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SPORT**

**Ph.D. THESIS RESUME**

**OPTIMIZATION OF SPORT PERFORMANCE IN  
ARTISTIC GYMNASTICS USING STRATEGIES  
FOR EMOTIONAL INTELLIGENCE  
DEVELOPMENT**

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**Keywords:** emotional intelligence, athletic performance, motivation, self-efficacy, anxiety, emotional development program, technical and artistic program.

## INTRODUCTION

The interest for great achievements in performance sport together with an increased efficiency and low health risks resulted in the impressive development of scientific research in sport and an increased interest in transfer of knowledge and applications of other fields of study. The field of psychic manifestations and emotional self-control represents the objective of several advanced research because this field explains how we can access biological resources, which are unapproachable in normal conditions but can be triggered by emergency situations or survival instincts (Gagea, 2007).

The mental preparation either implied or explicit must be a part of the formation and development of a complete athlete, which together with technical and tactical preparation, physical training, nourishment and recovery is one of the main components which maximize the athletes' performances.

The research we intend to make answers to a practical necessity of finding answers to some of the reasons causing performance athletes' failures in competitions. As that artistic gymnastics is a complex discipline, the gymnast being both physically and psychologically highly solicited and following the modifications occurred in the last period at the code of points (the requirements are extremely high and are physically difficult to achieve them), an approach of the gymnast training which includes the emotional aspect is necessary. The goal of research consists in identifying certain psychological factors that are important for obtaining performances in sport. These researches can contribute to presentation and application of efficient training methods in order to easily achieve performances with lower physical and emotional effort.

The main objective of this research consists in *increasing sport performances* in women's artistic gymnastic by implementing a *program for emotional intelligence development* in sport. Furthermore, we aim to *identify the emotional self-control mechanisms* which have influence upon the performance results achieved in sport.

This thesis is made up of three parts: First part presents the theoretical reasoning based on the concepts as: principles, laws and patterns, theories, concepts, norms and ideas related to the sport performance, psychological factors that have influence upon the sport performance, emotional intelligence, rational emotional and behavioural education programs.

The second part of the thesis describes the research methodology used: objectives, hypothesis, research methods and the structure and content of experimental models proposed to be researched related to the psychological preparation moreover the emotional intelligence development and technical and artistic preparation.

The third part presents personal contributions in the research in the field of psychological preparation and its application in the performance sport.

**The 1st chapter** depicts elements which differentiate the emotional intelligence construct from other similar constructs and presents critical approaches of the construct from the

perspective of several different theoretical models, considering the current scientific consensus in this field as well as controverted elements. The general term of emotional intelligence represents a set of abilities used by a person to monitor his or her own and other people's emotions, as well as the ability to discriminate between different emotions and to appropriately use emotional information to guide thinking and behaviour in order to achieve the desired goals. The current controversies concerning this construct resides in the fact that so far we cannot establish whether the emotional intelligence is or not a cognitive or non-cognitive ability, whether or not requires explicit or implied emotional knowledge, or whether is an ability or the result of a particular social and cultural context (Zeidner, Matthews, Roberts, 2001).

In addition, the studies establishing a correlation between different instruments used in assessing the emotional intelligence according to different theoretical models are insufficient for determining whether or not these measure the same thing.

Five aspects were identified within this concept: being aware of the personal emotions, management of emotions, focusing the emotions toward a purpose, empathy and ability to develop positive interpersonal relationships. Being aware of own personal emotions means identifying emotions and feelings developed in different situations in life as well as their coherent communication in given circumstances. Difficulties in understanding these emotions and their verbal expressing or misunderstanding the messages can lead to conflict states.

**The 2nd chapter** presents the concept of emotional intelligence in performance sport, by describing in details the studies related to this concept in sport, the emotional abilities and their importance for the performance sport.

Researches made in different fields of study embrace the benefits provided by emotional intelligence for different areas of success (Parker and collaborators, 2004; Slaski & Cartwright, 2002; Zeidner and collaborators, 2004). As a direct consequence it impelled researchers to actively involve this construct into the sport psychology.

The researchers have studied the importance of emotions in sport and underlined their significance, reaching to the conclusion that the emotional regulation can lead to optimal states of performance. During the performance the emotions can fluctuate, the athletes experiencing both positive and negative emotions (Hanin, 1997, Jones, 2003). In re-evaluation of emotions and their impact on sport performance Botterill and Brown (2002) assert that the athletes should critically reflect on their own emotional experiences. Moreover, Hanin (2000) suggests that the athletes should develop skills to recognize and manage their own emotions. Thus, we can say that the aforesaid proofs are closely lined up with the construct of emotional intelligence.

The relationship between emotional and cognitive intelligence and its connection with the sport performance was poorly investigated in the field of physical activities. The latest studies related to this subject were focused on the relationship between emotional intelligence and Big Five not in a sport-related context (Van der Zee, and colab., 2002) and on the relationship between emotional intelligence and sport performance.

Several researches were directed toward the investigation of the relationship between personality variables and pre-competition affective states (Prapavessis, Grove, 1994). Affective

dispositions are dynamical and can rapidly change depending on different personal or conjuncture variables.

**The 3rd chapter** widely describes three important psychological factors which have influence on the sport performance. In our research we put emphasis on three psychological factors: sport performance anxiety, motivation for performance sport and self-efficacy. I have chosen these 3 factors starting from the theoretical principles of cognitive-behavioural therapy which explain using the ABC model the formation of a behaviour.

Self-efficacy, anxiety and motivation represent important antecedents which may influence the formation of behaviour. Thus a high anxiety level can have a negative impact upon the athlete's performance, while a high level of self-efficacy and motivation has a positive effect on the athlete's performance.

The 4th chapter portrays, to a large extent, the basic concepts of the rational-emotive and behavioural education.

