
Analysis of pre-competitive state anxiety levels in artistic gymnastics athletes

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Abstract

Anxiety can be assessed from the perspective of three dimensions: somatic anxiety refers to physiological changes, cognitive anxiety associated with the degree of worry or negative thoughts, and self-confidence is related to a belief in facing a challenge. The study aimed to identify pre-competitive state anxiety levels in artistic gymnastics athletes, to compare pre-competitive anxiety levels of these participants between age groups and their competitive experience levels. 115 female artistic gymnastics athletes were analyzed, with a mean age of 13.61 ± 2.12 years. The results demonstrate that in the analysis of the three dimensions, there was a statistically significant difference only in the dimension Self-confidence ($p=0.012$). In the pairwise comparison, Self-Confidence showed a statistically significant difference in the 16-19 years and 13-15 years groups and also in the 16-19 years and 9-12 years groups. In the variable competitive experience, we can also notice a statistically significant difference in national competitions between groups 9-12 and 16-19. It can be concluded that the athletes participating in the older age group have lower self-confidence levels compared to the other groups. These results indicate that the older the athletes, the greater their concern with their performance, fear of failure and expectation of performance, leading to low levels of self-confidence.

KEYWORDS: Anxiety, State Anxiety, Artistic Gymnastic.

Análise dos níveis de ansiedade estado pré-competitiva em atletas de ginástica artística

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Resumo

A ansiedade pode ser avaliada sob o aspecto de três dimensões: a ansiedade somática se refere a alterações fisiológicas, ansiedade cognitiva associada ao grau de preocupação ou pensamentos negativos, e a autoconfiança tem uma relação com uma crença de enfrentamento de um desafio. O objetivo do estudo foi identificar níveis de ansiedade estado pré-competitiva em atletas de ginástica artística, comparar níveis de ansiedade pré-competitiva dessas participantes entre as faixas etárias e seus níveis de experiência competitiva. Analisou-se 115 atletas de ginástica artística do sexo feminino, com idade média de $13,61 \pm 2,12$ anos. Os resultados demonstram que na análise das três dimensões, houve diferença estatisticamente significativa apenas na dimensão Autoconfiança ($p=0.012$). Na comparação pairwise, a Autoconfiança apresentou diferença estatisticamente significativa, nos grupos de 16-19 anos e 13-15 anos e também nos grupos 16-19 anos e 9-12 anos. Na variável experiência competitiva, pode-se também notar diferença estatisticamente significativa em competições nacionais entre os grupos 9-12 e 16-19. Conclui-se que as atletas participantes do grupo de faixa etária mais elevada possuem menores níveis de autoconfiança comparadas aos demais grupos. Esses resultados apontam que quanto maior a idade das atletas, maior preocupação com o próprio rendimento, medo do fracasso e expectativa de desempenho, acarretando em baixos níveis de autoconfiança.

Palavras-chave: Ansiedade, Ansiedade Estado, Ginástica Artística.

Análisis de niveles de ansiedad competitiva estado en atletas artísticas de gimnasia

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Resumen

La ansiedad se puede evaluar en tres aspectos: la ansiedad somática se refiere a los cambios fisiológicos, la ansiedad cognitiva asociada con el grado de preocupación o los pensamientos negativos, y la confianza en uno mismo se relaciona con la creencia en enfrentar un desafío. El objetivo del estudio fue identificar los niveles de ansiedad precompetitiva en atletas de gimnasia artística, comparar los niveles de ansiedad precompetitiva de estos participantes entre los grupos de edad y sus niveles de experiencia competitiva. Se analizaron 115 atletas femeninas de gimnasia artística, con una edad media de $13,61 \pm 2,12$ años. Los resultados demuestran que en el análisis de las tres dimensiones, hubo una diferencia estadísticamente significativa solo en la dimensión Autoconfianza ($p=0,012$). En la comparación por pares, la autoconfianza mostró una diferencia estadísticamente significativa en los grupos de 16-19 años y 13-15 años y también en los grupos de 16-19 años y 9-12 años. En la experiencia competitiva variable, también podemos notar una diferencia estadísticamente significativa en las competiciones nacionales entre los grupos 9-12 y 16-19. Se concluyó que los atletas que participan en el grupo de mayor edad tienen niveles más bajos de confianza en sí mismos en comparación con los otros grupos. Estos resultados indican que cuanto mayores son los atletas, mayor es su preocupación por su propio rendimiento, miedo al fracaso y expectativa de rendimiento, lo que lleva a bajos niveles de confianza en sí mismo.

