OPTIMIZATION OF ATHLETES' TRAINING IN OLYMPIC AND PARALYMPIC SPORTS PREPARATION CENTERS THROUGH PSYCHOPHYSIOLOGICAL DIAGNOSTICS AND PSYCHOLOGICAL TESTING

Usmonov Egamberdi Musinovich
Department of "Theory and Methodology of Physical Education and Sports," Fergana Branch of the Institute for Retraining and Professional Development of Physical Education and Sports Specialists, Associate Professor, PhD.

Abstract

This study focuses on optimizing the training of athletes in Olympic and Paralympic sports preparation centers through psychophysiological diagnostics and psychological testing. It examines the assessment of athletes' physical and psychological conditions, identification of their individual characteristics, and personalization of the training process. Analysis of psychological tests and physiological indicators helps determine stress resilience, attention focus, and motivational state of athletes. Based on the findings, recommendations are developed to optimize the training process, enhancing athletes' potential for achieving high performance.

Keywords: Sports training, psychophysiological diagnostics, psychological testing, Olympic sports, Paralympic sports, optimization.

Introduction

In modern sports, achieving high performance depends not only on athletes' physical fitness but also on their psychological and physiological states. Optimizing the training process by considering the individual characteristics of athletes in Olympic and Paralympic sports training centers is regarded as a pressing issue. According to Resolution No. 731 of the Cabinet of Ministers of the Republic of Uzbekistan dated December 30, 2022, new directions and measures were outlined to organize the activities of Olympic and Paralympic training centers. This resolution aims to introduce advanced technologies to advance sports development, ensuring the application of innovations in athlete training. Based on this resolution, the article emphasizes the need to introduce innovative approaches in the sports sector and enhance athlete preparation on a scientific basis. The resolution particularly focuses on analyzing athletes' psychological and physiological states to maximize their potential.

Psycho-physiological diagnostics and psychological tests are effectively used as tools to assess athletes' stress resilience, focus, motivation, and other critical indicators. This approach is especially significant in Paralympic sports, where the individual needs of athletes with disabilities must be considered. Internationally, countries such as the United States and

European Union member states widely use specialized tests and diagnostic methods to evaluate athletes' psychological preparedness, significantly improving their competitive performance. In Uzbekistan, research in this area is still underdeveloped, often relying on experience and traditional methods. Consequently, there is a need to develop scientifically grounded methods to optimize sports training by integrating psycho-physiological and psychological approaches. This study aims to address this gap by developing effective training programs that account for athletes' individual characteristics.

Research Objective:

To optimize the sports training of athletes in Olympic and Paralympic sports training centers through psycho-physiological diagnostics and psychological tests, thereby improving their physical and psychological states and enhancing competitive performance.

Research Tasks:

The main tasks of the study are outlined below, each designed to comprehensively address the topic. These tasks are presented in detail and in tabular form.

MATERIALS AND METHODS

Table 1: Research Tasks

Task No.	Task description
1	Select tests and methods to assess athletes' psycho-physiological states
2	Develop and test the suitability of psychological tests for athletes
3	Analyze athletes' stress resilience and motivational states
4	Develop and test individualized training programs
5	Analyze research results and provide recommendations for optimization

1. Selection of Psycho-Physiological Assessment Methods

A range of scientifically grounded methods was selected to evaluate athletes' physical and psychological states. For instance, heart rate (HR), blood pressure, brain activity (EEG), and other physiological indicators were measured. These metrics are crucial for determining athletes' responses to stress and fatigue levels. Based on international practices, the "Biofeedback" system and "Heart Rate Variability" (HRV) methods were employed. These methods enable real-time monitoring of athletes' physiological states.

2. Suitability of Psychological Tests

Psychological tests were specifically designed to assess athletes' focus, reaction speed, emotional stability, and motivation levels. For example, the "Stroop Test" was used to measure attention and cognitive flexibility, while the "Spielberger Test" assessed anxiety levels. These tests were adapted for Olympic and Paralympic athletes, taking into account the types of disabilities and psychological needs of Paralympic athletes. When tested on a group of 50 athletes, the tests demonstrated an accuracy rate of 85%.

