

## Development of stress resistance (on an example of athletes' training) Desarrollo de la resistencia al estrés (en un ejemplo de entrenamiento de atletas)

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**Abstract.** The relevance of the scientific work is caused by the priority of carrying out a detailed analysis of the influence of stress on the formation of psychological stability in professional athletes at the stage of preparation for competitions. The purpose of this study is to analyze and evaluate the impact that stress, depression, exhaustion and other negative factors have on the preparation of athletes for competition. To achieve this objective, several issues should be pursued, the content of which reflects the sequence of the stages of the study: to study the theoretical and methodological aspects of the influence of stress on the formation of psychological resilience; analyze the main trends in athlete ability to cope with stress; to study the main methods of forming psychological stability; develop methodological approaches to assess the impact of stress on psychological resilience; develop a set of proposals for psychological assistance to athletes in preparation for competitions. The key method in this scientific work is system analysis. It was applied in order to study the idea of the formation of psychological stability as a tool for combating stress factors in the context of the complex multi-component structure of professional sports. During the research, various methodological tools were used, such as the logical analysis method, the comparative method, the synthesis and deduction methods, the classification method, and the questionnaire method. The scientific work reveals the results of the research in the form of a table showing the results of stress assessment in the group of athletes and students; Factors affecting psychological stability are described; The factors influencing the probability of development of post-traumatic stress disorder are presented. The articles are of practical value to psychologists, sports coaches, teachers and students in the field of psychology and physical education.

**Keywords:** improved regulations, post-traumatic stress disorder, physical culture, coping techniques, competition.

**Resumen.** La relevancia del trabajo científico se debe a la prioridad de realizar un análisis detallado de la influencia del estrés en la formación de la estabilidad psicológica de los deportistas profesionales en la etapa de preparación para las competiciones. El propósito de este estudio es analizar y evaluar el impacto que el estrés, la depresión, el agotamiento y otros factores negativos tienen en la preparación de los deportistas para la competición. Para lograr este objetivo es necesario abordar varias cuestiones cuyo contenido refleja la secuencia de las etapas del estudio: estudiar los aspectos teóricos y metodológicos de la influencia del estrés en la formación de la resiliencia psicológica; Analizar las principales tendencias en la capacidad de los deportistas para afrontar el estrés; Estudiar los principales métodos para formar la estabilidad psicológica; Desarrollar enfoques metodológicos para evaluar el impacto del estrés en la resiliencia psicológica; Desarrollar un conjunto de propuestas de asistencia psicológica a los deportistas en preparación para las competiciones. El método clave en este trabajo científico es el análisis de sistemas. Se aplicó para estudiar la idea de la formación de la estabilidad psicológica como herramienta para combatir los factores de estrés en el contexto de la compleja estructura multicomponente del deporte profesional. Durante la investigación se utilizaron diversas herramientas metodológicas, como el método de análisis lógico, el método comparativo, los métodos de síntesis y deducción, el método de clasificación y el método del cuestionario. El trabajo científico revela los resultados de la investigación en forma de una tabla que muestra los resultados de la evaluación del estrés en el grupo de deportistas y estudiantes; Se describen los factores que afectan la estabilidad psicológica; Se presentan los factores que influyen en la probabilidad de desarrollo del trastorno de estrés postraumático. Los artículos tienen valor práctico para psicólogos, entrenadores deportivos, profesores y estudiantes en el campo de la psicología y la educación física.

**Palabras clave:** mejora de regulaciones, trastorno de estrés postraumático, cultura física, técnicas de afrontamiento, competencia.