The rational-emotive-behaviour theory was developed by Albert Ellis, a therapist specialized on psychoanalysis, who reach this approach as a result of dissatisfaction felt with his patients during the years of work. A mental health optimization program using group counselling was designed. However this program can be efficient, when after a previous adjustment, it is used in the individual therapy of children, teenagers or even adults. Within the rational-emotive and behavioural education, these children can learn rational principles, furthermore the rational approaches can be applied in simulation condition and the habits they know and repeated may be utilized. Comparing with the children who did not acquired or practiced the rational-emotive education skills, these children will have positive levels of mental health due to their ability to control their reactions, the efficiency of each of them being correlated with reflexive and critical thinking, with self-acceptance, tolerance to frustration and a realistic perspective. The rational-emotive and behavioural theory stands on the basis of many successful educational programs. One program for EI development comprises themes such as:

What are emotions?

Where do emotions come from?

Situation – Thought – Feeling – Action diagram

Measuring emotional intensity;

Recognizing and provoking lack of self-confidence and self-acceptance;

Understanding the activity – mistake function and its importance for the learning process;

Separating opinions from facts;

Absolutist requirements and catastrophizing

Special modules: responsibility, roles and rules, developing the perspective, discrimination and stereotypes, nicknames.

**The 5th Chapter** makes a review of the specialty literature referring to the psychological characteristics of the greatest gymnasts, researches that include psychological assessments of the gymnasts during competitions.

**Part II of the thesis, METHODOLOGY OF RESEARCH, chapter 6** describes:

**The research objectives** as follows:

1. Implementation of a program for developing social and emotional abilities in the sport environment which improve performances in sport.
2. The increase in the level of accurate execution of routines by reducing errors made in the competition at all 4 apparatus.
3. Identifying mechanisms of emotional control responsible for the results obtained in sport performance.

The following **hypotheses** are presented:

1. Applying a strategy for developing the emotional intelligence on gymnasts, the presentation of the skills level will be increased during the preparation period until reaching the difficulty requirements settled in the Classification List and raising the level of accuracy of routines execution in competition.
2. The improvement of the gymnasts' sport performances is attributable to the mechanisms of emotional control such as:
  - increasing the motivation for performance sport;
  - increasing self-efficacy;
  - reducing performance anxiety;
  - increasing emotional abilities.
  - increasing social abilities.

In our research we have used the following investigation methods: analysis of data collected from the specialty literature; the observation method; the questionnaire-based survey; method of investigation of the psychometric properties of measuring instruments; the experiment method; the mathematical and statistical method of data processing and interpretation.

The research was made in several steps:

❖ The first stage of research took 3 months in which we proposed to make study related to the opinion of specialists in artistic gymnastics on the importance of psychological factor for gymnasts' preparation. The survey had as main purpose to establish the place and importance of emotional intelligence in gymnasts' training and the correlation between this component and other components of training.

❖ The second stage of our research was focused on checking the psychometric properties of elected scales in measuring motivation, self-efficacy and performance anxiety. By verifying the scales psychometric properties, we measure three relevant psychological factors for sport performance (motivation, anxiety and self- efficacy) which give us the possibility to accurately measure the level and evolution of these three constructs within a project of intervention for increasing the sport performance and emotional adaptability of gymnasts.

❖ During the following stage of research, which lasted one year, research we developed the principal experiment targeted on several directions:



- adaptation and application of an experimental model for developing emotional intelligence that includes the mode of application of structure and content of the emotional development to the gymnasts' training in order to develop some of their abilities and to improve the understanding and control of emotions especially in competitions. This program was utilized 3 months on the experimental group, in the period of February – May 2013;

- execution and application of a complex program for technical and artistic preparation with the purpose of increasing the efficiency of training process, by achieving high technical and artistic level, appropriate execution and the right posture which lead to the correct performance of the routines on all four apparatus. This program was applied at the 1<sup>st</sup> and 2<sup>nd</sup> lot during the period of a competition year 2012 - 2013;

- in addition to the emotional and technical preparation program, the trainers benefit from a training course (Annex 7) with the purpose of learning how to teach psychological knowledge for increasing the motivation and sport performances and to provide feedback to gymnasts. This program lasted three weeks and was held at the beginning of the program, in the period of: 1 February 2013 – 28 February 2013, one session of two hours weekly conducted by a certified psychologist. The training course was addressed to the trainers of the 1<sup>st</sup> lot of gymnasts.

Gymnasts of the 3<sup>rd</sup> lot followed the training program settled by the club trainers, using traditional training means.

- initial and final testing and retesting of these three lots after 6 months. We used these tests to verify the efficacy of the program of emotional intelligence development for junior gymnasts IV – level 1 and the mechanisms of emotional control responsible for the results obtained related to their performance. Period of testing: initial testing - December 2012; final testing – June 2013; retesting after 6 months from the finalization of the emotional development program – December 2013.

❖ The last stage of the research consisted in data analysis and statistical results interpretation.

Furthermore, the **Chapter 7** presents THE STRUCTURE AND CONTENT OF EXPERIMENTAL MODELS FOR PSYCHOLOGICAL TRAINING, EMOTIONAL INTELLIGENCE DEVELOPMENT AND TECHINCAL AND ARTISTIC PREPARATION, proposed for the experiment

### **7.1. The experimental model of psychological training** included 3 stages:

- the planning stage *in which questionable issues of interest and lessons planning are established;*

- stage of implementation, *in which the activities planned are executed and strategies for problems which might occur are determined;*

- feedback stage of *assessing the aforesaid activities and setting up modifications to the future actions,*

The program was conceived following the Ann Vernon's model, *Development of Emotional Intelligence* (Vernon, 2004), and it was adapted to artistic gymnasts. The program was focused on the following themes:

- **Self-acceptance:** *self-observation and being aware of your own feelings as they appear; presence of mind; power of sustaining something you believe in but disapproved by the rest of the world;*
- **Emotions:** *being aware of emotions and their adaptation to the moment situation, knowing the cause generating a certain feeling and finding methods to control emotions (fear, sadness, fury, apprehension); relationship between thinking, speaking about and doing something*
- **Beliefs and behaviours:** *following personal values and goals; sustaining the principles you believe in, even in cases when the majority disapprove them; ethic actions; recognizing the causes and effects of certain behaviours;*
- **Problem solving and decision taking;**
- **Interpersonal relationships.**

The experimental program of emotional intelligence development comprised 12 lessons, each one providing well-established activities by means of materials used, settled objectives, application procedure and discussions with athletes related to the proposed subject.

