

## Associated factors between the state of anxiety and a specific gymnastics skill with environmental variations

PATRÍCIA MARQUES BARRETO<sup>2</sup>; MAYRA GRAVA DE MORAES<sup>2</sup>; GABRIEL DE SOUZA ZANINI<sup>2</sup>; CASSIANO MERUSSI NEIVA<sup>1,3,4</sup>; GERUSA DIAS SIQUEIRA VILELA TERRA<sup>4,5</sup>; DALTON MÜLLER PESSÔA FILHO<sup>1</sup>; WILLER SOARES MAFFEI<sup>1</sup>; CARLOS EDUARDO LOPES VERARDI<sup>1,2</sup>

1 Faculty of Science, São Paulo State University (UNESP), Bauru, BRAZIL

2 Graduate Program in Developmental Psychology and Learning, Faculty of Science, São Paulo State University (UNESP), Bauru, BRAZIL

3 Faculty of Medicine, University of Ribeirão Preto, BRAZIL

4 Graduate Program in Health Promotion – University of Franca – BRASIL

5 University of Alfenas (UNIFENAS), Alfenas, BRAZIL

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### Abstract:

The present study had with goals to analyze the anxiety state and its relationship with the implementation of a specific skill of Gymnastics, held in different environments. The sample of the study consisted of 11 athletes of Gymnastics, female, representatives from the city of Bauru (Brazil). The athletes responded prefacing each evaluation to the Competitive State Anxiety Inventory-2 (CSAI-II) instrument that aims to measure the anxiety state. The results show that on the ground, considered the most secure environment, the gymnasts have demonstrated higher self-trust ( $27.27 \pm 4.95$ ) when compared with the low beam ( $26.36 \pm 5.66$ ) and with the high beam ( $25.27 \pm 4.24$ ) which presented the lowest result for self-trust.

**Keywords:** Gymnastics; Anxiety State; Environmental Variation.

### Introduction

The specific skills involved in Gymnastics are performed in different devices, namely, there is variation in environment where the task will be performed (Sands, et al., 2011). An example is the ground and the lock, where the need for these skills transfer from one environment to the other. For such a transfer occurs, the athlete must feel prepared and safe to perform a move in which the environment requires a higher degree of your domain. Thus, it is important to consider the personal characteristics, the competitive environment and the specific tasks involved in your sport (Medeiros Filho, Pinto & Carvalho, 2007). Therefore, it is the responsibility of teachers and technicians assess the stage of development to guide the athlete to proceed with this transfer of skill.

The athletes provide opportunities, risks and consequences background to the competition, which often give rise to fears and fears and can manifest as physical, cognitive, emotional or motor. Regardless of the sport, the athlete lives constantly in situations that will cause anxiety, by exposure to comments, criticism from fans, family members and even by his own coach (Vieira, Teixeira & Vieira, 2011).

Anxiety is an emotion triggered by stressors; stress, in turn is the consequence of the internal and external conditions and their proportions (Vieira, Teixeira & Vieira, 2011). The stress is often a negative emotional experience, accompanied by biochemical changes, physiological, cognitive and behavioural predictable, which aim to change the stressor event or accommodate their effects (Taylor & Stanton, 2007). Moderate levels of stress can improve performance, because, there is incentive to keep the athlete in surveillance, but an excess of stimulus can distract you from your goal (Kavanagh, 2005). Hernandez & Gomes (2002), claim that there is a relationship between anxiety and performance, which vary according to several factors, such as the type of sport, difficulty of the task, the athlete's personality trait, environment and fans.

The competitive anxiety is a, tendency to realize the competition is a threatening situation and answer her with feelings apprehensive and tense. Even so, the level of anxiety related to performance in sport is considered normal and healthy. However, the extreme anxiety in athletes can be harmful. The levels of stress and anxiety in competitive sports are reported more frequently during sports participation in young athletes (from 13 to 24 years) than in any common activity or daily work (Patel, Omar & Terry, 2010; Weinberg & Gould, 2014). In this context, the objective of the present study was to analyse and associate the anxiety state with the execution of a specific skill of Gymnastics, held in different environments.

## Methodology

### Sample

The sample of the study consisted of 11 athletes ( $11.64 \pm 1.91$  years age) practitioners of Gymnastics, female, representatives from the city of Bauru (Sao Paulo State, Brazil), in sporting competitions.