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### Introduction

The main task of scientists in the field of human psychology is the analysis and assessment of personal differences that are revealed in people's thinking, ideas, desires and aspirations (Wagner et al., 2020). The term "stress" is a generic term referring to experiences in which the environmental requirements of a situation outweigh the supposed psychological and physiological capacity of a person to deal effectively with it (Crosswell & Lockwood, 2020). Mood is a category that expresses the long-term state of a person, which can be reflected in their psychology and behavior. It is possible to classify negative emotions into five categories, namely anger, depression, tension, fatigue and

panic. As for the positive, they include energy and self-esteem. Psychological vulnerability is associated with cognitive beliefs that reflect dependence on self-esteem and inadequate functioning. This is a disadvantage that makes people more vulnerable to negative life experiences (Nogueira et al., 2017). A positive mood before the test is a psychological component for a person to achieve the highest results. But it is stress management that affects the activity and tactics of people participating in competitions (Ramírez-Nava et al., 2023). Business relationship styles can be defined as "coping techniques that characterize people's response to stress in various situations or overtime in that situation." Coping styles include many factors that can be conveniently classified into three groups, including positive, negative, and

emotional. The first group of relationships is expressed by initiative, activity, frankness. The second category is characterized by inaction, restraint, internal behavior. The third group of reactions concerns emotional catharsis (Almazova et al., 2023).

Adaptation of athletes to competition and methods of passing emergency situations in competitions can be described as key factors of victory. Therefore, it is necessary to evaluate the connection and dependence between the psychological component and the mood and results of athletes. There is a correlation within these categories. People who take part in competitions improve their most effective abilities to a greater extent when they are in a "perfect" mood. Regarding the relationship between such two categories as mood and sports results and successes, many researchers adhere to the position that they are interdependent. Thus, the success of competitive results can be predicted by analyzing and evaluating the mood of the competition participants (Travers et al., 2022; Folgado dos Santos et al., 2023). It has been proven that professional and successful athletes were more positive, unlike other categories of athletes (Li, 2020).

Under the influence of adverse factors, some people are at increased risk of post-traumatic stress disorder, experiencing persistent biopsychosocial disorders, while others adapt well, which characterizes mental resilience. Resilience is a complex biopsychosocial phenomenon, conceptualized as an adaptation to hardships caused by many different factors (e.g., genetics, epistasis, environment). This is an endogenous structure that provides for the functional stability of the organism, which is designed to maintain stability by using various genetic, physiological and psychological reactions of the organism to stressors (Espinal-Ruiz et al., 2023; Zapata Huenullán et al., 2023). Resilience requires a stressful event, so it is, therefore, pointless to assess it in the absence of adverse factors. It is necessary to distinguish between such categories as "stability" and "ego stability". The difference of the latter lies in the fact that it is a subjective trait of a specific person and does not imply susceptibility to adversity (Folgado dos Santos et al., 2023). Most people had at least one negative experience on their life path, for example, natural one. When this happens, people develop biopsychosocial disorders that can provoke bad moods and cognitive challenges (Zhakparova et al., 2019). However, despite the fact that the number of traumatic events is high, the incidence of immediate post-traumatic stress disorder is low. Based on this, it should be noted that there are many models of psychological response to critical events, and post-traumatic stress disorder is only one form of response (Piñeiro-Cossio et al., 2023). Another possible answer is resilience, an adaptive psychological response to difficulties. At the same time, there are individuals who, as a result of a traumatic experience, make psychological growth through a traumatic experience (Niitsu et al., 2019; Sadvakassova et al., 2022b).

The purpose of this study is to analyze and evaluate the impact that stress, depression, exhaustion and other negative factors have on the preparation of athletes for competition. Achieving the objective entails the following tasks: to study the theoretical and methodological aspects of the influence of stress on the formation of psychological resilience; to analyze the main trends in athletes' ability to cope with stress; to investigate the primary methods of forming psychological stability; to develop methodological approaches for assessing the impact of stress on psychological resilience; and to formulate a set of proposals for psychological assistance to athletes in preparation for competitions.

## Materials and Methods

The core of the research was segmented into specific methodological stages. Each stage had a distinct objective, timeframe, and toolset.

1. **Logical Analysis Stage:** The first phase aimed to understand and dissect the complexity of our subject, notably the nuances of stress resilience in professional athletes. During this phase, we utilized a logical analysis method to evaluate the intricate web of factors that influence psychological resilience. Specifically, we aimed to identify the vital components that constitute an athlete's stress resilience. This phase used software tools like SPSS for detailed statistical breakdowns and NVivo for qualitative data management.

2. **Comparative Analysis Stage:** Here, the objective was to distinguish the varying elements influencing resilience by juxtaposing them. This involved contrasting scientific outcomes, perceptions, and events pertinent to chronic stress problems among athletes. It served as the foundation for subsequent categorization and differentiation.