**7.2. The experimental model of technical and artistic preparation** was developed during one competition year and contains a wide range of means which improve the technical and artistic content in order to reach the high exigency of the routines at all 4 apparatus.

The content of technical and artistic preparation program includes:

1. Exercises for improving technical preparation for all elements stipulated in the Classification List of Romanian Gymnastic Federation at the four apparatus (vault, uneven bars, balance beam, floor/) These exercises aim to:

- learn, acquire and improve technical elements;
- acquiring the abilities necessary for correct technical execution of the skills;
- development and improvement of motor and psychomotor abilities

Exercises for improvement of artistic training which provides solutions for:

- Formation of a correct specific posture;
- Development of the general basis of movement;
- learning, consolidation and improvement of artistic elements;
- cultivation of rhythmicity and musicality.

The following requirements were considered in drawing up the model of artistic and technical preparation:

- Technical requirements at the four apparatus settled in the Classification List by the Romanian Gymnastics Federation;

- Requirements of execution related to errors according to the code of points of the Romanian Gymnastics Federation; in compliance with the code of points established by the International Gymnastics Federation;
- Analysis of planning documents related to the training of gymnasts coming from these 3 sport clubs;
- Data obtained following the study of specialty literature.

The model for technical and artistic preparation of gymnasts was conceived for each training stage in part (preparation stage, pre-competition and competition stage), with a well-established structure and content. The motor actions included in the means of preparation were established in such manner to contribute in reaching the proposed goals.

**Part III** of this thesis includes the practical part of the research and presents the personal contribution by means of 4 studies.

### **1<sup>st</sup> STUDY – THE OPINION OF ARTISTIC GYMNASTICS SPECIALISTS ON THE NEED FOR DEVELOPMENT OF EMOTIONAL INTELLIGENCE IN TRAINING GYMNASTS**

At this stage of our research we aimed to develop a study on the specialists in artistic gymnastics the need to develop emotional intelligence in preparing athletes.

**Our main objective** was to investigate, according to experts in artistic gymnastics, the need to develop emotional intelligence and emotional development application programs in preparation gymnasts to improve sports performance.

By using the **method of questionnaire-based** survey yielded information on experts' opinions regarding the approach to psychological preparation on developing emotional intelligence in sports training.

**The subjects** were coaches and athletes in the artistic gymnastics, physical education teachers specializing in artistic gymnastics.

As used instrument was a questionnaire on paper and pencil, which included descriptive data about respondents (age, gender, seniority, in sport, professional ranks) and items to investigate aspects of psychological preparation, of emotional intelligence and emotional development programs. The questionnaire included a series of questions (of opinion and knowledge), with the view of obtaining answers helpful in addressing research observant.

After centralizing the data obtained through the questionnaire presented an analysis of the results on each item.

Responses from the questionnaire for coaches and sports

Nr. crt.	Content questions	Variants response	Replies	
			Coach.	Gymn.
1.	Deemed necessary psychological preparation in addition to other components of the training?	a. yes b. no c. I do not know	96,5% 2,5% 1%	89,28% 8,12% 2,6%
2.	List three psychological problems that occur during competitions	1. too strong emotions 2. fear of failure 3. fear of injury 4. decrease motivation 5. low self-esteem 6. lack of concentration	89,47% 80,26% 73,68% 78,98% 77,63% 63,15%	98,21% 89,28% 100% 35,71% 28,57% 48,21%
3.	How often do they occur?	a. very frequently b. frequently c. occasionally d. infrequent e. hardly ever	1,31% 92,10% 6,57% 0% 0%	17,85% 75% 7,14% 0% 0%
4.	Success in competition is decided mostly by:	a. athlete technique b. tactical coach c. physical training d. how the athlete masters his emotions  e. How motivated is to win	27,63% 7,89% 26,31% 26,31%  11,48%	8,92% 3,22% 33,92% 32,14%  17,85%
5.	Set psychological factors important for success, depending on your experience. List five factors in order of importance.	1. emotional control 2. positive thinking 3. motivation 4. self confidence  5. perseverance 6. ambition	90,78% 84,21% 76,63% 69,73%  55,26% 46,05%	89,28% 89,28% 80,35% 73,21%  39,28% 26,78%
6.	Have you ever called in sports training, emotional development techniques?	a. yes b. no	5,27% 94,73%	5,36% 94,64%
7.	Determine what percentage percentage emotional intelligence contributes to increased sports performance.	a. 5% b. 25% c. 50% d. 75%	4% 32,20% 56,57% 7,33%	7,19% 39,20% 46,42% 7,19%
8.	From your point of view, emotional development is needed:	a. to improve sports performance b. to solve problems in extra-sporting life c. for convenience (ease) labor coach d. to resolve problematic situations (loosen the atmosphere before a competition consecutive defeats, injuries, conflicts between athletes, lack of motivation, etc.).	46,05% 2,63% 2,63% 48,68%	46,42% 5,35% 1,78% 46,42%
9.	You want to use emotional development techniques to	a. yes b. no	92,10% 5,90%	87,5% 10,5%

	enhance athletic performance?	c. I do not know	2%	2%
10.	In your opinion is necessary emotional development to be carried out within training, with a theme and a timetable?	a. yes	93,42%	89,28%
		b. no	6,58%	10,72%
		c. I do not know	0%	0%
11.	Do you think that by applying emotional development strategies in your training improves athletic performance?	a. yes	90,78%	91,07%
		b. no	0%	3,93%
		c. I do not know	9,22%	5%
12.	Consider the psychological intervention to be performed by a qualified person (psychologist)? Motivated please.	a. yes	64,47%	59,74%
		b. no	19,73%	21,47%
		c. I do not know	15,8%	18,79%

### Discussion and conclusions

Data from the analysis of the questionnaire addressed to specialists in artistic gymnastics indicates that the preparation for emotional development is still in early stages and requires greater attention and involvement from those in the gym.

