

**„ION CREANGĂ” STATE PEDAGOGICAL UNIVERSITY OF CHIȘINĂU
DOCTORAL SCHOOL OF PSYCHOLOGY**

With manuscript title

U.D.C.: 159.922.8:796.077.5(043.2)=111

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**REDUCING PERCEIVED STRESS
IN COMPETITION TRAINING
FOR ADOLESCENT ATHLETES
THROUGH RELAXATION TECHNIQUES**

Specialty 511.02 Developmental psychology and educational psychology

Summary of the PhD Thesis in Psychology

CHIȘINĂU, 2022

The thesis was elaborated within the Doctoral School of Psychology of the "Ion Creangă" State Pedagogical University

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The defense will take place on November 11th 2022 within the meeting of Doctoral Commission within the Doctoral School of Psychology from "Ion Creangă" SPU (1 Ion Creangă street, block 2, Senat Hall).

The PhD thesis and the Summary can be consulted at the Scientific Library of „Ion Creangă” State Pedagogical University of Chișinău and on ANACEC web-page (www.cnaa.md). The summary was delivered on October 11th 2022.

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CONCEPTUAL BASES OF RESEARCH

The topicality of the addressed theme results from the complexity of reducing perceived stress in the competitive training of adolescent athletes, which represents a disruptive element in contemporary life, becoming a significant factor in decreasing the ability to respond to external stimuli, negatively influencing the mental state of the person. The constant need for balance and improvement of well-being necessary for the adaptation of athletes generates trends for an interdisciplinary scientific approach to pre-competitive anxiety in order to identify new strategies and mechanisms for managing stress factors.

Mental stress is a subject that requires an always up-to-date approach and due to the fact that it can have a negative impact on health, researchers such as P.M. Insel and W.T. Roth (2013), I. B. Iamandescu (1999) demonstrating that stress factors can affect the immune system of the body, in the long term, increasing the risk of diseases [29, p. 49], [28, pp. 29-30]. The special importance given to the concept of stress, as well as its management methods, can be seen in the annual studies carried out by the most important professional organization in the field, the American Psychological Association (APA), which since 2007 and until now publishes reports on the sources of stress reported by the population and how they affect daily activities [2]. Also, to emphasize the importance of sport psychology and its scientific framework, the same organization recognized this branch by establishing Division 47 in order to facilitate research in this field [24].

The importance of studying this topic lies in the fact that the sports environment is extremely competitive and has a major impact on society. P. Nieman (2002) indicates extremely clearly that competitive physical activity can lead to a high level of stress and anxiety, and athletes can also present a low level of self-esteem [37, p. 310]. Also, authors such as I. Racu and Iu. Racu (2013) emphasizes the fact that adolescence is the most dynamic stage of human development [41, p. 191]. Scholars R. Rășcanu (2000) and T. Vasile (2016) indicate that during this period the expression of personality can be hindered due to the much more pregnant perception of stressors [53, p. 75], the adolescent may face problems such as: self-harm, suicidal ideation (N. Madge et al., 2011) [33, p.499], mood swings, inner conflicts, insecurity, etc. (U. Șchiopu, E. Verza, 1995) [51, pp. 201-209].

Description of the research situation and identification of the research problem. Internationally, the historical context of the emergence of important specialized studies that addressed the proposed research theme were the works of scholars L. Honkomp (2021), R. Neil et al. (2007), M. Kellmann (2010), who published studies in which the Progressive Muscle Relaxation (Jacobson) technique was used to reduce anxiety in athletes [27]; [36], [30],

Maimunah and H.A. Hashim (2016), M.A. Dawson et al. (2014), S.A. Parnabas et al. (2014) who used the directed imaging technique for the recovery of athletes following injuries [34, p. 237], [11], [38], E. Solberg et al. (1996) who analyzed the effects of meditation on sports performance [49], H.A. Hashim and H. Hanafi (2011) used relaxation techniques to improve the emotional states of adolescent athletes [21, p. 105], M.A. Alwan et al. (2013) who analyzed the relationship between relaxation techniques and sports performance [1].

The relationship between stress and coping mechanisms in athletes was analyzed by I. Burešová et al. (2016), M.J. Hamlin et al. (2019), T. Chyi et al. (2018), conducting extensive, representative studies with reference to the negative states that athletes related to stress (depression, anger, confusion) [5], [20], [38, p. 111].

An important contribution to this chapter is also made by the **papers of Romanian researchers**, including those of scholars M.Epuran (1990, 1968, 1964, 1980, 2001, 2022) [12], [13], [14], [15], [16], [17], I. Holdevici (1980, 2001, 2022, 2016, 1995, 2012, 1988) [15], [16], [17], [22], [23], [24], [25], [26], P. Vasilescu (1988) [25], [26], T. Vasile (2016, 2017, 2018) [53], [54], [55], [56], [57], R. Predoiu (2016) [40], C. Berbecaru (2008) [3].

Of particular interest are the **studies carried out in the Republic of Moldova** by researchers Constantin Ciorbă (2016, 2017, 2020) [8], [9], [10], Iulia Racu (2020, 2021, 2022) [42], [43], [44], [45], S. Gonciaruc, R. Samoteeva, Ș. Cijic (2019) [19].

Due to the need to build appropriate functional mechanisms for stress management, but also the difficulties faced by sports teenagers in reducing the perceived stress in pre-competitive preparation, determined the enunciation of **the research problem**, *which consists in the insufficient knowledge by adolescent athletes of relaxation techniques for coping with stress during pre-competitive training.*

The purpose of the research consists in the development, theoretical substantiation and experimental valorization of a psychological intervention program through relaxation techniques to reduce the perceived stress of adolescent athletes in the pre-competitive period.

The objectives of the research aim at:

1. Determining the theoretical-conceptual foundations regarding stress and relaxation techniques of adolescent athletes during the pre-competitive training period;
2. Identifying the psychological characteristics of athletes necessary to control stress and achieve sports performance;
3. Establishing the levels and particularities of the manifestation of stress, anxiety and self-esteem in adolescent athletes, in the pre-competitive period;

4. Conceptualization, implementation and experimental validation of the Psychological Intervention Program through relaxation techniques to reduce the perceived stress of adolescent athletes in pre-competitive training;

5. Elaboration of scientific conclusions and recommendations regarding the enhancement of sports performance and self-esteem by reducing stress and anxiety in adolescent athletes.

The research hypothesis put forward in this approach was effected in several theses: the neuropsychic tension and the stress level are determined by the specific conditions of the subject; adolescent athletes show a high level of stress and anxiety and a low level of self-esteem in the pre-competitive period, being oriented towards less effective coping mechanisms; by using an intervention program through relaxation techniques, coping resources can be developed to ensure a better management of it.

Scientific research methodology refers to the design and application of the following investigative methods: bibliographic and documentary study; psychological observation; analytical approach; induction; deduction; the axiomatic approach; reasoning by analogy; recourse to history; the observation, formative and control experiment; statistical-mathematical analysis; qualitative analysis.

The novelty and scientific originality of the research result from the design and implementation of theoretical foundations regarding competitive stress and a psychological intervention program that creates real premises for managing anxiety through relaxation techniques that reduce the perceived stress of adolescent athletes by increasing their self-esteem in a pre-competitive context. The research represents, at the national level, one of the first psychological works that offers a unified vision of the principles, conditions and methods by describing the psychological characteristics of adolescent athletes, necessary for stress control and that make it possible to adopt the program in an effective pre-competitive stress self-management strategy.

The obtained results that contributed to the solution of an important scientific problem aim at establishing stress levels and describing the particularities of its manifestation and the scientific substantiation of the Psychological Intervention Program through relaxation techniques that led to the development of personal coping resources in managing the pre-competitive stress level.