Palabras-clave: Ansiedad, Ansiedad Estado, Gimnasia Artística.

Introduction

Anxiety can be defined as a state of excessive preoccupation, combined with symptoms of irritability, muscle tension and restlessness (American Psychiatry Association, 2013). It can be characterized by insecurity, sense of loss of control and important physiologic changes (cardiological and respiratory), and can lead to a series of transient psychophysiological disorders, like headaches, sexual dysfunction, muscle aches and insomnia (Weinberg & Gould, 2016). Anxiety has become an adversity for the global population because its causes and consequences can be countless and affect people's daily lives.

In the sports world, an athlete's state of anxiety refers to the constantly changing mood. This component is characterized by subjective feelings of apprehension and tension (Spielberg, 1972), which can trigger a series of cognitive, behavioral and physiological responses to a situation known as stressful and related to competition (Ford, Ildefonso, Jones & Arvinen-Barrow, 2017). Research has attempted to explain the relationship between state anxiety and sports performance through theories and models. This includes the Theory of Multidimensional Anxiety (Martens et al., 1990), which proposes that state anxiety can be assessed under the aspect of three dimensions: somatic anxiety, cognitive anxiety and self-confidence.

The first refers to the physiological changes perceived by the individual, such as sweating, tremors, dry mouth, among others. The second is associated with the degree to which the individual worries or maintains negative thoughts in certain situations considered stressful, characterized by confusion, indecision, irritability and low levels of concentration. Self-confidence is associated with the belief in facing the challenge or task to be accomplished (Butt et al., 2003; Martens et al., 1990; Patel et al., 2010; Weinberg & Gould, 2016).

The onset of pre-competitive anxiety is usually related to two central issues: uncertainty about their performance results, as well as the importance given to the competition event (Silva, Enumo & Afonso, 2016). For the competitor, competition often is understood as a matter of survival and this interpretation leads to an increase in the unpredictability of results. The causes that can raise anxiety levels are numerous, such as the fear of failure, pressure exerted by the coach, the team, family members and also the fans; fear of injury, little competition experience (Ferreira Junior, Souza & Barros, 2018).

Although some studies emphasize that anxiety can be perceived as a facilitator for the performance of some athletes, based on the conception that these individuals interpret their symptoms positively and tend to have high levels of self-confidence in the competition moment, anxiety remains one of the main obstacles between competition and good performance (Lesinger et al., 2018; M. G. Fernandes, Nunes, Raposo, H. M. Fernandes & Brustad, 2013; Thanopoulos & Platanou, 2016). This occurs frequently in athletes who have little competitive experience and, typically, has lower levels of self-confidence when compared to athletes who have competitive experimental experiences. (Lesinger et al., 2018; Thanopoulos & Platanou, 2016).

In this sense, studies indicate that the competition experience can be an expressive factor in anxiety levels, because athletes with competition experience of an international standard may have lower levels of anxiety when being compared to those with a national standard (Morales, Garcia, Salvá, Escobar & Buscà, 2012). Also, age may be another factor influencing, as younger athletes may have higher levels of cognitive anxiety and decreased self-confidence when compared to mature and more experienced athletes (Thanopoulos & Platanou, 2016). These results are reinforced by pioneers Martens, Vealey and Burton (1990), who hypothesized that the source of anxiety and self-confidence are environmental factors related to athletes' expectations regarding the comprehension of their own sports skills associated with previous competition experiences.

Therefore, it is emphasized that anxiety can provide emotions that deregulate the necessary motor action for the particularity of the modality to be presented and thus, directly influence the performance, bringing physiological, psychological and motor changes (Lesinger et al., 2018; Silva, Enumo & Afonso, 2016). Artistic gymnastics in specific is a modality that requires the athlete to refine many valences simultaneously for the competition moment, such as coordination, balance and strength related to the skill in which judges are evaluating (Barreto et al., 2016). In contrast, these athletes should keep the presentation demonstrating subtlety, lightness and beauty of the movements, which factors can bring unexpected results due to the high levels of anxiety state.