Our main objective was to see the need to develop emotional intelligence and emotional development application programs in preparing athletes to improve sports performance. For this purpose we analyzed the opinion of specialists noting the urgent need to optimize emotional development programs and their inclusion in the program of psychological preparation.

According to specialists emotional intelligence development issues is largely unknown but is not given enough importance in preparing athletes. The level of implementation of development programs emotional unfortunately is low, probably due to lack these specialized programs on sports, because of poor cooperation between specialists in sport psychology and sport clubs and the low participation of specialists sessions information and training in emotional development techniques.

It is appreciated that the coaches give importance to training and psychological preparation in a largely considered that the development of emotional intelligence affects athletic performance in training and competition.

It was also found that the questionnaire data analysis specialists listed mental qualities important to a gymnast. These qualities are important psychological factors in the development of emotional intelligence.

Due to changes in the practical requirements (code points) that are becoming increasingly difficult to achieve both sporty and coach (coaches having more responsibilities) appear collaboration with psychologists need to facilitate the proper preparation athletes emotionally.

It is appreciated that, based on these results, the coaches are willing to implement a training plan athletes emotional development strategy and believes that these strategies can affect sports performance. Thus, the results obtained by applying questionnaires highlighted the need to pay particular attention to emotional development gymnasts.

## 2<sup>nd</sup> STUDY -- PRELIMINARY STUDY RELATED TO THE VERIFICATION OF PSYCHOMETRIC INSTRUMENTS MEASURING ANXIETY, SELF-EFFICACY AND MOTIVATION FOR PERFORMANCE SPORT

Following the first study, which highlighted the importance given to psychological factors in achieving specialist sports performance and result analysis literature in this area, we chose several psychological factors that impact on sports performance. Follow them and trying to manipulate so as to increase athletic performance will be the main objectives of this research approach. Prior to this, but I wanted to make sure that we can properly measure, so we undertook this preliminary study we examined some psychometric qualities of measuring instruments for sport performance anxiety, self-efficacy and motivation for sport sporting performance.

**Objective** of this study is to verify the proper measurement of psychological factors determined to be important in athletic performance.

**Method** was applied linguistic adaptation of scales from English into Romanian.

Subjects - final versions translated the scales were applied on a sample of 110 athletes from 9 sports specialties. Some of them are sports practiced as individual sports and team.

### Measuring Instruments

- Performance Anxiety in sport we chose to measure the Sport Anxiety Scale
- Self-efficacy for sport, we chose to measure the Physical Activity Self-Efficacy Scale.
- Motivation for sport performance we chose to measure the Sport Motivation Scale.

### Procedure

The three scales were applied athletes translated by an assessor who read the questions and answer surrounded by sports.

### Results

We analyzed scales adapted in terms of their loyalty. We analyzed the internal consistency Cronbach  $\alpha$  method.

Table 5. Cronbach  $\alpha$  coefficient for internal consistency Anxiety Scale Performance in Sport (SASP)

	SAPS	$\alpha$ Cronbach
	Total	0.892
Subscal	Somatic	0.687
	Concern	0.761
	Impaired concentration	0.826

For Motivation Scale for Sports Performance Cronbach  $\alpha$  value is 0.850, which indicates a high fidelity scale (Murphy and Davidshoper 1991).

For self-efficacy Scale for Sport, for the 8 questions that show self-efficacy for physical condition score is 0.769 which indicates a fairly large scale. For the 4 questions we built analyzed the internal consistency for the 9 sports. This internal consistency coefficient gym is 0.831 which indicates a high fidelity. To dance coefficient is 0.789 which indicates a high fidelity. For judo coefficient is 0.772 which indicates a high fidelity. For table tennis coefficient is 0.108 which indicates a very low fidelity. Swimming ratio is 0.194 which indicates a very low reliability. To track coefficient is 0.481 which indicates a low reliability. For football ratio is 0.348 which indicates a very low reliability. For basketball coefficient is 0.789 which indicates a high fidelity. For karate coefficient is 0.626 which indicates a moderate to low fidelity.

Outside subscales for swimming, table tennis, athletics and football subscales have good internal consistency indicating that measure the same construct questions. Of interest to us is great value subscale for the gym that will be used later in the research project.

**Stability** of the results indicates the extent to which different applications as topic similar results. To check the stability in time we calculated the correlation coefficients between the first and second application of the subscales. For this analysis we had a group of 57 athletes who have reapplied to the same scale. The results showed high correlations between the first and the second embodiment. The scales were re-applied every 6 weeks.

Anxiety score is  $r = 0.741$ ,  $p = 0.000$

Motivation keeper  $r = 0.857$ ,  $p = 0.000$

Self-efficacy score is  $r = 0.724$ ,  $p = 0.000$ .

To be specific self-efficacy subscale sport whose stability over time is good ( $r = 0.780$ ,  $p = 0.000$ ).

With these results in a relatively broad group of athletes we calculated separately for each scale range in falling a low score, medium and large to enable us to report the results of future studies will include smaller samples and size. Thus we calculated the average range of scores by taking the **average and standard deviation** of the scores. A low score is below average - one standard deviation and a high score is above the average + 1 standard deviation. The range of average  $\pm$  1 standard deviation indicates an average score.

For anxiety lower score is  $<17$ , higher than 30, average 17 to 30

For motivation small score is 68, 92 and 69-91 is high is average

For self-efficacy small lowest score below  $<25$  (0-24) and high score is from  $> 33$ ,  
between 25-32 environments.

Specific self-efficacy than  $<10$ , high 18, average 10 to 18.

### **Conclusions**

In conclusion translated scale and subscale 3 built new gym have good psychometric properties suitable for measuring the level and evolution of these three constructs in an intervention project to increase sports performance and emotional adaptation to gymnast's performance.