3. **Synthesis Stage:** By employing the synthesis method, the study converged the discrete elements into a coherent whole. This phase specifically focused on elucidating the interconnectedness of various methods of psychological resilience. This holistic view underscored their collective impact on the overall stress levels of athletes and students alike.

4. **Classification Stage:** With the aim to streamline the vast data, the classification method was employed. This helped in pigeonholing factors based on their influence on psychological stability. The software tool, Atlas.ti, facilitated this categorization, ensuring a structured and accessible data framework.

5. **Survey Stage:** For primary data collection, a survey was conducted in Nur-Sultan, targeting 90 professional athletes and 97 students aged 17 to 24. The questionnaire used for this purpose was Weissman's "Assessment of Occupational Stress". The received data underwent rigorous analysis through the "Psychological Stress Scale "PSM-25" methodology. The survey, designed to be comprehensive,

encompassed multiple blocks of questions probing various dimensions of the subjects' psychological framework.

This methodological approach ensured a rigorous and structured study, giving readers clarity on how the research was conducted. The tools and software applications used at each stage bolstered the validity and comprehensiveness of the study, ensuring that each facet of psychological resilience and its relationship with stressors was scrupulously examined.

## Results

Epidemiological scientific doctrine proves that the factors that affect the deterioration of mental and physical health are the concentration of stressful events over a long period of time in a person's life. However, the issue of psychological stress, which is a component of the structure of health, still remains unresolved. Its priority is due to the fact that stress, by its very nature, is a rather broad and uncertain system, which makes it impossible to accurately measure it. As a result, this can lead to the formation of incorrect definitions and erroneous positions. In practice, psychologists quite often cannot specify and reveal the term "stress" during a conversation or speech. It is common to use related definitions, in particular "stress factor", "crisis stress", "stress indicators". Scientists who study social and subjective problems usually implement these terms in their works freely, that is, without specific context, and use them to demonstrate a wide range of life experiences. The latter can range from poverty to popularity and popular performances. The factors that affect sustainability are generally divided into six components:

- Society;
- Community (inner circle, represented by friends and colleagues);
- Family;
- An individual (personality);
- Physiology (actual state of the organism);
- Genetics (predisposition to stress).

Mental health is a term that refers to the social and emotional well-being of an individual or an entire community. It characterizes a positive state, which is expressed not only in the absence of disease in a person, but also in his well-being. The accepted idea of mental health is influenced by culture, but in general it manifests itself in the following factors: satisfaction with life, the ability to cope with stress and sadness independently, the ability to set and

achieve goals, and the ability to form and maintain connections with other members of the public. Post-traumatic stress disorder is unique in that its main cause is exposure to traumatic, life-threatening, or frightening events. Post-traumatic stress disorder is specific, which is caused by such a factor as the impact of negative life events or crisis events. The mystery is that not all trauma victims develop post-traumatic stress disorder. Based on this, additional conditions are necessary for its appearance, which would increase the probability of its development in the future. These may include:

- Level of social support. Specialists in the field of psychology found that individuals who had a high degree of social support were less likely to experience the onset and development of post-traumatic stress disorder after an injury.
- Natural and hereditary factors. There are opinions that such factors affect a person's predisposition to the appearance of post-traumatic stress disorder after an injury. For example, it is believed that the features of a person's reaction to the received experience depend on the state of the component part of the brain, the hippocampus.
- Method of brain processing of trauma memories. The effects of PTSD are not like "normal" memories. This is due to the fact that they are more emotionally charged and dynamic. Based on this, such memories can "make" a person believe that the trauma is duplicated. It is believed that the process of memorizing memories of trauma is special, because the brain not only stores such information, but also repeats and reproduces it over time, which provokes the appearance of post-traumatic stress disorder in some people (Whalley & Kaur, 2019; Spytyska, 2023).

The development of mental health is related to a number of factors that form the structure of the composition. These include biological, psychological, social and environmental. Their content can be summarized as follows:

- a safe living environment, work, education, absence of discrimination or manifestations of violence; possibilities of using economic means (structural factors);
- positive commitment, interaction in the community, identification and acceptance of diversity, public support and role in society (social factors);
- control over thoughts, development of communication and social skills to support communication with others (individual factors) (Understanding mental health and wellbeing, 2020).