The theoretical significance of the research consists in the interdisciplinary approach to the perceived stress of adolescent athletes, the development and implementation of a unitary epistemic-empirical equation with reference to relaxation techniques and their role in managing the level of perceived stress in the pre-competitive training of adolescent athletes. The results of

the given research fall within the scope of the basic objectives of contemporary psychological science, establishing a topical problem on the agenda of the day and offering an original method of solving it.

The applicative value of the research derives from the research results that can be used in various fields, such as: counseling adolescent athletes; developing support programs for children and young people in order to develop coping resources and control anxiety, enhancing the level of self-esteem; professional training (initial and continuing) of psychologists.

Main scientific results of the research:

- establishing the theoretical-conceptual foundations with reference to the stress perceived by adolescent athletes in their training for the pre-competitive stage and describing the meaning of the operational concepts of the research: perceived stress, anxiety, self-esteem, sports performance and mental stress, relaxation techniques and their applications in sports psychology [59, pp. 43-50];

- conceptualising intervention programs through relaxation techniques and facilitating the development of stress management skills [66, pp. 151-154], [62, p. 352];

- synthesizing the indicators, the values of the level of stress, anxiety and self-esteem in adolescent athletes, in the pre-competitive period and their evaluation criteria [59, pp. 46-50];

- the identification and elucidation of coping capacities mechanisms needed for the control of pre-competitive stress in adolescent athletes [59, pp. 46-50], [62, p. 356];

- scientific substantiation and valorization in sports practice of psychological intervention programs through relaxation techniques in the management of pre-competitive stress [66, pp.151-153];

- the conceptualization, implementation and experimental validation of the Psychological Intervention Program through relaxation techniques that contributed to reducing the perceived stress of adolescent athletes in pre-competitive training;

- scientific and practical conclusions and recommendations regarding the management of perceived stress and anxiety and increasing the level of self-esteem among athletes in order to enhance performance.

Implementation of the obtained scientific results. The most important aspects of the paper were analyzed and published within the national and international scientific activities organized in Romania and the Republic of Moldova. The materials are recommended for completing the curriculum in higher education (faculties of psychology and educational sciences) with applied approaches, training elements, applied seminars, University courses and continuous

training, in which the relevance of relaxation techniques in controlling the perceived level of stress and anxiety and increased self-esteem among different groups of people will be addressed.

Publications on the topic of the thesis. The research results are reflected in 11 articles published in scientific journals from the National Register of category B and C profile journals and articles in collections of international and national conferences.

The volume and structure of the thesis. Annotation (in 3 languages), list of abbreviations, list of tables, list of figures, introduction, 3 chapters, general conclusions and recommendations, bibliography of 230 titles and 9 appendices, 162 pages of basic text, 61 figures and 59 tables.

Key words: stress, psychological intervention, relaxation techniques, anxiety, self-esteem, performance, competition.

THESIS CONTENTS

In the **INTRODUCTION**, the topicality and importance of the research topic are argued, the purpose, objectives, hypothesis and methodology of the research are presented. The novelty and scientific originality of the results of the work are exposed, the publications, the summary, the applicative value of the work and the keywords are presented.

Chapter 1. Theoretical aspects of stress and relaxation techniques presents a theoretical analysis of the concept of stress, the relationship between stress, anxiety and self-esteem in athletes, stress factors during adolescence, the relationship between stress and hormones, sports performance and mental stress, relaxation techniques and their applications in sports psychology. Finally, the conclusions of the first chapter were presented, the scientific research problem, the purpose and objectives of the experimental study were formulated.

At the beginning of the first chapter, a series of definitions and interpretations of the concept of stress can be found, from H. Selye (1976) who introduces the term stress and defines it as the "non-specific adaptive response to various external factors" [48, p. 137], to R.S. Lazarus and S. Folkman [31], Insel and W.T. Roth R. [29], R. Floru [18], M. Golu [4], I.B. Iamandescu [28]. Among the stress factors in sports activity were identified [24, pp. 94-95]: temperature, muscle tension, competitions in absolute or relative terms, training, overwork, psychosocial conditions, but also: problems related to self-esteem, relationships with others, time management, noise etc. [40, p. 53].

In this chapter we also presented the elements specific to the adolescence period, which includes young people between the ages of 14/15 and 18-25 [58, p. 185]. During this period, important factors and life events such as: stress, self-esteem, body image, depreciation, abuses can lead to self-harm behaviors, suicidal ideation [33, p.499]. Also, according to Scholars R.

Rășcanu (2000) quoted by T. Vasile (2016) during adolescence the expression of personality can be hindered due to the much more pregnant perception of stressors [53, p. 75].

At the end of the first chapter, were described the appropriate elements for relaxation practice: a safe and quiet environment, an appropriate posture, release from the thoughts and tension of the day, breathing practice, cultivating attention, etc. [52, p.30-31].

Chapter 2. The experimental research of the level of perceived stress, anxiety and self-esteem in adolescent athletes proposes for analysis the experimental design of the research, resulting from the synthesis of specialized literature resources and which addresses the relationship between the level of stress, anxiety and self-esteem. Following the presentation of the methodological framework, the research results of the experiment are described and the conclusions of chapter 2 are formulated.

The purpose of the observational research was to identify the sources of stress and anxious symptomatology, the level of perceived stress, state and trait anxiety and self-esteem in adolescent athletes, as well as the correlations between these variables. Thus, in the framework of the empirical study, we had the following **objectives**: identifying the sources and levels of stress in relation to adolescent athletes; identifying anxious symptomatology and the level of cognitive and somatic anxiety in adolescent athletes; identifying the level of perceived stress, anxiety and self-esteem in adolescent athletes in the pre-competitive period and establishing the correlations between these variables.

The experimental research was carried out between 2020-2021 and had two stages, as follows: a pilot study in which a number of 150 participants were included, we investigated the reported stress and trait anxiety, the sources of stress and anxious symptomatology, and in the second stage a number of 75 participants were included in which the following were investigated: the level of stress, anxiety and self-esteem. The research instruments used were: Athletes' Life Stress Questionnaire [32], Sports Competition Anxiety Test (SCAT) [35], Perceived Stress Scale [7], Adults State and Trait Anxiety Inventory (STAI) [50], Self-Esteem Scale [47].

Following the analysis of the results obtained in the first stage of the experimental confirmatory research (pilot study), after applying the research tools, we were able to establish the following:

1. The distribution associated with the level of stress reported by the participants in the confirmatory study, which we present in figure 1.

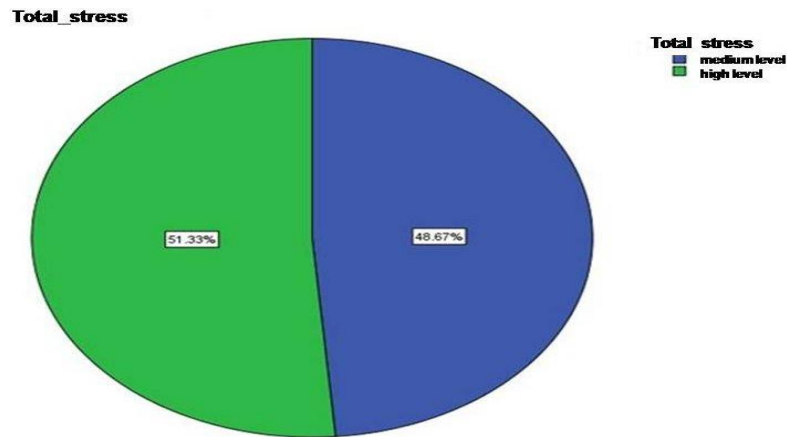


Figure 1. Graphic representation of the distribution associated with the reported stress level

We can observe that, out of the total 150 participants, 51.33% (77 participants) report a high level of stress, while the remaining 48.67% (73 participants) report a medium level of stress, as presented in the figure 1. Study participants report that the situations they encounter favor the occurrence and maintenance of stress, with none of them showing a low level of stress.