### **3<sup>rd</sup> STUDY – EFFICIENCY OF THE PROGRAM FOR DEVELOPING THE EMOTIONAL INTELLIGENCE FOR IMPROVING THE SPORT PERFORMANCES OF JUNIOR GYMNASTS IV- LEVEL 1**

Another study conducted in our research concerns the effectiveness of emotional intelligence development program on improving sports performance from junior gymnasts.

#### **Objectives**

Implementation of a program of socio-emotional skills development in the sport, with a role in increasing sports performance.

#### **Hypotheses**

By applying a program to develop emotional intelligence gymnasts, having a structure and appropriate content, in preparation, provide presentation raising exercises, the requirements imposed by the schedule difficulty of classification and increased accuracy of performances in the competition.

#### **Variables and experimental design**

This study has a two-factor design with two variables.

*Independent variable:*

- Factor 1 - the instruction: - standard program;
  - complex technical training program;
  - Technical training program + program complex emotional development;
- Factor 2 - Execution conditions: - training
  - competition
- Factor 3 - the time: T1 initial testing (pretest) → final testing T2 (posttest) → retest after 6 months T3

*The dependent variable* - sports performance - difficulty;

- execution errors;
- note on each device and made note;

#### **Subjects**

When the experiment was attended by 58 gymnasts aged 6 to 10 years, from 3 artistic gymnastics clubs in the country. Gymnasts were divided into 3 groups: 19 gymnasts in group 1, 19 in group 2 and 20 group 3.

#### **Measuring Instruments**

To check the preparedness of gymnast's observation grid was used for monitoring the performance requirements of difficulty and execution requirements on 4 apparatus, denoted in training and competition. The grid contains the point value of exercise in terms of difficulty and execution.

Evaluation of the gymnasts in the experiment was done by:

*Sports Performance evaluation by checking the technical and artistic*

- ❖ Difficulty level assessment of the suitability of the technical elements and combinations;



- ❖ Evaluation of the fulfillment of requirements for technical execution and artistic accuracy.

Checking the accuracy requirements of difficulty and execution was done by granting by a brigade of arbitrators, each gymnast in part to competition each device separately, a score for making the exercises required by the curriculum for the classification of FRG and Code scoring FIG.

### **The procedure**

The experiment was conducted on an annual competitive and targeted several directions:

- ❖ Have been applied to the first test (initial testing) the gymnasts in the three groups.
- ❖ Started implementing complex program of technical and artistic gymnasts for 2 lots, namely: lot 1 and lot 2, in order to improve the training process by obtaining a high technical and artistic, and kept a proper execution, which contributing to the successful execution of exercises at the 4 devices.
- ❖ Applying a coaches training with the objective of transferring knowledge and the spores psychological motivation and athletic performance and providing feedback gymnasts. The program was applied to group 1 coach's gymnasts.
- ❖ Applying a model of emotional intelligence development, which includes the application of the structure and content of emotional development program of sports training gymnasts, to develop skills to understand and better control their emotions in general and in particular - in competitions.
- ❖ Followed testing at the end emotional development program (test 2), on the same tests as in initial testing.
- ❖ Gymnasts retesting was done after 6 months at the end of emotional development (test 3), on the same tests as in the initial and final stage.

### **Results**

First in groups were compared to the baseline before the start of the program to see if there are any significant differences between them. Test ANOVA showed no significant differences between the 3 groups for any of the variables. The fact that the 3 groups start at a similar level of performance allows us to make comparisons between groups without having to control the variables. Thus, the performance comparison of the 3 groups using ANOVA for repeated measurements to see if the 3 different groups evolve from different program faced. Then t test was used (with Bonferonni correction for statistical significance) to put out exactly intragroup differences between groups. All calculations were performed separately for training conditions and competition conditions, with the independent variables and the type of training program (factor group) and the 2 times of measurement of the dependent variable.

ANOVA indicated a significant difference for all variables, both in terms of training and competition conditions. The 3 different groups pass the pretest (before the program) to posttest (after hours).

To better understand the differences between groups, we analyzed the performance of each group at the end of the training program, using independent samples t test for materiality Bonferonni correction.

In terms of training, at the end of the program we find significantly better educated groups modified (PT and PTP) both made note (large effect sizes) and for each machine to standard training group. The exception is jumping machine where we have significant differences between PTP and PS group. Between the two groups with modified training (PT and PTP) no significant differences in terms of training at the end of the program.

In terms of competition, PT group has significantly better results compared to the control group comprised note and jumping all devices except where differences are not significant. PTP group, having the advantage psychological preparation has a significantly better performance compared to the control group which consists note (large effect size) and every device, but significantly better results compared to PT group, in note composed (large effect size) and all appliances except jumping. Thus, in terms of training not find significant differences between groups with modified training program in competition and group receiving psychological preparation is clearly superior performance.

If summarize the results, we can say that if we follow the performance in terms of training, the added benefit is made especially for technical training component improved. But this component reduces its effects in terms of competition, where the advantage is obvious psychological preparation.

Then I watched and the time evolution of each group to understand more deeply our results.

Observing the evolution of the control group, we see that the performance in terms of training made significantly decreases the note at the beginning of the end of the period we watched gymnasts. The size of the effect is, however, negligible one. In terms of competition we find significant differences in performance downward (compose note, parallel, floor).

Next, we examined the time course of the group with comprehensive technical training program.

If we follow the evolution of technical training group improved in terms of training, we see significant performance increases throughout the program, for all modes dependent variable. The best trend is observed for the device ground ( $d = -0.81$ , large size) and beam ( $d = -0.76$ , size large) and in parallel ( $d = -0.58$ , medium). The jumping occurs but smaller effect ( $d = -0.33$ ). To mark made on all devices, there is a medium to large effect size ( $d = -0.64$ ).

In terms of competition, at the end of the program see significant differences compared with the beginning of the program to mark composed and beam. The beam is again the best development with a large effect size ( $d = -0.95$ ), while the overall performance on all devices is a small effect size ( $d = -0.31$ ).

