurance, cause

Table 1. Reliable Correlations of Chess Players' Internal Uncertainty Stressors with The Main Studied Indicators

N	STUDIED INDICATORS	CORRELATIONS (R)
1.	Competitive emotional endurance	-0.87
2.	Psychoregulation	-0.80
3.	Competitive motivation	-0.75
4.	Attention features	0.72
5.	Neuropsychological concentration	0.62
6.	Personal anxiety	0.57
7.	Complex motor reaction	0.51

negative mental states, manifestations of different anxiety levels, also right or wrong manifestations of different types of attention mobilization training in competitive situations, which, in its turn, can have an impact on the effectiveness of competitive activities.

The above is also substantiated by our comparative analysis of competitive results, specific competition effectiveness and studied psychological indicators. It becomes clear that stable and reliable competitive results are shown especially by those chess players who have high stability to the stressors of internal uncertainty, which ensures the effective manifestation of other investigated mental indicators, leading to high competitive results.

Discussion

In modern chess, the psychological factor is pushed to the forefront (Holding & Pfau, 1985; Gobet & Simon, 1998), so it is necessary to consider it as a primary condition and regulator ensuring the effectiveness of a chess player's activity. Studies of psychological phenomena by various authors prove that they tried to consider the psychological factor in the athlete's sports training system as a complete and multifaceted manifestation (Grabner, Stern, & Neubauer, 2007), but often it remained at the functional or personal levels (Gould, Voelker, Damarjian, & Greenleaf, 2014; Geghamyan, 2021; Kaczyńska, Kołodziejczyk, & Sałabun, 2021).

The entire process of our research was considered as a complete system of formation of the level of psychological preparation of the athlete, because studies on the psy-

chological factor in chess cannot be based on one mental phenomenon – they must be implemented with complex psychological characteristics.

The leading psychological indicators ensuring the effectiveness of a chess player's competitive activity, their reliable correlative connections and formation mechanisms are clarified. They are the following: stability to the stressors of internal uncertainty, the degree of competitive emotional endurance, the index of personal anxiety, the energy field of competitive motives, the psychoregulation, the degree of mobilization readiness, as well as indicators of attention characteristics and complex motor reaction. As a result of correlation analysis, it was revealed that in the structure of the internal mechanisms of the personality of highly qualified chess players, the index of stability against the stressors of internal uncertainty occupies a central place. The high degree of stability of the latter can contribute to the effective manifestation of other mental indicators, ensuring stable competitive results. Individual indicators may be model specifications for a given sport.

These studies also showed that the above-mentioned correlative reliable connections can undergo significant changes, stabilize along with sports improvement, and new ones appear based on them, which provides an opportunity for further studies of this issue. The above mentioned supports the research hypothesis that highly qualified chess players have unique correlations of psychological indicators and development mechanisms.

Conclusions

Summing up the research results on the correlation of psychological indicators, it can be concluded:

1. The leading psychological indicators of a chess player demonstrate unique reliable correlations in the whole set of studied indicators, which reveals interconnected systems within the internal structure of a chess player's personality, the effective manifestations of which can enable him to perform in a more more stable and effective way during decisive competitions.
2. In order to effectively organize the competitive process of highly qualified chess players, it is necessary to take into account the level of a chess player's stress resistance, especially towards internal uncertain stressors, the stability of which will stimulate the realization of potential opportunities.
3. Demonstration of high competitive results in chess can be achieved mainly by effective manifestation of the following indicators: internal uncertainty stressors, competitive emotional resilience, personal anxiety, psycho-regulation, mobilization readiness, attention features, complex motor reaction. The selected indicators can describe the level of sports training of a highly qualified chess player and serve as model characteristics of psychological service.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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ПСИХОЛОГІЧНІ ПОКАЗНИКИ, ЯКІ ЗАБЕЗПЕЧУЮТЬ ЕФЕКТИВНІСТЬ ЗМАГАЛЬНОЇ ДІЯЛЬНОСТІ ШАХІСТА

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Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; Е – збір коштів

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Історія питання. В основу цієї статті покладене обговорення психологічних проблем у сучасних шахах, які значною мірою пов'язані зі стрімким зростанням шахового духу суперництва в останні роки, частотою участі в змаганнях, гостротою суперництва та іншими подібними проявами.

Мета дослідження. У цьому дослідженні ми мали на меті виявити найважливіші психологічні показники, які забезпечують ефективність змагальної діяльності шахіста, описати їхні кореляційні зв'язки та особливості їх прояву.

Матеріали та методи. Процес дослідження здійснювали з використанням взаємопов'язаних лабораторно-інструментальних і неінструментальних методів, які мають важливе практичне значення в психології: анкет, тестів, спостереження, методів математичної статистики, а також самостійно розробленого «психодіагностичного багатофакторного» обладнання. Це дослідження було організоване серед 30 гросмейстерів Національної чоловічої збірної Республіки Вірменія із шахів різних років, переможців Всесвітньої Олімпіади, командних світових турнірів та Кубка світу. Воно було спрямоване на вивчення чотирьох основних сфер психіки шахіста: змагальної психічної надійності, індивідуально-психологічних характеристик, емоційних станів та емоційних здібностей.

Результати. У результаті аналізу кореляційних зв'язків із 52 досліджуваних психологічних показників були виокремлені 8 патернів: стійкість до стресорів внутрішньої невизначеності, змагальна емоційна витривалість, особисте прагнення, енергетична сфера змагальної мотивації, психорегуляція, мобілізаційна готовність, особливості уваги та швидкість

складної рухової реакції. Вибрані показники ми розглядаємо як провідні психологічні фактори, що забезпечують змагальний процес шахіста.

Висновки. Ефективні прояви вибраних психологічних показників можуть дозволити шахістові стабільніше та результативніше виступати у вирішальних змаганнях. Вибрані показники також можуть характеризувати рівень спортивної підготовки шахіста високої кваліфікації та слугувати модельними характеристиками психологічної служби.

Ключові слова: модельні характеристики, психологічні показники, провідні фактори, шахіст, кореляційні зв'язки.

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