2. Participants report: a high level of stress associated with sports activity (64%, 96 participants score values between 5 and 6), a low and average level of daily stress (58.7%, 88 participants score values of scores between 2 and 3) and a low and medium level of academic stress (68%, 102 participants register values of scores between 1 and 2). These results can be explained by the fact that the participants attach much more importance to sports life and its challenges and have less time for other aspects of life.

3. The distribution of stress sources and their level, the results obtained are presented below, in table 1 and table 2.

Level	Stres accidents	Stres performance	Stres_coach relation	Stres trainings	Stres interpersonal relations
High	55.3%	76.7%	63.4%	64.7%	9.3%
Medium	44.7%	23.3%	36.6%	35.3%	68.0%
Low	0.0%	0/0%	0.0%	0.0%	23.0%
Mean	4.6133	5.7644	4.8044	4.8400	3.1956

Level	Stres_romantic_relations	Stres_family_relations
High	11.3%	4.0%
Medium	20.0%	20.6%
Low	69.0%	75.0%
Mean	2.3067	2.5067

The highest scores obtained by the participants were recorded for the sources of stress associated with sports activity. The results obtained and presented in tables 1 and 2 indicated a high level of stress for subscales regarding performance (76.7%), training (64.7%), coach relationship (63.4%) and injuries (55.3%) and a low level of stress regarding romantic (69%) and family (75%) relationships. *The source of stress that presents the highest level is assimilated to the need to achieve a high level of performance (76.7%), this being reported by the participants as the most important source of stress, while family relationships have recorded the lowest level for 75% of participants.*

4. The distribution associated with the level of reported trait anxiety, shown in figure 2.

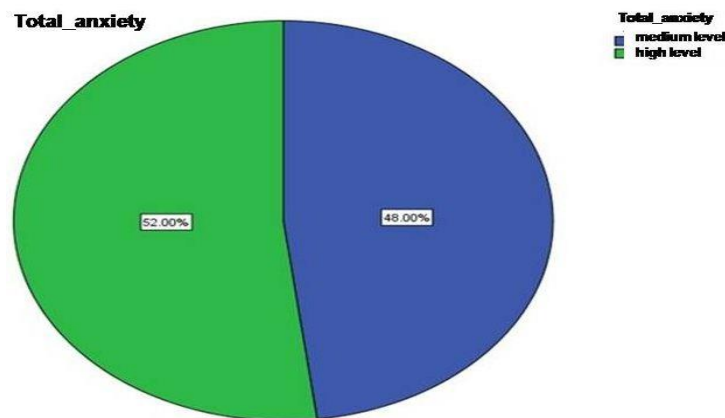


Figure 2. Graphic representation of the distribution associated with the level of reported trait anxiety

The results obtained indicate that of the total participants, 52% (78 participants) report a high level of total anxiety, while 48% (72 participants) report a medium level of total anxiety, according to figure 2.

5. Following Pearson correlation analysis, statistically significant positive correlations were identified both between reported stress and trait anxiety ($r = .19$, $p = 0.05$, bilateral), and between cognitive anxiety and somatic anxiety ($r = .28$, $p = 0.01$, bilateral).

These results indicate that the multiple sources of stress faced by athletes can influence the presence and maintenance of anxiety symptoms, both cognitive and somatic, and a more in-depth analysis is needed regarding stress, and the two facets of anxiety (state and trait), but also the correlation between stress and self-esteem as its mediator [39].

In the second stage of the confirmatory experimental study, according to the results obtained in the pilot study, we analyzed the level of the variables stress, state and trait anxiety, self-esteem in the pre-competitive period, as well as the correlations between these variables. The distribution of scores regarding the level of perceived stress, anxiety and self-esteem reported by the participants are presented in table 3.

Table 3. Distribution of scores on the level of perceived stress, anxiety and self-esteem for the participants

Variables	N	M	S.D.	Minimum	Maximum
Perceived stress	75	4.56	.43	3.57	5.00
State anxiety	75	3.70	.39	2.90	4.00
Trait anxiety	75	3.72	.27	3.25	4.00
Self esteem	75	1.42	.52	1.00	3.00

1. The results obtained following the application of the Perceived Stress Scale indicated that the adolescents participating in the research present a high level of stress felt in the pre-competitive period. Scores ranged from 3.57 to 5 for participants ($M= 4.56$, $S.D. = .43$). Thus, according to these results, the study participants feel a high and difficult to control stress level in the pre-competitive period, in which the state of nervousness and irritation can be accentuated, they face unforeseen events.

2. The results obtained after the application of the State and Trait Anxiety Inventory indicated that the athletes participating in the research present a high level of state anxiety, the scores varied between 2.90 and 4 for the participants ($M= 3.70$, $S.D. = .39$) and trait anxiety, scores ranged between 3.25 and 4 ($M= 3.72$, $S.D. = .27$) felt in the pre-competitive period. Comparing the results obtained after using the two STAI questionnaires, they indicate a high level of anxiety for both scales, but more participants had maximum scores on the scale measuring state anxiety 41.3% compared to trait anxiety 34.7%. This indicates that the state of anxiety is anticipatory, preceding sports competitions.

3. The results obtained following the application of the Self-Esteem Scale indicated that the research participants have a low level of self-esteem in the pre-competitive period. Scores ranged from 1 to 3 for participants ($M= 1.42$, $S.D. = .52$). Low self-esteem indicates lack of confidence in one's own worth. The level of self-esteem can determine the motivation and affect the emotions, thoughts and behavior of adolescents.

4. The results obtained from the correlation analyzes indicated the following: the presence of statistically significant positive correlations between the level of stress and state

anxiety ($r = .73$ ($r^2 = .53$), $p = 0.01$, bilateral) and trait anxiety ($r = .73$ ($r^2 = .53$), $p = 0.01$, bilateral) and the presence of statistically significant negative correlations between the level of stress and self-esteem ($r = -0.81$ ($r^2 = 0.66$), $p = 0.01$, bilateral) and state anxiety level ($r = -0.75$ ($r^2 = 0.56$), $p = 0.01$, bilateral) and trait anxiety and self-esteem level ($r = -0.67$ ($r^2 = 0.45$), $p = 0.01$, bilateral). Thus, the higher the level of stress, the higher the level of state and trait anxiety, and the higher the level of stress and state and trait anxiety, the lower the level of self-esteem.

5. Following the results obtained in the confirmatory experiment, we identified the need to develop a psychological intervention program in order to control and reduce the level of stress and anxiety and to increase the level of self-esteem.

Chapter 3. Decreasing the perceived level of stress and anxiety and increasing the level of self-esteem in adolescent athletes in experimental conditions presents the formative design of the intervention program. The experimental intervention program was developed based on the particularities identified in the confirmatory study. The first part presents the training stages, the content of the intervention program. In the final part, with the aim of evaluating the effects of relaxation techniques in adolescent athletes, we analyzed the results and impact dimensions of the intervention program. The chapter contains the comparative interpretation of the experimental test-retest results for the control group and the experimental group and the effectiveness of the program that aimed to decrease the level of stress and anxiety and improve the level of self-esteem in adolescent athletes, ending with generalization conclusions.

The research hypothesis was concretized in: the use of an intervention program through relaxation techniques can develop coping resources that reduce the level of stress in adolescent athletes, in the pre-competitive period, ensuring a better management of it.