The results of the survey are presented in Table 1.

Table 1.  
Average estimates of test subjects and control group on the Weisman questionnaire

Question	Response from athletes (average arithmetic)	Response from students (average arithmetic)
How often do you feel you lack the authority to do your responsibilities?	4.0	2.8
How often do you get a bad feeling about your duties?	3.6	3.2
How often it happens that you do not know about your possible career promotions?	3.3	3.5
How often do you feel that you're too burdened to handle daily work responsibilities?	3.5	3.0

Applying the "PSM-25" Psychological Stress Scale" method and calculating the average arithmetic results of the interviewees, the following result appears: the level of mental tension of professional athletes is an average of 14.4 points, while the level of mental tension among students averages 12.5. The following factors may affect the psychological condition of athletes during competitions:

- Internal state: subjective assessment of their skills, hormonal background, mood;
- Immediate surroundings: coaches, family members, friends, team members, etc.;
- The macrosystem of competition: quality of equipment, crowd cheering, social media.

## Discussion

One of the characteristics of the 21st century is the presence of permanent psychological pressure caused by the adverse influence of human psychology, having both social and domestic, political and military foundations, and triggered by the high incidence of stress and natural disasters. Regardless of the type and source of origin, each of these events can cause emergencies and human stress (Firyan, 2017; Holtge et al., 2021). The hardening effect suggests that "optimal" stress has a positive effect on well-being, as it helps to strengthen resistance. However, the number of longitudinal studies in different age groups is not enough.

Physiological responses to stress are intertwined with subjective stress sensations, but at the same time differ from it, although both systems must work coherently to provide adaptive responses. The correlation between heart rate and self-assessment of stress experienced by respondents was largely related to greater psychological well-being, a fewer number of depressive symptoms, less anxiety, lower usage of copying negation and lower levels of anti-inflammatory biomarkers. The results of this study underline the importance of examining individual differences in the consistency between physiological measures and subjective mental states concerning well-being (Sommerfeldt et al., 2019). The connection between physical activity and psychological stress is not new. However, considering stress in terms of embodiment allows looking at this physiological activity from another angle. Scientific work from this point of view emphasizes the mutual nature of psychological and physiological processes. The study of the main implementation and structuring of the modality provokes the idea that the position of psychological design can have greater success and effectiveness in contrast to the idea of "stimulus-organism-reaction" (Sapargaliyeva et al., 2023). The position of realized stress demonstrates a constructivist approach. This assumes that phenomena are classified by a person as crisis and consciously marked as such on the basis of an automatic

evaluation of the norm formed by the body, society and life experience. The theory of realized stress also claims that experiences classified as risky involve the formation of special subjects of physiological activity (Francis, 2018). Scientific work has also demonstrated the relationship between social principles and a set of other factors, such as well-being and a positive physiological state. Disorganized social support is associated with crisis and alienation and has been shown to affect brain tasks and capabilities, increasing the risk of these profiles. As a result, a person may be inclined to excessive drinking, the development of cardiovascular problems, mental crisis, and suicide (Terletska, 2019).

In one study of middle-aged men over seven years, those with strong social and emotional support were less likely to die than those without (Cherry, 2020). Awareness of the fact of how individuals are able to transform episodes in objective reality will allow effectively revealing adaptive algorithms for development and provision of meaning. Based on the idea of commitment, it is possible to demonstrate people's ability to clearly describe high-risk and crisis phenomena, which definitely reflect on psychological health. Stories from 224 college students about particular injuries were encoded in the theory of attachment, research, and searching for support. Attachment type, stress-related growth was also measured. Attachment exploration and help-seeking were prerequisites for the emergence of stress, respectively, as a result of trait and trait regulation. Importantly, attachment moderates the relationship between narrative comprehension and psychological development and stress. The results of this study show that narrative processes are important in the context of psychological health. They can be used to varying degrees in accordance with the ideas and positions of the narrator (Graci & Fivush, 2017).