### Procedures

Initially, the research project was submitted to the National Research Ethics Committee (CONEP) and approved in accordance with the procedure in Process n. 154604601011. Preceding data collection was requested permission to research development to the coach of the team as well as the legal guardian for the participant training center, and presented the goals and methodology to be employed during the study.

In contact with the participants, these were informed about the conditions for joining in the search. Then, an informed consent was delivered to the responsible, with the aim of clarifying the conditions for participation of young athletes in the survey. The condition of participation in the research was the return of informed consent, duly signed by the person responsible. The athletes, who met the criteria for participation in research, were then assessed individually "in loco".

### Instrumentation and task

As inclusion criteria for the study an analysis of the variation of movement pattern was conducted by two referees in gymnastics at the Secretariat of Sports, Leisure and Youth of São Paulo State (Brazil). They used like base on the assessment, the General and Specific Fails and Deduction Table for Floor Exercise and Balance Beam adapted from the Code of the International Federation of Gymnastics (2009-2012). The referees were lateral to the performer of the movement, in the same way in which stand the referees in the official competitions of the sport. It was considered a specific skill of Gymnastics called "wheel" characterized as a dynamic element (Araújo, 2012). Have been deducted the points as the execution errors starting from 10.00 note. Only the athletes who had previously cited movement domain, participated in the study.

The realization of data collection occurred in three stages. In a first moment, the survey athletes performed the *wheel* movement in the floor exercise environment. On the second moment, the *wheel* movement was performed on the balance beam with 5 meters long by 10 cm wide and 20 cm tall from the ground. Finally the *wheel* movement was performed on the balance beam with 5 meters long by 10 cm wide and 1.2 m tall from the ground. Was given to all the participants, an interval of 48 hours between each stage of evaluation.

The gymnasts participating in the study, also answered 30 minutes prior to each evaluation to Competitive State Anxiety Inventory-2 (CSAI-II). This instrument aims to measure the anxiety-pre-competitive state, i.e., how eager the athlete feels at a given moment in time, preceding the completion of the evaluation of the movement. Divided into: cognitive, somatic anxiety and self-confidence. The test is composed of 27 questions, in which the answers can vary in following ranges: absolutely not (1); a little (2); lot (3); and very much (4) (Martens, Vealey & Burton, 1990). The scale serves to interpreting the variables, cognitive, somatic anxiety and self-esteem, being characterized as: low (9 to 18 points), medium (19 to 27 points) and high (28 to 36 points).

### Data analysis

For the statistical analysis were used: calculations of descriptive statistics (mean and standard deviation); Anova one-way test, to see if there was significant difference between the values of the three environments (floor exercise, low beam and high beam). To verify that there was correlation between the three environments and aspects of cognitive, somatic anxiety and self-confidence, were used the linear correlation coefficient of Pearson (r). In all statistical tests was adopted a significance level of 0.05.

## Results

For performance (table 1) the evaluated gymnasts achieved the lowest notes in the low beam ( $9.08 \pm 0.99$ ), then the crossbar ( $9.32 \pm 1.27$ ) and the highest notes were obtained in floor exercise ( $9.71 \pm 0.18$ ).

Table 1: Descriptive values obtained and comparison between the tested environments (f.e.-floor exercise; l.b.b.-low balance beam; h.b.b.-high balance beam).

	Values		
	f.e.	l.b.b.	h.b.b.
Average	9.71*	9.08	9.32
SD	0.18	0.99	1.27

\*There is significant difference only to l.b.b. (Anova one-way test  
 $p = 0.0275$ ,  $n = 11$ )

When comparing performance, referring to the values obtained by the participants of the study, it was evidenced that there is a significant difference ( $p = 0.0275$ ) between the floor exercise and the low balance beam, as shown in table 1. The results related to anxiety-state show that, when performing the *wheel* on the floor exercise and on low balance beam, the average value of cognitive anxiety ( $2.83 \pm 14.45$ ) was classified as low, while on high balance beam ( $18.18 \pm 0.71$ ) classified as medium. (Table 2).

Table 2: (A) Descriptive values obtained and classification on anxiety state - p value relative to the Anova one-way test; (B) Pearson correlation coefficient (r) and P value between the environment (f.e.-floor exercise; l.b.b.- low balance beam; h.b.b.- high balance beam) and the anxiety aspect.