The objectives of the formative experiment: the development and implementation of the psychological intervention program; evaluating the results and effectiveness of the training program and presenting conclusions and recommendations based on the obtained results. The participants were 60 females, aged between 18 and 19 years (Mean = 18.42; S.D. = .30), divided into 2 equal groups (experimental group – EG and control group – CG). The relaxation sessions (fig. 3) were held weekly for 8 consecutive months, totaling 33 psychological intervention sessions.

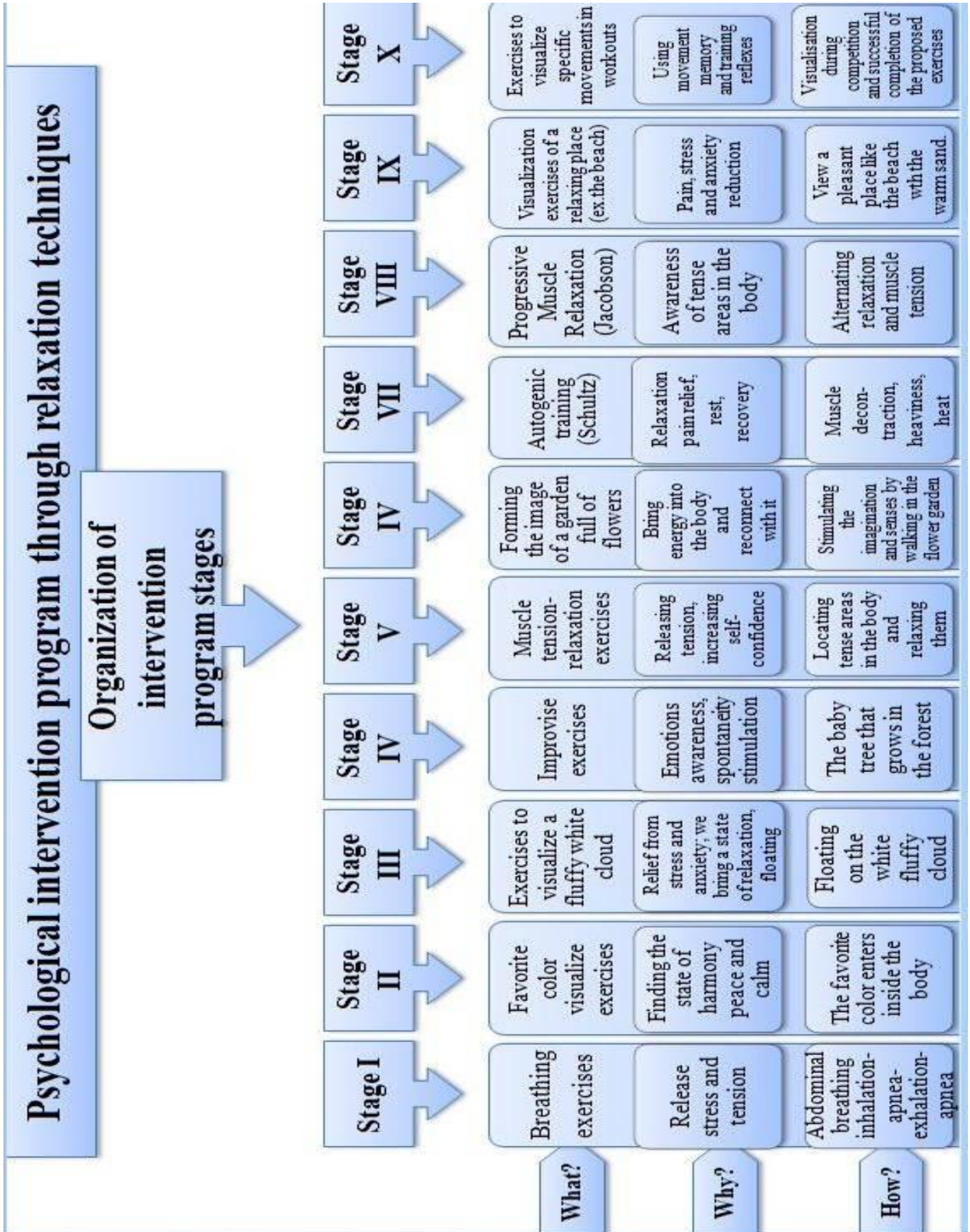


Figure 3. Graphic representation- stages of the psychological intervention program through relaxation techniques

In order to test and verify the formulated hypotheses, to achieve the goals outlined and to achieve the research goal, we applied the following research instrument: the Perceived Stress Scale [7], the State and Trait Anxiety Inventory for Adults (STAI) [49] and the Self-Esteem Scale [46].

At the beginning of the formative experiment we analyzed the results obtained by the participants from the two groups (EG and CG). We applied the t-test for independent samples whose results show that there are no significant differences at the beginning of the experiment between the two groups associated with the control condition and the experimental condition, as detailed in table 4.

Table 4. Baseline measurements and demographic characteristics

Variables		Group	N	M	S.D.	Min.	Max.	t (df)	p
Age	Group	Control	30	18.35	.28	18	18.9	-	-
		Experimental	30	18.47	.31	18	18.9		
Self esteem	Group	Control	30	1.13	.21	1.00	1.60	- 2.11 (57)	.04
		Experimental	30	1.24	.18	1.00	1.60		
Perceived stress	Group	Control	30	4.85	.20	4.43	5.00	3.97 (57.11)	.01
		Experimental	30	4.63	.23	4.14	5.00		
State anxiety	Group	Control	30	3.89	.22	3.35	4.00	1.13 (57.72)	.26
		Experimental	30	3.82	.21	3.20	4.00		
Trait anxiety	Group	Control	30	3.86	.21	3.42	4.00	1.62 (57.46)	.11
		Experimental	30	3.78	.19	3.26	4.00		

Thus, we can observe that the scores obtained by the participants for the level of self-esteem starts in both groups from the minimum score (1) and is located in both groups from the minimum value 1 to the maximum value 1.6, the perceived stress level starts in the experimental group from a lower value of 4.14, but the range for both groups ends at 5, the range of state anxiety level is very close in both groups formed 3.35-4.00 for CG and 3.20-4.00 for EG respectively, and the high level of trait anxiety it starts at 3.26 in EG, and 3.42 in CG, reaching a maximum of 4 in both groups. Likewise, the average ages of the participants in the formative experiment are close, as are the averages of the measured variables. The obtained results indicated a high level of stress and state and trait anxiety and a low level of self-esteem in the pre-competitive period. The emotional state of worry, anxiety or nervous tension is present at a high level in the pre-competitive period and can lead to sleep or eating disorders, maladjustment,

panic states, etc., which can create a high level of discomfort for adolescent athletes. Low self-esteem indicates certain feelings of lack of confidence in one's own worth and competence. The level of self-esteem can determine the motivation and affect the emotions, thoughts and behavior of adolescents. The devaluation of one's own person can have negative implications not only in the competitive activity, but also in terms of the general well-being of the athletes. Adolescent athletes experience negative emotions and thoughts that it is important to learn how to manage in order to perform at the highest possible level during the competitive period.

After EG's participation in the relaxation techniques intervention program, we measured again the level of the variables perceived stress, state and trait anxiety, and self-esteem to analyze if there are statistically significant differences between the two groups. We present in table 5 the results obtained by CG and EG in the retest stage.