Finally, we analyzed the performance of the group with comprehensive technical training program and psychological preparation. Performance throughout the training program, both in terms of training and competition conditions is significant, showing improvements in all devices

and made note. Thus, we can say that this group has the fastest and consistent time course of the 3 groups. In terms of training, the group recorded an increase in performance at the end of the program to start, with large effect sizes (except where jumping is average size). In terms of competition, however, the effects are even more impressive, we find large effect sizes for all air and compose note, the most notable progress being again if the beam ( $d = -2.39$ ).

Performance was assessed 6 months after completion of training programs changed. The women returned to normal training program. I analyzed the results after 6 months compared to those at the end of the program. A significant difference between these two moments' shows that the effects obtained at the end of the program is maintained. A significant difference shows us that the results of the program are improving or are lost to 6 months after the program (depending on the direction of this difference, if significant performance increases or decreases).

For performance comparison groups 6 months after participation in the program was used for repeated measures ANOVA test to see if the 3 different groups evolve from different program faced. Then t test was used (with Bonferonni correction for statistical significance) to put out exactly intragroup differences between groups. All calculations were performed separately for training conditions and competition conditions, with the independent variables and the type of training program (factor group) and the 2 times of measurement of the dependent variable.

ANOVA indicated a significant difference for all variables, both in terms of training and competition conditions. The 3 different groups go posttest (after-psychological) in retesting after 6 months of program completion (test 3).

To better understand the differences between groups, we analyzed the performance of each group 6 months after the training program, using independent samples t test for materiality Bonferonni correction.

The results are somewhat similar to those at the end of the program, but there are some differences. Thus, we find further superior performance of both groups trained modified from standard training group for the final grade and all devices, both in terms of competition and training conditions. Compared to the end of the program, 6 months after the significant differences and jumping machine (in both groups), which had no significant difference at the end of the program. Also, regarding the comparison groups modified training, we see again and 6 months after completion of training, the lack of significant differences in terms of training, but significant differences, with large effect sizes in conditions of competition. Remains a significant difference in performance for jumping machine instead of parallel machine performance improves considerably PTP group, a significant difference appeared with a large effect size, given that the end of the program there were no significant differences for parallel between the two groups.

Then I watched and the time evolution of each group to understand more deeply our results.

The results shows an evolution in the group with high standard training unchanged except beam apparatus under conditions of competition, where athletes in this group recorded a decline

in performance compared to the performance obtained 6 months ago. Improved technical training group did not record any significant difference in performance compared to the values obtained 6 months ago, indicating a hold of the effects obtained.

Technical and psychological group is continuing its evolution seems that good performance although training program ended. Thus, in terms of training, we see a breakthrough performance in terms of score composed progress due apparently jumping and parallel devices where this group improves its performance in terms of training. For beam and floor machines do not appear significant results. The magnitude of this effect is one mean progress, but given the cessation of any psychological preparation and return to standard technical training, the results are significant (more discussion section). In terms of competition, however, progress is currently on "all fronts" improving the performance of athletes for all devices. If there is an even parallels medium to large effect size ( $d = 0.56$ ). Despite stopping psychological training sessions this group continues to improve its performance in terms of competition.

### **Conclusions**

Summarizing all our results, we can say that we have an important effect both for technical training component and psychological training component. Effects of complex technical training to be seen in the control group performs better in terms of training, but also better performance in terms of competing for the overall performance even if the size of this effect is a small one. Although there are small differences between the two groups, they are significant and competitive conditions, this effect can make the difference between a small podium and one outside. The effects of psychological training component can be seen especially in the superior performance of the group that received this component to component group receiving only technical training complex. While training conditions no significant difference between the two groups in terms of competition are significant differences in effect sizes large and extra large. This is actually the entire stake training, performance in competition.

Overall, modified training groups have better performance compared to standard training group, both in terms of training and competition conditions at the end of the training program, and 6 months after completion of training programs modified and technical and psychological group has an advantage compared to the group receiving only technical training in conditions of competition (no significant differences in training).

In conclusion, our results support the superiority of improved technical training to standard training and psychological preparedness major impact in terms of competition. Gymnasts should receive technical training carefully monitored and "tailored" to their own needs and vulnerabilities identified and appropriate psychological training enabling them to demonstrate their full potential in sport competitions.

## **4<sup>th</sup> STUDY – STUDY OF INVESTIGATION OF EMOTIONAL CONTROL MECHANISMS WHICH HAVE INFLUENCE ON THE GYMNASTS’ PERFORMANCE**

### **Objectives**

The objective of this study was to identify the mechanisms responsible for the results obtained in terms of performance.

### **Hypotheses**

1. Improve sports performance of gymnasts is due to increased motivation for sport performance;
2. Improve sports performance of gymnasts is due to increased self-efficacy;
3. Improve the performance of gymnasts sports performance is due to decrease anxiety;
4. Improving sports performance of gymnasts is due to increased emotional skills;
5. Improve sports performance of gymnasts is due to increased social skills.

### **Method**

We analyzed the results following the procedure described by Weersing and Weisz (2002):

- Step 1: Test Efficiency.
- Step 2: Test specificity intervention.
- Step 3: Test mechanisms of change.
- Step 4: Test Mediation.

We performed analysis of change mechanisms for results in terms of competition, because it is ultimately the real challenge of training (technical or psychological): increased performance in terms of competition. The analysis also was performed on grade change mechanisms composed, reflecting the different results of the entire technical and psychological preparation. Separate performance on machines, we have considered worthy of such an analysis unless significant differences obtained in note composed, and I have had significant differences at a given device and deserved to see further. However, given that we have made significant differences in grade and all appliances (except apparatus jumping at the end of the program, where no significant differences between groups technical and psychological preparation), it makes no sense to stop at a separate analysis of each unit.

### **Subjects**

In this study recruited 58 gymnasts divided into 3 groups: 19 gymnasts in group 1, 19 in group 2:20 in group 3 subjects aged 6 to 10 years.