A - Anxiety State				B - Pearson correlation coefficient between the environments and the anxiety aspect.		
<b>Cognitive</b>						
	<b>f.e.</b>	<b>l.b.b.</b>	<b>h.b.b.</b>		<b>R</b>	<b>P</b>
<b>Average</b>	14,45	16,91	18,18	<b>f.e.xl.b.b.</b>	0,3705	0,262
<b>SD</b>	2,83	4,95	0,71	<b>f.e.xh.b.b.</b>	0,7619	*0,0064
<b>p value</b>	0,1965			<b>l.b.b.xh.b.b.</b>	0,7574	*0,0069
<b>Somatic</b>						
	<b>f.e.</b>	<b>l.b.b.</b>	<b>h.b.b.</b>		<b>R</b>	<b>P</b>
<b>Average</b>	15,64	15,73	14,73	<b>f.e.xl.b.b.</b>	0,3973	0,2263
<b>SD</b>	0,71	2,12	2,83	<b>f.e.xh.b.b.</b>	0,2693	0,4233
<b>P value</b>	0,6476			<b>l.b.b.xh.b.b.</b>	0,695	*0,0176
<b>Self-confidence</b>						
	<b>f.e.</b>	<b>l.b.b.</b>	<b>h.b.b.</b>		<b>R</b>	<b>P</b>
<b>Average</b>	27,27	26,36	25,27	<b>f.e.xl.b.b.</b>	0,7571	*0,0070
<b>SD</b>	4,95	5,66	4,24	<b>f.e.xl.b.b.</b>	0,5912	0,0554
<b>P value</b>	0,7006			<b>l.b.b.xh.b.b.</b>	0,4998	0,1175

\*There is a positive correlation (P value <0,05)

It was observed that somatic anxiety and self-confidence in the three environments were classified as medium grade. Despite the different rating only for the cognitive anxiety on high beam, it was found that the results of the cognitive anxiety were increasing according to the increase of complexity presented by the environment in which would perform motor skills, i.e., there was an elevation of the cognitive anxiety between the floor exercise ( $14,45 \pm 2.83$ ) for the low balance beam ( $16.91 \pm 4.59$ ), and also the low balance beam to high balance beam ( $18.18 \pm 0.71$ ).

In turn, the self-confidence has behaved in a manner inversely proportional to cognitive anxiety, so, in the floor exercise, the environment is considered more secure, the gymnasts have demonstrated higher self-confidence ( $27.27 \pm 4.95$ ) when compared with the low balance beam ( $26.36 \pm 5.66$ ) and the high balance beam ( $25.27 \pm 4.24$ ) which presented the smallest result for self-confidence. It is appropriate to point out that in relation to variation of somatic anxiety, higher scores were on low balance beam ( $2.12 \pm 15.73$ ), considered the transition environment between the floor exercise and the high balance beam, and the slightest presence of somatic anxiety occurred on high balance beam ( $2.83 \pm 14.73$ ), which shows the table 2 A.

The results were also submitted to the Pearson correlation test (table 2 B), to investigate the relationship between the three environments and the anxiety. The results were significant between the averages of cognitive anxiety factor and there were strong positive correlation in the transition of the *wheel* in the floor exercise environment for the high balance beam ( $r = 0.7619$  and  $p = 0.0064$ ) and the low balance beam to high balance beam ( $r = 0.7574$  and  $p = 0.0069$ ).

The somatic anxiety factor not presented significant difference when comparing the averages but also demonstrated strong correlation during the making of the *wheel* on low balance beam to high beam ( $r = 0.695$  and  $p = 0.0176$ ). Note that something curious happened: while the somatic anxiety increased on low balance beam, on the high balance beam it down. Finally, in self-confidence there wasn't significant difference between the averages. Although, when considering the assessment of element of *wheel* the results clearly demonstrate strong correlation between the floor exercise environment for the low balance beam ( $r = 0.7571$   $p = 0.0070$ ).

### Discussion

Self-confidence must be recognized for its importance as a necessary condition for competition and obtaining high performances (Fisher, 2006). In a recent study of Sonoo et al. (2010) held with a children's volleyball team, it was found that the good results were achieved when the self-belief of the team remained stable. Thus, the authors agree that the confidence in stable levels was considered to be an essential factor for the good performance of the team. Following this same line of reasoning, in the present study, the fact that the gymnasts perform less self-confidence to the realization of the *wheel* on low balance beam than on floor exercise environment, may have been the reason for the lower performance.