Before the empirical evidence presented, the hypothesis of the present study, based on Multidimensional Anxiety Theory (Martens, Burton, Vealey, Bump & Smith, 1990), it comes from the construct that cognitive anxiety and somatic anxiety would be related to each other, and self-confidence would be inversely proportional to others. The second hypothesis is based on the statement that younger athletes with less competition experience will have higher anxiety levels than more experienced ones.

Therefore, the objective of the present study was to identify pre-competitive state anxiety levels in artistic gymnastics athletes and to compare the pre-competitive anxiety levels of these participants between age groups and their competition experience levels.

Method

Participants

This research analyzed 115 female artistic gymnastics athletes, with a mean age of 13.61 ± 2.12 years. A sample was subdivided by quartiles into three groups: Group 1 (Q1=9 to 12 years), Group 2 (Q2=13 to 15 years) and Group 3 (Q3=16 to 19 years).

Ethical procedure

The research was submitted and approved by the Research Ethics Committee of the São Paulo State University (Opinion No.: 323,400), in compliance with Resolution 466/12 of the National Health Council.

Instruments

To measure the participants' anxiety levels, the Competitive Anxiety Inventory (CSAI-2) was used, recommended by Martens, Vealey and Burton (1990) and validated and adapted for Brazilian athletes by Coelho, Vasconcelos-Raposo and Mahl (2010). This instrument consists of 27 questions, subdivided by the dimensions of cognitive anxiety, somatic anxiety and self-confidence. Through the Likert scale, referring to the momentary emotional states, results are obtained regarding 1 = nothing, 2 = a little, 3 = quite and 4 = completely, in front of each question.

In addition, we used a sociodemographic questionnaire that had descriptive information about age, time and levels of competition.

Data were collected at the São Paulo State Regional Games 30 minutes before the artistic gymnastics' competitions. We included female participants who had already held more than one competition as the main inclusion criterion. Besides, we analyzed the data that answered all questions from both instruments.

Data analysis

We performed data analysis using SPSS software version 25 and considered statistical significance when $p < 0.05$, indicating model validity. The Shapiro-Wilk normality test was carried out, and its significant results for all variables suggest that the statistical analysis be performed by means of non-parametric tests. We performed descriptive statistics such as mean, standard deviation and median for the total sample data. We performed age group division by quartiles and Kruskal-Wallis test for comparison between age group categories in the pairwise comparison model.

Results

The sample consisted of 115 gymnasts with an average age of 13.61 ± 2.12 , all of them female.

To find results regarding age, we categorized the age groups by quartiles, subdivided into 9 to 12 years, 13 to 15 years and 16 to 19 years to identify the levels of state anxiety that were analyzed (Table 1).

Table 1. Descriptive statistics of state anxiety levels of the groups

Cognitive Anxiety					
Group	n(%)	$\bar{x} \pm dp$	md	Minimum	Maximum
9-12	33 (28,7%)	16,9 $\pm$ 4,37	17	9	30
13-15	58 (50,4%)	15,79 $\pm$ 4,05	16	9	24
16-19	24 (20,9%)	17,91 $\pm$ 5,13	18,5	11	28
Somatic Anxiety					
Group	n(%)	$\bar{x} \pm dp$	md	Minimum	Maximum
9-12	33 (28,7%)	17,57 $\pm$ 4,06	17	10	28
13-15	58 (50,4%)	17,12 $\pm$ 3,5	17	12	27
16-19	24 (20,9%)	17,83 $\pm$ 3,42	18	12	25
Self-Confidence					
Group	n(%)	$\bar{x} \pm dp$	md	Minimum	Maximum
9-12	33 (28,7%)	23,87 $\pm$ 5,15	25	14	33
13-15	58 (50,4%)	23,96 $\pm$ 4,94	24	15	36
16-19	24 (20,9%)	19,75 $\pm$ 4,91	20,5	12	29

We performed Kruskal-Wallis test of independent samples for comparison between the three groups of age groups and among the dimensions of state anxiety analyzed, there was a statistically significant difference for comparison of the self-confidence dimension ($p=0.012$), shown in Table 2.