Table 5. Distribution of scores regarding the level of perceived stress, anxiety and self-esteem in participants in the retest stage

Variables		group	N	M	S.D.	Min.	Max.
Perceived stres	Group	Control	30	4.85	.21	4.36	5.00
		Experimental	30	1.21	.15	1.00	1.57
State anxiety	Group	Control	30	3.87	.22	3.30	4.00
		Experimental	30	1.27	.20	1.00	1.65
Trait anxiety	Group	Control	30	3.89	.15	3.50	4.00
		Experimental	30	1.24	.15	1.00	1.60
Self esteem	Group	Control	30	1.06	.14	1.00	1.50
		Experimental	30	3.85	.19	3.40	4.00

Following the results obtained by the two groups (CG and EG), statistically significant differences are observed between CG and EG in the retest stage. Regarding the CG the obtained scores indicate a maintenance of a high level of perceived stress, state and trait anxiety and a low level of self-esteem. For the CG participants, the resulting values indicate the maintenance of the manifestations specific to situations of intense stress and anxiety, but also the emotions specific to a low level of self-esteem. Following participation in the relaxation sessions, statistically significant differences can be observed in GE in terms of decreasing the level of stress, and state and trait anxiety and improving the level of self-esteem.

We present below the results obtained by the two groups after the participation of GE in the intervention program and highlighting the differences between CG and EG at the retest stage in terms of the values for each analyzed variable.

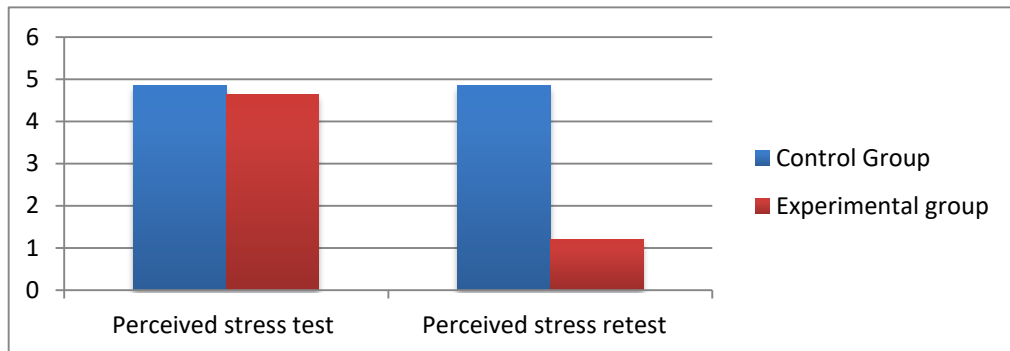


Fig. 4 Graphical representation of the distribution of the perceived stress level of the participants according to the group

Figure 4 organizes the data on the perceived stress level of the participants according to belonging to the control group and the experimental group. For the control group, the stress level perceived by the participants is between 4.36 and 5. For the experimental group, the stress level perceived by the participants is between 1 and 1.57. The results obtained show that there are no changes in the level of stress perceived by the participants in the CG in the two phases, they obtained scores between 4.43 and 5 in the test phase. Therefore, it is observed that the level of stress perceived by the participants in the control group is still at a high level and that they did not register different statistical values in the retest phase compared to the test phase. Following the results obtained and regarding the statistical differences of the average scores obtained by CG and EG subjects on the level of perceived stress, we mention that the psychological intervention aimed at reducing the level of perceived stress produced an effect on the adolescents. Thus, in the *adolescents of the experimental group, a decrease in the level of perceived stress is observed after the implementation of the psychological intervention.*

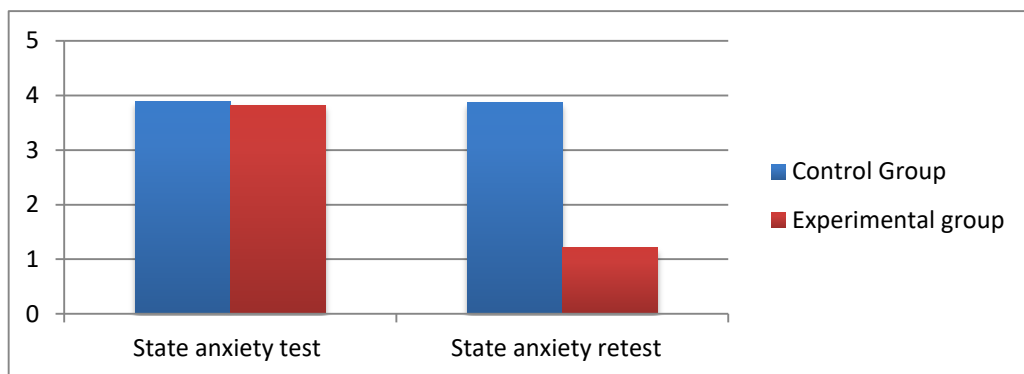


Fig. 5 Graphic representation of the distribution of the state anxiety level according to the group

Figure 5. organizes the data on the anxiety level of the participants according to belonging to the control group and the experimental group. For the control group, the level of anxiety as a state is between 3.3 and 4, and the median is 4. For the experimental group, the level of anxiety as a state felt by the participants is between 1 and 1.65. 50% of participants are between 1.1 and 1.4, and the median is 1.3. The results obtained show that there are no changes in the level of state anxiety for the participants in the control group in the retest phase, they obtained scores between 3.35 and 4 in the test phase. Therefore, the level of state anxiety felt by the participants in the control group is still at a high level and that they did not register different values in the retest phase compared to the test phase. Following the results obtained and described above regarding the statistical differences of the average scores obtained by CG and EG subjects on the level of state anxiety, we mention that the psychological intervention aimed at reducing the level of anxiety produced an effect on the adolescents. Thus, in *the adolescents of the experimental group, a decrease in the level of state anxiety is observed after the psychological intervention.*

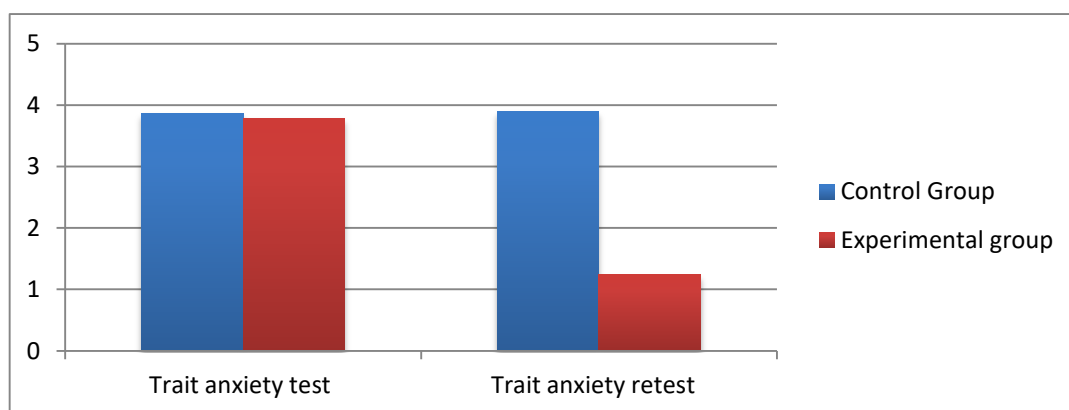


Fig. 6. Graphical representation of the distribution of participants' perceived trait anxiety level by group

Figure 6 organizes the data on participants' trait anxiety level by control group and experimental group membership. For the control group, the level of trait anxiety is between 3.5 and 4. 50% of the participants are between 3.8 and 4, and the median is 4. For the experimental group, the level of trait anxiety felt by the participants is between 1 and 1.6. The obtained results show that there are no changes in the level of trait anxiety for the CG participants in the retest phase, they obtained scores between 3.42 and 4 in the test phase. Therefore, the trait anxiety level perceived by the CG participants is still at a high level and they did not register different statistical values in the retest phase compared to the test phase. Following the results obtained

and described above regarding the statistical differences of the average scores obtained by CG and EG subjects on the level of trait anxiety, we mention that the psychological intervention aimed at reducing the level of anxiety produced an effect on the adolescents. Thus, in the *adolescents of the experimental group, a decrease in the level of trait anxiety is observed after the psychological intervention.*