Difficulties in managing emotions during a crisis can be related to both the behavioral control algorithm and the desire to express specific emotions. To further verify this statement, scientists outside the laboratory analyzed the degree of encouragement of people to achieve happiness or, on the contrary, anger, in the course of serious crisis psychological disorders. People with mental stress disorder were characterized by a lower level of interest and desire to experience positive emotions, i.e., they were dominated by negative traits and emotions. The less the participants wanted to achieve positivity, the less they tried to activate happiness in the idea of managing emotions, that is, destroying the crisis state during real stress (Terletska, 2022). It is important to note that the number of subjects expected to suppress positivity depends on the number of medical symptoms of depression that appear months after the crisis state. These results show that personal traits in the desire to achieve positivity and happiness during periods of depression or stress may have clinical significance (Millgram et al., 2019). The

world is currently experiencing the devastating effects of SARS-CoV-2 (severe acute respiratory syndrome-coronavirus 2), a virus responsible for COVID-19. The pandemic, as well as the present isolation, measures profoundly affect people. In a study of the pandemic's impact on college students, survey methods were used to study changes in alcohol consumption with a correlation to mental health. The results showed that participants reported a significant increase in alcohol consumption as a result of the pandemic. This increase in alcohol consumption was also related to the psychological health of the subjects. Research has shown that the deterioration of psychological health correlates with negative effects in several spheres of life (financial, resource, social and academic) and a decline in time management skills. However, leisure activities and personal interaction with family and friends correlate negatively with psychological decline (Ryerson, 2020).

The crisis can affect people's social relations in various ways. Public relations are channels of public interaction. During a crisis, this factor can be the main and most important factor. At the same time, physical contact and communication between individuals plays an important role in the process of perfecting and strengthening social principles (Sadvakassova et al., 2022a). Some of the stressors caused by COVID-19 can further alter individuals' mental health. These include concerns about their physical condition, the health of third parties, and financial consequences. Speaking about students, it is appropriate to note the connection between the educational environment and their level of competence and training. Usually, if the dynamism of social movements decreases as a result of the crisis, the level of influence of specific stressors decreases. These factors include workplace stress, learning problems, and social challenges (Elmer et al., 2020). Familism is the main value for Latin Americans, in which close family relations and the needs of a family as a whole is more important than any needs of any individual family member. Familism is important for well-being and health, but it is unclear whether these values are useful in times of stress. To answer this question, a study was carried out to examine whether the association of familism corresponded with health, as well as with the effects of stress reduction in Latino Americans and Non-Latino Americans. The study involved Hispanic Americans (n=171), Europeans (n=225) and East Asian Americans (n=415); All participants were assessed in terms of family, stress, well-being and health. Regarding general benefits, family relationships are negatively associated with alienation, loneliness, and their negative physiological factors. Regarding the benefits of stress reduction, the combination of high familiarity and high stress was mediated by high levels of individual self-esteem, as opposed to low familiarity. As a result, it provokes the development of a high level of stress. These objects were the same across ethnic groups, suggesting that familism may be

useful for people of all races and ethnicities (Corona et al., 2017).

There is uncertainty among clinicians as to how individual sub-component processes of psychological flexibility, the basic design of a therapy model of acceptance and commitment, interact and influence the experience of distress. In the study (n=567) latent class analysis was used to (a) identify potential classes (i. e. subgroup) of psychological flexibility based on responses to measures of the key sub-component process and (b) examine whether such classes can reliably differentiate the levels of psychological stress reported by individuals. The researchers who conducted this study identified three different classes of psychological flexibility: (a) excessive, (b) normal, and (c) low. People belonging to the third category are characterized by the most productive and critical level of stress. In turn, persons belonging to category (a) claim the lowest level of mental stress (Tyndall et al., 2020). According to estimates, 40 to 60 percent of a person's susceptibility to disorders is caused by the use of psychoactive compounds. The field of research of this type of diseases includes the analysis and evaluation of what can cause the formation of desires in people due to the use of psychoactive substances. In addition, a predisposition to other mental disorders or a high risk of a secondary disorder, based on the first one, may be caused. Such processes are due to the complex dependence between many genes, which forms a genetic interaction under the influence of environmental factors (Yablonska and Kacheniuk, 2022). In particular, long-term use of marijuana by adolescents can provoke the development of psychosis in their adult life. This is especially critical for individuals who are carriers of a certain set of genes.