Table 2. Comparison between groups by Kruskal-Wallis Test for anxiety dimensions

Cognitive Anxiety					
Group	n(%)	x±dp	md	x²	p
9-12	33 (28,7%)	16,9±4,37	17	1,466	0,220
13-15	58 (50,4%)	15,79±4,05	16		
16-19	24 (20,9%)	17,91±5,13	18,5		
Somatic Anxiety					
Group	n(%)	x±dp	md	x²	p
9-12	33 (28,7%)	17,57±4,06	17	3,052	0,514
13-15	58 (50,4%)	17,12±3,5	17		
16-19	24 (20,9%)	17,83±3,42	18		
Self-Confidence					
Group	n(%)	x±dp	md	x²	p
9-12	33 (28,7%)	23,87±5,15	25	8,859	0,005*
13-15	58 (50,4%)	23,96±4,94	24		
16-19	24 (20,9%)	19,75±4,91	20,5		

Notes: * $p < 0,05$

When performing the pairwise comparison test, we identified in the results regarding the Self-Confidence dimension a statistically significant difference, specifically between the groups of 16-19 years, 13-15 years ($p=0.008$) and also in the groups 16-19 years and 9-12 years ($p=0.013$), contrasting that the group of older athletes has lower self-confidence on average than the other groups.

In the competition experience variable, we also noticed a statistically significant difference in national competitions ($p=0.033$) between groups 9-12 and 16-19 ($p=0.028$). For state competitions, there was a significant difference ($p=0.004$), revealed by pairwise, specifically between groups 9-12 years and 16-19 years ($p=0.038$), as well as in groups 9-12 years and 13-15 years ($p=0.004$).

Table 3. Comparison between groups by Kruskal-Wallis Test for the competition experience

International Competitions					
Group	n(%)	x±dp	md	x ²	p
9-12	33 (28,7%)	0,24±0,66	0	0,889	0,641
13-15	58 (50,4%)	0,39±0,93	0		
16-19	24 (20,9%)	0,20±0,50	0		
National Competitions					
Group	n(%)	x±dp	md	x ²	p
9-12	33 (28,7%)	1,12±1,86	0	6,836	0,033*
13-15	58 (50,4%)	2,50±3,33	0		
16-19	24 (20,9%)	1,54±2,50	0		
State Competitions					
Group	n(%)	x±dp	md	x ²	p
9-12	33 (28,7%)	1,75±2,41	0	11,129	0,004*
13-15	58 (50,4%)	3,72±2,95	4		
16-19	24 (20,9%)	5,33±6,61	3,5		
Municipal Competitions					
Group	n(%)	x±dp	md	x ²	p
9-12	33 (28,7%)	10,57±12,18	10	4,508	0,105
13-15	58 (50,4%)	7,62±8,80	5		
16-19	24 (20,9%)	16,95±18,44	12		

Discussion

The present study aims to identify pre-competitive state anxiety levels in artistic gymnastics athletes, as well as to compare anxiety levels between age groups and their levels of experience in competition. The results showed first, that on average, the levels of Cognitive and Somatic Anxiety in the athletes of the older group (16 to 19 years old) are higher than in the other groups, and their Self-Confidence is statistically significant when compared to the other groups.

These results contradict the initial hypothesis that older athletes have lower levels of somatic and cognitive anxiety and high self-confidence, due to their greater experience in competition and, thus, demonstrate to deal better with the state of pre-competitive anxiety. In this sense, it is believed that these results can be explained, as athletes of this age group have greater demands (Nascimento Junior, Gaion, Nakashima & Vieira 2010; Schwebel, Smith & Smoll, 2016), with higher training loads in search of good performance, which can result in increased injuries, symptoms of fatigue, stress, affect self-esteem and anxiety (Merkel, 2013; Silva, Enumo & Afonso, 2016; Santos et al., 2014; Weinberg & Gould, 2016).

We can relate the low levels of self-confidence presented in the results, with the demands of the athlete himself, the coach, the teammates and the supported (Leite et al., 2016). In addition, studies show that competing with low levels of self-confidence can lead to increased insecurity, negative emotions, anxiety, depression and dissatisfaction, thus impairing the athlete's performance and concentration at decisive moments in the competition (Leite et al., 2016; Machado et al., 2016; Martens et al., 1990).