### **Measuring Instruments**

The instruments applied us in this study were:

- ❖ CBCL - The questionnaire asked parents to evaluate the behavior of children 6-18 years (Achenbach, T., 2001 ASEBA, University of Vermont, SC RTS version Romanian Romanian Psychological Testing Services Ltd.);
- ❖ TRF - Questionnaire for teachers to assess the behavior of children 6-18 years ((Achenbach, T., 2001 ASEBA, University of Vermont, SC RTS version Romanian Romanian Psychological Testing Services Ltd.);

- ❖ Anxiety Scale Performance in Sport (translated version, Sport Anxiety Scale after 2 (SAS-2) (Smith, R., E., SMOLLA, FL, Cumming, SP, and. Grossbard, J. R, 2006);
- ❖ Self-efficacy Scale sports (translated version Physical Activity Self-Efficacy as Scale (pases) (Bartholomew, J., B., Loukas A., Jowers E., M., and Allu S., 2006);
- ❖ Sport Motivation Scale Performance (version translated by The Sports Motivation Scale SMS-28) (Pelletier, L., G. Fortier, M., S., Vallerand, R., J., Tuson, K., M., Briere, N., M., and Blais, M., R., 1995);
- ❖ SCE-P - Screening emotional skills, as parents (Cognitrom, 2009);
- ❖ SCS-P Screening social skills, as parents (Cognitrom, 2009).

### **Procedure**

Since this study aims pursuit of psychological variables involved and one of the groups received a counseling intervention were applied before the intervention, all groups, screening questionnaires for emotional and behavioral disorders. To this end, parents completed the questionnaire CBCL gymnasts (The questionnaire for assessing the behavior of parents of children 6-18 years) and TRF coaches questionnaire (Questionnaire for teachers to assess the behavior of children 6-18 years).

After applying and verifying the results of screening questionnaires for emotional and behavioral disorders, they started to follow psychological variables in the three groups of gymnasts. Mechanisms pursued by us in this study were: anxiety, general and specific self-efficacy, motivation, emotional and social skills. All gymnasts in the study received questionnaires for each mechanism followed in early emotional development program and final. Please note that during the study period of 3 months, the gymnasts were divided into 3 groups: group 1 received, in addition to traditional training methods, the emotional development program and a comprehensive technical training program; group 2 received a comprehensive technical training program identical to that of group 1; and group 3 had no intervention were prepared by traditional training models.

### **Results**

The results of the questionnaires (CBCL, TRF) aimed at the identification of emotional and behavioral problems, both as parents and teachers form (which we applied it to coaches) have not identified any cases of such disorders.

So I could watch psychological variables on the assumption of parameters tested normal children.

#### *Step 1. The test efficiency.*

Results from previous studies have shown that there are significant differences between groups at the end of the training program. The psychological intervention group has a significantly better performance as compared to standard training group ( $t(58) = 5.904$ ,  $p = 0.000$ ,  $d = 1.90$ ) and to technical training group ( $t(58) = 2.579$ ,  $p = 0.014$ ,  $d = 0.83$ ). The technical training group has a significantly better performance compared to standard training

group ( $t(58) = 3.067, p = 0.004, d = 0.98$ ). Given the significant differences, we can proceed to the next step.

*Step 2. Intervention specificity test.*

First, we calculated the extent to which the intervention effect resulting in increased levels of self-efficacy, motivation, emotional and social skills and low levels of anxiety. Thus we calculated t test for paired samples, the difference between the pre and post intervention of these variables for each group.

The results show that training group psychological intervention effect on all variables thought to be mediators. The program has been constructed to produce changes in these variables (based on the literature and preliminary studies). For technical training group intervention lowers anxiety (as the practice more technical training program during execution exercise decreases anxiety competitions) and increased self-efficacy specific to the gym (at the end of the training program gymnasts have greater confidence that can perform exercises). The same variables are affected by the standard of training.

The next step was to compare the three groups at the end of the program, for each of the variables thought to be mediators. We calculated unvaried ANOVA with group membership as an independent variable, the variable at the end of the dependent variable and covariate intervention in pre intervention level variable:

Table 26. Results of unvaried ANOVA test

	F	Tests post hoc Bonferonni
<b>Sports Performance Anxiety</b>	<b>F= 12.386</b> <b>p=0.000</b>	PTP vs PS: MD= - 3.995, p=0.001 PTP vs PT: MD= - 5.035, p=0.000
<b>General self-efficacy</b>	<b>F= 11.846</b> <b>p=0.000</b>	PTP vs PS: MD=2.240, p=0.001 PTP vs PT: MD=2.676, p=0.000
<b>Specific self-efficacy</b>	F= 0.299 p=0.743	-
<b>Motivation</b>	<b>F= 8.895</b> <b>p=0.000</b>	PTP vs PS: MD=5.730, p=0.005 PTP vs PT: MD=6.663, p=0.001
<b>Emotional competence</b>	<b>F= 28.266</b> <b>p=0.000</b>	PTP vs PS: MD=7.530, p=0.000 PTP vs PT: MD=9.147, p=0.000
<b>Social competence</b>	<b>F= 5.309</b> <b>p=0.008</b>	PTP vs PS: MD=5.219 p=0.014 PTP vs PT: MD=4.787, p=0.029

The results are significant for all variables, except for specific self-efficacy. Post hoc comparisons show that significant differences in favor of psychological intervention group compared to the other two groups in terms of variables thought to be mediators. Such analysis mechanisms continue to change all variables assumed to be mediators, except specific self-efficacy.

*Step 3. Test mechanisms of change.*

In this step we tried to establish a temporal link between the change that occurs in the alleged mechanisms and the change that occurs in the result sought (performance under conditions of competition). Score change (difference between pre and post intervention) for composite score was correlated with the change score for each of the variables thought to be mediators. Table 27 shows the correlations for each group.