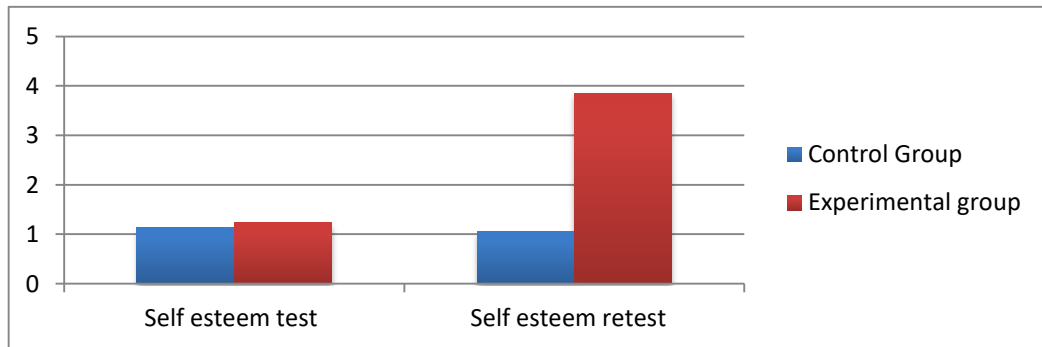


Fig. 7. Graphical representation of the distribution of participants' self-esteem scores by group

Figure 7 organizes the data on participants' self-esteem according to control and experimental group membership. For the control group, the level of self-esteem reported by the participants is between 1 and 1.5, and the median is 1. For the experimental group, the level of self-esteem of the participants is between 3.4 and 4. The results obtained show that there are no changes in concerns the level of self-esteem for GC participants in the retest phase, who obtained scores between 1 and 1.6 in the test phase. Therefore, the level of self-esteem felt by the GC participants is still at a low level and they did not register different values in the retest phase compared to the test phase. Following the results obtained and described above regarding the statistical differences of the average scores obtained by GC and GE subjects at the level of self-esteem, we mention that the psychological intervention aimed at improving the level of self-esteem produced an effect on the adolescents. Thus, in the *adolescents of the experimental group, an improvement in the level of self-esteem is observed after the implementation of the psychological intervention.*

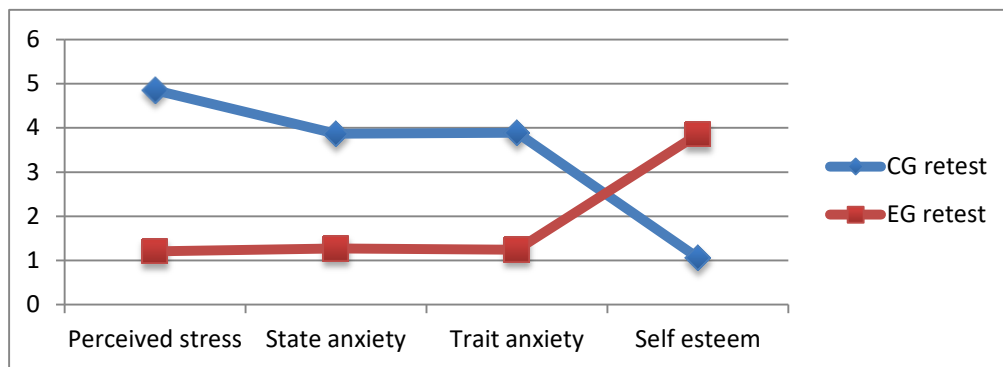


Fig. 8. Graphic representation of the distribution of stress, anxiety and self-esteem scores of the participants according to the group in the retest stage

Figure 8 shows the differences between GC and GE in the retest stage depending on group membership and the differences obtained by GE after participating in the intervention program through relaxation techniques. Thus, following the presented results we can conclude:

1. The research data *support the hypothesis that the level of stress felt is significantly reduced in participants who practice relaxation exercises compared to those who don't* ($m_1 = .00$, $m_2 = 3.41$, $t = -73.02$, $df = 34.39$, $p = .001$). The confidence interval (95%) for the difference between the means is between the lower limit -3.51 and the upper limit -3.32, expressing a low precision of the estimate of the difference between the means.

2. The research data *support the hypothesis that the state anxiety level is significantly reduced in participants who practice relaxation exercises compared to those who don't* ($m_1 = .02$, $m_2 = 2.56$, $t = -50.27$, $df = 31.68$, $p = .001$). The confidence interval (95%) for the difference between the means is between the lower limit -2.64 and the upper limit -2.44, expressing a low precision of the estimate of the difference between the means.

3. The research data *support the hypothesis that the trait anxiety level is significantly reduced in participants who practice relaxation exercises compared to those who don't* ($m_1 = .02$, $m_2 = 2.55$, $t = -48.97$, $df = 34.32$, $p = .001$). The confidence interval (95%) for the difference between the means is between the lower limit -2.68 and the upper limit -2.46, expressing a low precision of the estimate of the difference between the means.

4. The research data *support the hypothesis that the level of self-esteem is significantly improved in participants who practice relaxation exercises compared to those who don't* ($m_1 = .07$, $m_2 = 2.61$, $t = 53.05$, $df = 49.09$, $p = .001$). The confidence interval (95%) for the difference between means lies between the lower limit of 2.58 and the upper limit of 2.78, expressing low precision of the estimate of the difference between means.

In conclusion, the results obtained by EG, compared to those of CG obtained in the retest phase, allow us to state that **the psychological intervention had a significant positive effect on the level of stress, anxiety and self-esteem in the subjects of the experimental group**, evidenced by **the decrease of the perceived stress and anxiety levels, as well as increasing self-esteem** regarding competitive performance.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

The investigation of the launched objectives offered us a plenary and integrative vision of the process of reducing and managing stress in adolescent athletes, in the pre-competitive period by carrying out a psychological intervention program through relaxation techniques. Theoretical studies and validated experimental data reveal the following general **conclusions**:

1. Sports practice requires endurance, agility, flexibility, strength, discipline, the practice of daily training. Sport pushes the limits, imposes the permanent need to approach perfection, the need for originality and affirmation of one's own personality, stress in athletes implies the permanent need to adapt to stress factors. **The theoretical foundations regarding stress and relaxation techniques of adolescent athletes during pre-competitive training were determined**, represented by the concepts of competitive stress and sports performance, principles of relaxation, psychotonic training methods, progressive muscle relaxation, applied dynamic relaxation, body training, autogenic training, guided imagery, the relationship between stress, anxiety and self-esteem, the mind-body relationship in performance enhancement.

2. The interdisciplinary approach to perceived stress by adolescent athletes, interpreted as a psychosocial phenomenon, as a non-specific response of the body to the demands of the environment, reflected in reactions of the body whose well-being is threatened and which does not have an immediate response to combat that threat, but has the need to perform the functions of adaptation and restoration of well-being. **The psychological characteristics of adolescent athletes necessary to control stress and achieve sports performance were identified**: mastery of emotions, control of thoughts, persistence of attention and ability to concentrate, mood and positive thinking, self-confidence, permanent adaptation, body awareness, existence of motivation, practice of self-control (A. Nicolescu (2020; 2021) [59], [60], [62]).

3. In order to deal with the tense and stressful situations adolescent athletes face in the pre-competitive period, they adopt less effective coping mechanisms, which causes difficulties in managing the stress level. **The levels of manifestation of stress, anxiety and self-esteem in adolescent athletes in the pre-competitive period were determined**. The high level of anxiety

characteristic of adolescent athletes in the pre-competitive period causes injuries, prolongation of the recovery period, increased cognitive anxiety for mistakes and results, high level of somatic anxiety and low level of self-esteem in the pre-competitive period.