In this way, it is confirmed that the lessening of self-confidence results in worse performance, corroborating notes made by Lundqvist, Kentta and Raglin (2011) that the anxiety symptoms found in lower intensity and high perception of confidence are factors that imply symptoms facilitators of competitive performance.

Ferreira (2006) shows in his study, that somatic anxiety levels higher in professional hockey athletes, when compared to amateur athletes may have contributed to the positive effect on yield. Opposite results were obtained in the present study, therefore, increase the values of somatic anxiety factor on low balance beam, besides the athletes presented the lowest grades compared to the high balance beam, environment in which somatic anxiety appeared lower. Such an occurrence between studies may be explained by the fact that a high level of activation of somatic anxiety favors the result in activities requiring endurance, strength and speed (Fisher, 2006), but for motor skills requiring coordination, concentration and balance the high level of somatic anxiety becomes harmful (Martens, Vealey & Burton, 1990).

One of the explanations for this worsening performance, these types of skills, can be found in the research of Moran, Byrne, and Mcglade (2002), in a study with gymnasts on the balance beam, by a phenomenon known as "narrowing of attention" in which emotions, such as anxiety, can induce a form of narrowing to use attention, decreasing the amplitude of the focus of attention with increasing excitement. Thus, the focus of athletes eager can narrow to the point that some relevant stimuli for the task can be ignored and its performance can degrade. On the results it is believed that somatic anxiety highest in low balance beam compared to high balance beam and self-confidence in low balance beam lock lower when compared to the floor exercise, were responsible for the worsening of performance in carrying out the *wheel* on low balance beam environment.

On the other hand the self-confidence in low balance beam and high balance beam did not provide different behaviour, probably due to the level of experience in between the participants of this study and familiarity in engaging the skill assessed, since this is practiced during training with greater frequency on high beam than on low beam, because this environment is used only in the initial phase of their learning. In this period the intention is to transfer the specific ability of the floor exercise environment for the high balance beam, thus low balance beam constitutes a transition environment, in which the group evaluated due to his experience, currently has little contact with the execution of that skill in this environment. This fact may have contributed to the errors in the execution of the *wheel* in low balance beam, hence the lower notes were obtained in this environment. So, on high balance beam adapted better using coping strategies, showed more easily and better performance (Hanton et al., 2008).

According to Vieira, Teixeira and Vieira (2011) the competitive situation raises anxiety levels and causes change in the performance, but not necessarily hurting the athlete's success. According to the same authors, athletes with high expectation of results, had also a high anxiety and also achieved good performance. Opposing this result, as the cognitive factor Sonoo et al. (2007) show that high levels of anxiety increases the occurrence of losses. In the present study it was found that the increased cognitive anxiety between the floor exercise environment for the high balance beam, may have been the reason of lower notes. For Stefanello (2007) analysis of the challenge related to the perception of the ability of the athlete can raise anxiety and consequently hinder this, act with your best performance. However, between the low and high balance beam, cognitive anxiety has increased, but the notes were higher in high balance beam when confronted the low balance beam. This result corroborates those of Vasquez, Teixeira and Vieira (2011) presented previously.

### Conclusions

Based on the results obtained in the present study, it was found that to the extent that there is an increase in the perception of insecurity about the environment, cognitive anxiety increases while self-confidence diminishes, and as a result, the performance of the athletes can be influenced. There are obvious relationship between anxiety and performance. Associations were found between somatic, anxiety and performance and between self-confidence and performance. With increasing somatic anxiety the performance of the evaluated athletes got worse. Similar condition was observed with the decrease in self-confidence. This result was expected because the skill evaluated requires coordination, balance and concentration.

On the cognitive aspect were presented two distinct results related to performance. One of them improved performance with increased cognitive anxiety (of the low balance beam to high balance beam), and another which saw lower notes to the environment in which the cognitive anxiety was higher (from floor

exercisetohigh balance beam).Note that anxiety can influence the performance of athletes and desirable levels depend on of individuality, environment and perception of the difficulty level of the task.It becomes necessary to teachers and coaches detect profile anxiety-state their athletes, to prepare them to achieve optimum performance with security.

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