Contrary to the results found in the present study, in one study, swimming and water polo athletes were submitted to the same pre-

competitive anxiety instrument (CSAI-2) and compared between age groups (13 to 15 years and 16 to 19 years) . The results showed high levels of cognitive anxiety in younger athletes and high self-confidence in older athletes (Thanopoulos & Platanou, 2016). The explanation can probably be related to the fact that the experience of training and participation in competition events influences the dimensions of pre-competitive state anxiety (Machado et al., 2016; Thanopoulos & Platanou, 2016).

In a study that qualitatively examined the relationship between self-confidence, competitive anxiety and interpretation of anxiety symptoms in relation to performance, it showed that pre-competitive anxiety was perceived as high out of control by those athletes who had low self-confidence. In addition, the authors point out that self-confidence is a fundamental factor so that athletes do not experience exhausting feelings and thoughts in a competitive situation (Hanton, Mallalieu & Hall, 2004).

Given this, scientific evidence indicates that athletes who have more titles and have better skills in dealing with the demands and pressures of competition and sports training have greater self-confidence. Therefore, the athlete who is successful in their competition journey will certainly make positive predictions about their performance, reinforcing the perception of performance capacity and adapting more easily to aspects of anxiety and fear (Faria & Gomes, 2018).

We were also able to observe significant differences in relation to the competition experience. This variable corroborated the initial hypothesis of the study, that athletes of older age groups have more experience of competition (Table 3). Above all, they are the most experienced athletes who had lower scores in the self-confidence dimension. The experience of the present study therefore comes close to the number of competitions experienced by athletes, at different levels of performance (municipal, state, national and international). We can relate these findings to the fact that these athletes, having experienced more competitions, may have greater feelings of concern regarding their own performance, in addition to comparisons about expectations and results obtained, feeling of pressure, consequently presenting lower levels of self-confidence (Lavoura & Machado, 2018; Weinberg & Gould, 2016).

Thus, it is believed that when the athlete realizes that his performance is not reaching the expected requirements of his sport, his levels of self-confidence decrease, resulting in an even greater interference with his motor skills and athletic routine (Lorenzo, Gómez, Pujals and Lorenzo, 2012). This perception can cause a drop in performance not only at the time of competition and lead to the abandonment of sports practice, as it does not support the pressure (Tomé-Lourido, Arce & Ponte, 2019).

Studies also point out that elite athletes experience fewer anxiety symptoms and have greater confidence when compared to amateur athletes (Rice et al., 2019; Junge & Prinz, 2019). These results reinforce evidence previously found, since all athletes analyzed are from amateur categories.

Our research is limited due to its experimental cross-sectional design. Therefore, it is difficult to predict precisely whether the relationship

established between the low levels of the self-confidence dimension of state anxiety is a function of experience in sports competitions. In addition, the methodological choice to assess state anxiety just before the moment of competition and not also after, does not show us how these athletes are after the competition, leaving an open bias. Finally, it is worth highlighting the need for future research to consider these notes for better scientific deepening and more detailed understanding of the relationship shown in the present study.

In this sense, we see the need for future research to outline strategies for athletes to acquire a good command of the self-confidence dimension and thus maintain good emotional control and performance, especially when they experience high levels of anxiety, as well as coping strategies, concerns about competition and fear of external and internal pressure, specifically in the age group of the athletes observed in the present study.

Conclusion

We concluded that the athletes participating in the higher age group (16-19 years) have lower levels of self-confidence compared to the other groups (9-12 years and 13-15 years). In addition, we note that older athletes are the ones with the most competition experience. These results may be related to the fact that the older the athletes are, the more concerned with their performance they get and the greater the fear of failure and expectation of performance, which may lead to lower levels of self-confidence compared to less experienced athletes.

Therefore, we believe that there should be greater emphasis on psychological factors both in the training and pre-competition phases and in the competition process, given the importance and influence on sports and competition practice, as self-confidence in sport is considered one of the most important aspects of the psychological competences of athletes, because it is the belief that the athlete has about his ability to succeed. Thus, it is necessary to focus more attention on the control and balance of the psychological dimensions that involve sports practice and ability to compete through coping strategies and psychotherapeutic support necessary for these athletes to value the well-being, quality of athlete's life and also improves performance without psychological interference.

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