Table 27. Correlations between change scores (pre to post intervention) between the result of the competition and made note allegedly mediators variables for each group

		PTP (N=19)	PT (N=19)	PS (N=20)
<b>Sports</b>	<i>r</i>	0.151	-0.141	-0.036
<b>Performance</b>	<i>p</i>	0.536	0.564	0.881
<b>Anxiety</b>				
<b>General self- efficacy</b>	<i>r</i>	0.058	0.176	0.161
	<i>p</i>	0.813	0.471	0.498
<b>Motivation</b>	<i>r</i>	<b>0.745**</b>	0.147	0.127
	<i>p</i>	<b>0.000</b>	0.548	0.593
<b>Emotional competence</b>	<i>r</i>	0.392	0.305	0.127
	<i>p</i>	.097	0.203	0.595
<b>Social competence</b>	<i>r</i>	0.092	0.449	0.296
	<i>p</i>	0.708	0.054	0.205

After these results remains "standing" one potential mediator motivation. It seems that although the intervention effects on the mediators and the end of the program there are significant differences in favor of PTP compared to the other two groups regarding alleged mediators, things are not so when it comes to change. The only change in performance correlates with the change in motivation and just PTP group. The other two groups, the change in the psychological mechanisms apparently is not relevant to the change in performance.

*Step 4. Analysis of mediation*

The results obtained so far we only allow analysis of the presumed mechanism motivation mediation. The results show that when the motivation for effective control performance regression coefficient between the program and performance ( $B = 0.612$ ) is reduced, but still significant ( $B = 0.553$ ). Sobel test indicated that mediation effect is insignificant ( $Z = .18, p = .085$ ).

**Discussion and conclusions**

Summarizing all the results we can conclude that:

1. Our intervention effect on performance. Group psychological intervention has the best performance at the end of the program, in terms of competition (for more details see Study 3).
2. Intervention effects on putative mechanisms. Psychological training program with significantly affecting all the mechanisms assumed, resulting in increased levels of self-efficacy (general and specific gymnastics), and motivation improve emotional and social skills. The



psychological intervention leads to significant decreases in anxiety levels. The level of anxiety, and decreases in the other programs, but the effect is a medium size, while the psychological training group have a very large effect size. Regarding specific self-efficacy for gymnastics and the other two groups have high levels of it at the end of the program, with an effect size similar. Comparisons inter groups at the end of the program showed that self-efficacy regarding this specific our intervention, emotional development program, no significant effect compared to the other two programs. For the other five variables but (anxiety, self-efficacy for sports, motivation, emotional and social skills), but the group receiving psychological intervention has the best results compared to the other two groups.

I could not, in our analysis, to show a temporal relationship between the change in performance and changes in the arrangements only for motivation variable, where the group psychological intervention. This result is somewhat surprising, given the results obtained so far. We put the issue of statistical power of our study, given the low volume of participants in the 3 groups (19 vs 19 vs 20).

4. Also, we were unable to demonstrate a causal relationship, a relationship of mediation mechanisms thought to be responsible for better performance with psychological training group.

However, the experimental group psychological intervention was clearly has a significant performance superior to other two groups, and the results obtained in steps 1 and 2 from the analysis of mechanisms of change are somewhat encouraging. The problem mechanisms of change are one that remains open. A future study with more participants should investigate the mechanisms of change and determine whether these mechanisms are, but they could be highlighted in batches with few participants, or if other variables are the mechanisms responsible for the progress of this group performance. It would be worth the measured variables such as frequency of participation in training, coping mechanisms, etc.

In conclusion, we were able to show that the intervention effect on the mechanisms thought to be mediators, but we could not go all the way this analysis and to demonstrate a causal relationship between the alleged variables and the effect of increasing performance. However, our results are promising, and questions left unclear in this research approach can be investigated in future studies.

## **GENERAL CONCLUSIONS AND RECOMMENDATIONS**

The main purpose of this thesis consists in identifying certain psychological factors of importance in achieving sport performance. This can contribute to presentation and application of more efficient training methods which facilitate the achievement of performance.

Considering the issues of interest related to investigation, in our research we put emphasis on increasing the sport performance by developing the emotional intelligence of athletes. We have attempted to customize the investigation, which was mainly psychological, taking as much as possible into consideration the character of our theme while we tried to theoretically substantiate our conclusions and to confer them an applicative character.

Effects of our findings are established on theoretical, methodological and practical level as follows:

1. The theoretical value of thesis comprises the critical analysis of study paradigms of emotional intelligence influencing or affecting sport performance and psychological characteristics of gymnasts.

2. In what concerns the methodological contribution we have translated and interpreted three elements measuring important psychological constructs for the performance sport: the self-the performance anxiety scale, the efficacy scale in sport, the performance sport motivation scale. As a preliminary analysis, these instruments have good psychometric qualities and the further study can verify the validity (together with all aspects involved by it) of these instruments in order to completely adjust them. Subsequently to such adjustment, these instruments can be generally utilized in all sport clubs for assessing athletes' motivation, self-efficacy and anxiety to enable specialty interventions of psychologists or trainers.

3. Practical aspect – This research resulted in identifying a psychological training program for gymnasts. As demonstrated in our study, this program significantly influenced the gymnasts' performances in sport. Naturally, the efficiency and general applicability of this program should be investigated on other lots of gymnasts. However, the structure and content of this program may represent a definite product of this research project. The program can be used in its current form or improved depending on the future results in any gymnastics club.

Based on the researches made and results obtained following the application of the experimental program for emotional development of gymnasts we can make several recommendations.

The future studies should analyze in detail mechanisms causing changes in case of a group of athletes receiving an intervention for emotional development. A thorough study made on a larger number of subjects will enable a more accurate analysis of the cause-effect relationship between the psychological mechanisms and sport performances. The more relationships are found the better programs of emotional development and increase of sport performance can be developed.

Furthermore, the future studies should be focused on other important tasks. The frequency of attendance to training (even to the sessions of psychological preparation program) may help in finding answers to complex relations between psychological factors and sport performance. In addition, we should monitor the risks factors for quitting this sport. The identification of an athlete who requires increased attention and support (perhaps using a questionnaire) could help trainers, especially in difficult moments, to prevent athlete quitting this sport.

Another interesting factor which should be studied is the coping mechanism such as: the manner in which an athlete faces pressure in competitions; what mechanisms are efficient and how we can teach athletes to use them.

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