4. **The psychological peculiarities of the manifestation and management of the level of stress in adolescent athletes during the pre-competitive period were described**, which constituted the premise of the development and implementation of the strategy of psychological intervention in the management of stress level, oriented towards the development of coping resources capitalized through relaxation techniques. **The theoretical significance of the research** is confirmed by the development and application of a unitary epistemic-empirical equation with reference to relaxation techniques and their role in managing the level of perceived stress in the competitive training of adolescent athletes.

5. **Arguments have been made regarding the constant need for adaptation and integration of adolescent athletes** which leads to an appropriate and balanced emotional maturation. The need to structure the thinking style, as well as the high level of stress demands the body at an extremely high level, which leads to the need to find new ways to improve well-being [57, p. 20].

6. **Scientific conclusions were formulated** regarding the results obtained at the ascertainment stage, which showed that by applying **the life stress questionnaire, the adolescent athletes** demonstrated a medium level of stress - 48.67% and a high level of stress (51.33%). The highest scores obtained by the participants were recorded for the sources of stress associated with sports activity, high levels being observed for stress regarding sports performance (76.7% of participants), stress regarding injuries (55.3% of participants), stress regarding the athlete's relationship with the coach (63.4% of participants) and stress specific to sports training (64.7% of participants). The results obtained following the application of the Sports Anxiety Scale indicated that of the total participants, 52% report a high level of total anxiety, while 48% report an average level of total anxiety. Study participants show a high level of cognitive anxiety for mistakes (76.7% of participants) and results (68% of participants), but also a high level of somatic anxiety manifested by emotionality (75.3% of participants), tension (61.3% of participants), empty stomach and tachycardia (80.7% of participants).

7. Following the analysis of Pearson correlation tables, **statistically significant positive correlations were identified both between reported stress and trait anxiety, and between cognitive anxiety and somatic anxiety**. These results indicate that the countless sources of

stress faced by athletes can influence the appearance and maintenance of anxious symptoms, both cognitive and somatic, and a more in-depth analysis is needed regarding perceived stress as a predictor of anxiety [28], the two facets of anxiety (state and trait), but also the correlation of stress with self-esteem as its predictor and mediator [39].

8. **The results obtained** following the application of the Perceived Stress Scale **indicated that the teenagers participating in the research present a high level of stress felt in the pre-competitive period. It has been scientifically proven that the high level of stress in the pre-competition period can be associated with the following factors:** *negative thoughts about the upcoming competition, lack of good sleep and nutrition hygiene, family problems, external expectations, lack of self-confidence, fulfillment of their own expectations etc.*

9. **The experimental data obtained** from the application of the State and Trait Anxiety Inventory **indicated that athletes participating in the research show a high level of stait and trait anxiety during the pre-competitive period.** The emotional state of worry or nervous tension is present at a high level in the pre-competitive period and can lead to sleeping or eating disorders, maladjustment, panic states, etc., which can create a high level of discomfort for the participants. They will face the anticipatory anxiety that is triggered before each contest, which is a condition that it is advisable to learn to control.

10. **It was experimentally demonstrated** that the results obtained from the application of the Self-Esteem Scale indicated that **the research participants have a low level of self-esteem in the pre-competitive period.** Low self-esteem indicates certain feelings of lack of confidence in one's own worth and competence. The level of self-esteem can determine the motivation and can affect the emotions, thoughts and behavior of adolescents. Devaluation of one's own person can have negative implications not only in competitive activity, but also in terms of general well-being.

11. **The conceptualization, implementation and experimental validation of the Psychological Intervention Program through relaxation techniques to reduce the perceived stress of adolescent athletes in pre-competitive training** is based on the integration of relaxation techniques, which refer to meditative guidance, experiential techniques and those from cognitive behavioral therapy. The use of the integrative approach in the development and implementation of the intervention program made it possible to: determine the problems that generate the appearance of stress in adolescent athletes, in the pre-competitive period; identifying and developing personal coping resources, with their use in solving the problems

they face and which generate stress; learning ways to deal with stress by selecting effective coping mechanisms - through activities designed to decrease the perceived level of stress and anxiety and increase the level of self-esteem in adolescent athletes. **The novelty and originality of the research** results from the effectiveness, statistically demonstrated, of the psychological intervention program that ensured the decrease of stress and anxiety and the increase of self-esteem of adolescent athletes.

12. The implementation of the psychological intervention strategy through relaxation methods in managing the perceived level of stress and anxiety and increasing the level of self-esteem in adolescent athletes in the pre-competitive period favored the decrease of perceived stress. Through the positive influence on the process of developing coping resources (self-efficacy, optimism, emotional regulation, increased tolerance to stress, problem solving, etc.) **the applied value of the research was demonstrated**, justified by the development of nominated coping resources that have favored the choice of the adolescent athletes in the pre-competitive period of effective coping strategies for stress management (positive reinterpretation, emotional discharge, search for socio-instrumental and socio-emotional support, planning actions to overcome stressful situations), ensuring an effective management of psychotraumatic situations.

13. Following the results obtained in the formative study, we can conclude that the psychological intervention program achieved its intended objective and produced the desired effects, which are confirmed by the statistically significant differences between the data of the control group and the experimental group observed at the retest stage, but also for the experimental group in the test/retest stages, that shows both the degree of effectiveness and its efficiency, as follows: the research data support the hypothesis that the level of the perceived stress is significantly reduced in participants who practice relaxation exercises compared to those who don't. The research data supports the hypothesis that the level of state anxiety is significantly reduced in participants who practice relaxation exercises compared to those who don't. Research data supports the hypothesis that trait anxiety levels are significantly reduced in participants who practice relaxation exercises compared to those who don't. Research data supports the hypothesis that self-esteem is significantly improved in participants who practice relaxation exercises compared to those who don't.

In order to reduce the stress vulnerability of adolescent athletes in the pre-competitive period and to meet the needs of psychological assistance, we propose the following **practical recommendations**:

1. Implementation of the intervention program through relaxation techniques for adolescent athletes within school programs.
2. Training of specialists in the field through continuing education courses.
3. The development of a future guide for psychologists, with the bases of intervention in athletes' pre-competitive period and the use of the intervention program through relaxation techniques within the framework of the guide.
4. Completing the curriculum in higher education (faculties of psychology and educational sciences) with applied approaches, trainings, seminars, university courses and continuing education, in which the relevance of relaxation techniques in managing the perceived level of stress and anxiety and increasing the level of self-esteem among different groups of people will be addressed.

Research perspectives:

- Extending investigations of athletes facing stress factors, which is why we recommend a study on the relationship between age, pain and anxiety in athletes during competitive periods.
- Research analysis on the correlation between perceived stress level as a predictor of anxiety and depression and other variables in adolescent athletes.

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ADNOTARE

Nicolescu Alexandra-Cristina, Diminuarea stresului perceput în pregătirea competițională a sportivilor adolescenți prin tehnici de relaxare

Teză de doctor în psihologie. Chișinău, 2022

Structura tezei: Lucrarea este constituită din adnotare, lista abrevierilor, introducere, trei capitole, concluzii generale și recomandări, bibliografie din 230 surse, 9 anexe, 162 de pagini de text de bază, 62 de figuri, 59 de tabele. Rezultatele cercetării sunt publicate în 11 lucrări științifice.

Cuvinte cheie: stres, intervenție psihologică, tehnici de relaxare, anxietate, stimă de sine, performanță, competiție.

Domeniu de studiu: psihologia adolescentului, psihologia sportului.