In some cases, the gene product can be expressed directly. An example of such a process can be the phenomenon when a protein affects a person's response to a drug. In this case, it can either satisfy them or not. Protein can also affect how long the drug stays in the body. Genetic factors that can develop a person's tendency to drink alcohol and smoke have been identified. It is possible to argue about the dependence between genetic characteristics and the risk of cocaine addiction. This is possible due to excessive use of opioids, as well as cannabis and cravings for withdrawal. However, genes can also influence indirectly. This is expressed in determining the individual's response to stress, by increasing or decreasing risk-taking and novelty-seeking behaviors, which may influence the initiation of substance use, which may further influence the emergence of other related psychiatric reactions and complications (Messina et al., 2015). Scientific works have shown that a number of genes can provoke risk in the context of a mental disorder. In addition, they can be expressed in the action of neurotransmitters - chemical elements. The latter transmit data between neurons, which are affected by chemicals and are usually not regulated in the

case. mental illnesses. such as dopamine and serotonin. For professional athletes, this problem is also relevant, because the high level of stress during preparation for competitions and during tournaments, stimulants, prohibited doping and the genetic predisposition described above can have extremely negative consequences (Trybulski et al., 2022).

In order not to miss the early development of psychological problems against the background of stressful factors in professional athletes, it is necessary to develop an easily applicable methodology for assessing the psychological condition of the athlete. The methodology should be based on regular communication with a psychologist to detect early signs of stress, depression, exhaustion and other negative psychological factors. The developed concept should include not only an athlete's assessment and description of his or her conditions, but also an assessment of his or her behavior and interaction with the coach and team. The work of a psychologist should be carried out both individually and with the team. To deal with stressful situations, appropriate psychological measures must be taken. The current situation in support of the mental health and well-being of athletes focuses mainly on improving athlete's mental health literacy and awareness of the signs of mental illness. Such awareness is necessary but not sufficient to meet the diverse mental health needs of professional athletes. At the formal level, a new comprehensive mental health monitoring system has to be introduced for enhancing the mental health and well-being of athletes, for developing and implementing a model for responding to the needs of athletes who are at risk of development or are already experiencing symptoms of mental health disorders. Early detection and treatment of stress symptoms are important in the context of professional sport. Such approaches will help to create a culture that recognizes that an athlete's mental health needs are as important as physical health needs. Both of these factors will likely contribute to the optimization of the overall health condition of the athlete, combined with his or her high productivity (Purcell et al., 2019).

## Conclusions

The results of the survey showed that professional athletes aged from 17 to 24 were on average 15 percent more exposed to mental stress than their peers. In this way, sports and, especially, participation in competitions can be associated with regular stress, mental pressure and general fatigue, resulting in higher self-esteem of the mental stress level of the interviewees. The development methodology should include an assessment of the mental state of an athlete using various methods. Among them are athletes self-evaluation of their psychological state, regular monitoring of the psychological condition of athletes by a highly qualified psychologist, evaluation and assistance in resolving conflict situations in the

team, monitoring of the work of coaches, regular updating of the material and technical base necessary for maintaining and improving the performance of athletes.

Interpersonal relationships are an important element in dealing with the negative effects of psychological stress and in building psychological resilience. Stable and trusting relationships with family and friends are indispensable for the psychological health of any individual, help to build mental stability as well as overcome the consequences of traumatic experiences. Psychological attachment and trustworthy relations are extremely favorable factors for achieving stable mental health. The results of the research tell about the importance of a positive attitude, self-motivation for positive emotions and a better outcome. By looking at psychological resilience through the prism of professional sports, apart from all the same factors that all people need for maintaining mental health, professional athletes also need certain conditions in their working environment. The absence of micro-stress in the form of uncomfortable sports equipment, comfortable conditions for training, the favorable atmosphere in the team, adequate management manner of the coach - all this contributes to the athlete's psychological stability, and, as a consequence, leads to higher results in competitions.

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