3. Analysis of Stress Resilience and Motivation

Stress resilience is a critical factor in athletes' success under competitive conditions. The study analyzed athletes' stress responses based on the "Lazarus and Folkman" stress model. Results revealed that Paralympic athletes' stress resilience was, on average, 10% lower than that of Olympic athletes, highlighting the need for tailored programs to address their specific needs. Motivation levels were assessed using questionnaires based on the "Self-Determination Theory."

4. Individualized Training Programs

Individual training programs were developed based on each athlete's psycho-physiological and psychological indicators. For instance, athletes with lower focus were assigned meditation and cognitive exercises. Training schedules to enhance physical endurance were designed using HRV data. These programs were implemented with 30 athletes over a three-month testing period, resulting in an average performance improvement of 12%.

5. Analysis of Results and Recommendations

The research findings underscored the importance of designing training programs that account for athletes' individual characteristics. Psycho-physiological diagnostics and psychological tests provided coaches with insights into athletes' strengths and weaknesses. This approach not only enhances sports performance but also ensures athletes' psychological stability.

Research Methodology:

The study was conducted on a scientific basis, incorporating multiple methodological approaches, which are detailed below and presented in tabular form. The research was experimental and analytical, focusing on optimizing sports training for athletes in Olympic and Paralympic sports training centers. It was conducted in two phases: 1) collecting psycho-physiological and psychological data, and 2) testing individualized training programs.

Table 2: Research Phases

Phase	Objective	Methods
Phase 1	Assess athletes' states	Tests, questionnaires, physiological measurements
Phase 2	Test individualized programs and analyze results	Experimental exercises, statistical analysis

RESULTS AND DISCUSSION

The study involved 60 athletes (30 Olympic, 30 Paralympic) from Olympic and Paralympic sports training centers in Fergana Province. The sample included athletes aged 16 to 25, selected based on their experience, health, and competitive performance.

1. Psycho-Physiological Diagnostics

- **HRV (Heart Rate Variability):** Used to assess athletes' stress responses and resilience.
- **EEG (Electroencephalography):** Employed to evaluate cognitive brain activity.
- **Blood Pressure and Heart Rate:** Measured before and after physical exertion.

2. Psychological Tests

- **Stroop Test:** Measured attention and cognitive flexibility.
- **Spielberger Test:** Assessed anxiety levels.
- **Motivation Questionnaire:** Developed based on the "Self-Determination Theory."

3. Questionnaires and Interviews

These were used to evaluate athletes' subjective states.

Data Analysis

Collected data were analyzed using SPSS 26.0 software. The following statistical methods were applied:

- **T-test:** To identify differences between groups.
- **Correlation Analysis:** To determine relationships between psychological and physiological indicators.
- **ANOVA:** To compare results across different groups.

ANALYSIS AND RESULTS

The research results are analyzed based on the following tables and diagrams.

Table 3: Research Results

Indicator	Olympic Athletes	Paralympic Athletes	Difference (%)
Stress Resilience	78%	68%	10%
Focus	85%	80%	5%
Motivation Level	90%	82%	8%

The results indicate that Olympic athletes demonstrated higher levels of stress resilience and focus compared to Paralympic athletes. This difference may be attributed to the types of disabilities and psychological pressures faced by Paralympic athletes. Both groups showed high motivation levels, though individual variations were notable.

T-test results confirmed that the difference in stress resilience between groups was statistically significant ($p < 0.05$). Correlation analysis revealed a positive relationship between focus and competitive performance ($r = 0.72$).

The implementation of individualized training programs led to an average performance improvement of 12%. Notably, cognitive exercises had a significant impact on Paralympic athletes.

CONCLUSION

The study demonstrates that psycho-physiological diagnostics and psychological tests are essential tools for optimizing athletes' training. Tailored programs that account for individual characteristics enhance athletes' stress resilience, focus, and motivation. Specifically, customized approaches for Paralympic athletes play a critical role in improving their competitive performance.

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