Scopul cercetării constă în elaborarea, fundamentarea teoretică și valorificarea experimentală a unui program de intervenție psihologică prin tehnici de relaxare pentru diminuarea stresului perceput a sportivilor adolescenți în perioada precompetițională.

Obiectivele cercetării: Determinarea fundamentelor teoretico-conceptuale privind stresul și tehnicile de relaxare a sportivilor adolescenți în pregătirea precompetițională; identificarea caracteristicilor psihologice ale sportivilor necesare pentru controlul stresului și pentru atingerea performanței sportive; stabilirea nivelurilor și particularităților de manifestare a stresului, a anxietății și a stimei de sine la adolescenții sportivi, în perioada precompetițională; conceptualizarea, implementarea și validarea experimentală a Programului de intervenție psihologică prin tehnici de relaxare pentru diminuarea stresului perceput a sportivilor adolescenți în pregătirea precompetițională; elaborarea unor concluzii științifice și recomandări privind sporirea performanței sportive și a stimei de sine prin diminuarea stresului și a anxietății la adolescenții sportivi.

Noutatea și originalitatea științifică rezultă din proiectarea și punerea în practica psihologică a unor fundamente teoretice privind stresul competițional și a unui Program de intervenție psihologică ce crează premise reale pentru gestionarea anxietății prin tehnici de relaxare care diminuează stresul perceput al sportivilor adolescenți sporind stima de sine a acestora în context precompetițional. Cercetarea reprezintă, la nivel național, una din primele lucrări psihologice care oferă o viziune unitară asupra principiilor, condițiilor și metodelor prin descrierea caracteristicilor psihologice ale sportivilor adolescenți, necesare pentru controlul stresului, atingerea performanței sportive și care fac posibilă adoptarea programului într-o strategie eficientă de autogestionare a stresului precompetițional.

Problema științifică importantă soluționată vizează stabilirea nivelurilor de stres, descrierea particularităților de manifestare a stresului și fundamentarea științifică a Programului de intervenție psihologică prin tehnici de relaxare care a condus la dezvoltarea resurselor personale de coping în gestionarea nivelului de stres precompetițional.

Semnificația teoretică a lucrării constă în abordarea interdisciplinară a stresului perceput al sportivilor adolescenți, elaborarea și punerea în aplicare a unei ecuații epistemico-empirice unitare cu referire la tehnicile de relaxare și rolul acestora în gestionarea nivelului de stres perceput în pregătirea competițională a sportivilor adolescenți. Rezultatele cercetării date se înscriu în spectrul obiectivelor de bază ale științei psihologice contemporane, stabilind în agenda zilei o problemă de actualitate și oferind o metodă originală de soluționare a acesteia.

Valoarea aplicativă a lucrării derivă din rezultatele cercetării care pot fi valorificate în domenii variate: cercetarea stresului contribuind la extinderea granițelor epistemologice ale teoriei cu referire la programele prin tehnici de relaxare a stresului perceput și la diversificarea strategiilor de punere în aplicare a acestora; în activitatea de consiliere a adolescenților sportivi, realizată la diferite nivele de intervenție; în elaborarea programelor de sprijin pentru copii și tineri în vederea dezvoltării resurselor de coping și combaterea anxietății, ridicarea nivelului stimei de sine în contextul formării profesionale (inițiale și continue) a psihologilor.

Implementarea rezultatelor științifice. Aspectele importante ale lucrării au fost analizate și publicate în cadrul activităților științifice naționale și internaționale organizate în România și Republica Moldova. Materialele sunt recomandate pentru completarea curriculei în învățământul superior (facultăți de psihologie și științe ale educației) cu demersuri aplicative, traininguri și seminarii aplicative, cursuri universitare și formare continuă, în care vor fi abordate relevanța tehnicilor de relaxare în gestionarea nivelului perceput de stres și anxietate și creșterea nivelului stimei de sine în rândul diferitor grupuri de persoane.

ANNOTATION

Nicolescu Alexandra-Cristina, Reducing perceived stress in competition training for adolescent athletes through relaxation techniques

PhD Thesis in Psychology. Chişinău, 2022

Structure of the thesis: The work consists of annotation, the list of abbreviations, introduction, three chapters, general conclusions and recommendations, 230 bibliographic sources, 9 appendices, 162 pages of text, 62 diagrams and 59 tables. The results are published in 11 scientific papers.

Keywords: stress, psychological intervention, relaxation techniques, anxiety, self esteem, performance, competition.

Field of study: adolescent psychology, sport psychology

The purpose of the research consists in the development, theoretical substantiation and experimental valorization of a psychological intervention program through relaxation techniques to reduce the perceived stress of adolescent athletes in the pre-competitive period.

The objectives of the research: Determining the theoretical-conceptual foundations regarding stress and relaxation techniques of adolescent athletes during the pre-competitive training period; identifying the psychological traits of athletes necessary to control stress and achieve sports performance; establishing the levels and particularities of stress, anxiety and self-esteem manifestation in adolescent athletes, in the pre-competitive period; the conceptualization, implementation and experimental validation of the Psychological Intervention Program through relaxation techniques to reduce the perceived stress of adolescent athletes in pre-competitive training; the development of scientific conclusions and recommendations regarding the enhancement of sports performance and self-esteem by reducing stress and anxiety in adolescent athletes.

Novelty and scientific originality results from the design and implementation of theoretical foundations regarding competitive stress and a psychological intervention program that creates real premises for managing anxiety through relaxation techniques that reduce the perceived stress of adolescent athletes and increase the adolescent athletes' self-esteem in a pre-competitive context. The research represents, at the national level, one of the first psychological papers that offers a unified vision on the principles, conditions and methods by describing the psychological characteristics of adolescent athletes, necessary for controlling stress, achieving sports performance and making it possible to adopt the program in an effective strategy of self-management of pre-competitive stress.

The important scientific problem solved concerns the establishment of stress levels, the description of the particularities of stress manifestation and the scientific substantiation of the Psychological Intervention Program through relaxation techniques that led to the development of personal coping resources in the management of the pre-competitive stress level.

The theoretical significance of the study consists in the interdisciplinary approach to the perceived stress of adolescent athletes, the development and implementation of a unitary epistemic-empirical equation with reference to relaxation techniques and their role in managing the level of perceived stress in the competitive training of adolescent athletes. The results of the given research fall within the scope of the basic objectives of contemporary psychological science, establishing a topical problem, and offering an original method of solving it.

The practical value of the research derives from the research results that can be exploited in various fields: stress research contributing to the expansion of the epistemological boundaries of the theory with reference to the relaxation technique programs, the perceived stress, and their implementation strategies; in the counseling activity of adolescent athletes, carried out at different levels of intervention; in the development of support programs for children and young people in order to develop coping resources and control anxiety, improving the level of self-esteem for professional training (initial and continuous) of psychologists.

Implementation of scientific results. The most important aspects of the work were analyzed and published within the national and international scientific activities. The paper is recommended for completing the university curriculum (psychology and educational sciences faculties) with applied continuous trainings and seminars, university courses, in which the relevance of relaxation techniques in managing the perceived level of stress and anxiety and increasing self-esteem among different groups of people will be addressed.

NICOLESCU ALEXANDRA-CRISTINA

**REDUCING PERCEIVED STRESS
IN COMPETITION TRAINING
FOR ADOLESCENT ATHLETES
THROUGH RELAXATION TECHNIQUES**

Specialty 511.02 Developmental psychology and educational psychology

Summary of the PhD Thesis in Psychology

Approved for printing:	Paper size: 60x84 1/16
Offset paper. Offset printing.	Circulation: 30 ex.
Pattern sheets:1,2	Order no. 30

„Ion Creangă” State Pedagogical University of Chişinău Printing House
MD-2069 Chişinău, Ion Creangă street, Chişinău