

Analysis of pre-competitive anxiety of Brazilian young swimmers

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ABSTRACT. This study analyzed the level of state-anxiety of swimming athletes based on sex, category, competitive specialty, competitive level and competitive experience. Participants were 178 male ($n = 105$) and female ($n = 73$) swimmers with mean age of 15.51 ± 1.9 years at regional, national and international levels. The Competitive State Anxiety Inventory-2 (CASI-2) was used as instrument. Data analysis was conducted using the independent Student's t-test, Mann-Whitney, Kruskal-Wallis and Spearman correlation. The results showed higher levels of self-confidence in males ($p = 0.02$) and higher levels of cognitive anxiety in females ($p = 0.019$). Among the competitive specialties, there were differences between levels of cognitive anxiety ($p = 0.045$) and self-confidence ($p = 0.041$) of swimmers. Differences were also observed in levels of cognitive anxiety ($p = 0.049$), somatic anxiety ($p = 0.001$) and self-confidence ($p = 0.047$) between swimming competition levels. It was concluded that male swimmers are more self-confident and less anxious than female swimmers and there are different levels of self-confidence and types of anxiety for different competitive specialties and ranking of competitions.

Keywords: anxiety; athletes; swimming; sport.

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Introduction

Emotional changes due to stress caused by the sporting context can have a significant impact on athlete performance (Woodman & Hardy, 2003; Nascimento, Morais, & Vieira, 2014). Expectations about performance and pressures exerted by parents, coaches and others involved in competitive sport trigger in many athletes, in addition to stress, emotional or behavioral responses such as fear, apprehension, panic, insecurity, aggression and apathy, capable of promoting exaggerated levels of psychophysiological activation (Paludo, Nunes, Simões & Fernandes, 2017).

Many of these emotional changes are linked to the term anxiety which can be established as a negative emotional condition, characterized by nervousness, worry and apprehension, associated with the activation or excitation of the body (Nascimento, Bahiana & Nunes-Júnior, 2012). According to Paludo et al. (2017), anxiety in sports performance is a relational process between a system of interdependent psychological variables and processes, of a cognitive and motivational nature. This is capable of improving, worsening or not interfering with performance, depending on the psychological characteristics of coping of the individual (Silva, Lima, Ribeiro, Costa & Hernandez, 2015).

The Multidimensional Anxiety Theory (Martens, Vealey & Burton, 1990a) has been used in most studies on competitive anxiety studies. Such theory proposed the subdivision of competitive anxiety into cognitive (CA), somatic (SA) and self-confidence (SC). The first is represented by thoughts and doubts about performance and the competitive situation. The second, associated with unpleasant physiological perceptions of excitation, mediated mainly by reactions of the autonomic nervous system. And the third, the positive construct related to motivational ability and positive thinking about competition (Martens et al., 1990a).

To measure these components, Martens, Burton, Vealey, Bump & Smith (1990b) developed the Competitive State Anxiety Inventory 2 (CSAI-2). Studies have shown that these dimensions of competitive anxiety tend to be influenced by variables such as gender, modality and level of skill and competitive

experience (Woodman & Hardy, 2003; Fernandes, Nunes, Vasconcelos-Raposo & Fernandes, 2013; Teixeira, Nunes & Cruz, 2016).

Specifically, for swimming, studies were developed with the participation of athletes of different competitive levels (Souza, Texeira & Lobato, 2012; Parnabas, Parnabas & Parnabas, 2015). These studies demonstrate the great possibility of emotional changes on competitive anxiety, evidencing possible differences in competitive anxiety between sports, sex, ranking and competitive experience.

Thus, based on the need to draw a specific profile of competitive anxiety in Brazilian swimmers, the findings of this study can contribute in a particular way in the direction of training and psychological preparation for competition, since technicians, sports psychologists and others involved, need basic information about the behavioral characteristics of a certain group of athletes included in the competitive process.

In this context, this study aimed to analyze the level of pre-competitive anxiety of swimming athletes through (CSAI-2), specifically seeking to compare levels of cognitive, somatic and self-confidence anxiety according to sex, category, type of test, ranking of competitions and experience, besides verifying the relation between the subscales of competitive anxiety.

Material and methods

Participants

The study selected 200 swimming athletes to participate in the study, however, 22 were excluded due to failure to complete the questionnaires. Thus, the final sample consisted of 178 non-probabilistically selected athletes (convenience sample), being 105 males and 73 females, aged 13 to 20 years (15.51 ± 1.9 years). To participate, the athlete would have to have at least one year of competitive experience and/or have participated in regional and/or national and international competitions. The athletes came from five regions of the national territory: North ($n = 35$), Northeast ($n = 35$), Center West ($n = 30$), South ($n = 28$) and Southeast ($n = 50$), who participated in regional championships developed in the second half of 2015 in the Regions mentioned above, organized by the Brazilian Confederation of Aquatic Sports. These competitions precede the national championships of categories, being the second competition of national importance for the athletes who participated in the research.

Each participant signed the Free and Informed Consent Form and the Term of Agreement (in case of underage athletes). The study was approved by the Research Ethics Committee with the number 1391940, and is in accordance with current legislation.

Instruments

An anamnesis with objective questions was applied to collect demographic, health and specification data on the practiced mode, such as sex, subjective health, weekly frequency, years of competition, hours of training, main competitive test and participation in competitions.

To assess pre-competitive anxiety, we used the Competitive State Anxiety Inventory (CSAI-2), originally developed by Martens et al. (1990b) and validated for the Brazilian context by Coelho, Vasconcelos-Raposo & Mahl (2010). This instrument is composed of 27 items distributed in three subscales: CA ($\alpha = 0.85$); SA ($\alpha = 0.88$); and SC ($\alpha = 0.90$). The items are answered on a Likert scale, on a continuum that varies from 'nothing' (1) to 'very' (4). The scores of the subscales are obtained by summing the items, which range from 9 to 36 points. These are grouped in low anxiety (9 to 18 points), moderate (19 to 27 points) and high (28 to 36 points).

Procedures

Initially, the researcher went to the technical congress of the competition to explain the study and to contact the coaches. These were in charge of informing parents and athletes about the participation of the athletes in the research. Participants signed the Term of Agreement (when minor) and Free and Informed Consent Form (when over 18) and completed the anamnesis and CSAI-2 questionnaires, always before the first event of the competition (15 to 45 min.). The questionnaires were collected during the competition so that they were not taken home or delivered at another time.

Data analysis

Descriptive statistics were performed for sample characterization, presented as mean and standard deviation. Data normality was checked by the Kolmogorov-Smirnov test. CSAI scores were not normally distributed, and a non-parametric statistic was adopted for this variable. Student's t-tests were applied for independent samples in the comparison between the sexes in the variables: age, frequency in training, years of training, competitive experience and the Mann-Whitney U-test for the competitive state anxiety subgroups. The Kruskal-Wallis test was performed to analyze the differences between anxiety levels in the groups: competitive categories, events, years of competitive swimming and ranking of competitions. Spearman correlations were also applied to determine the level of association between the competitive state anxiety constructs for participants in total and by sex. For all analyses of comparison and association, a significance level of $p \leq 0.05$ was adopted, using the statistical package Statistical Package for the Social Sciences (SPSS) - IBM 22.0.

Results

According to the results of Figure 1, young swimmers presented a predominance of low to moderate levels of SA (60.1 and 29.8%, respectively) and CA (47.8 and 40.4%, respectively) and moderate to high SC (48.3 and 29.8%, respectively).

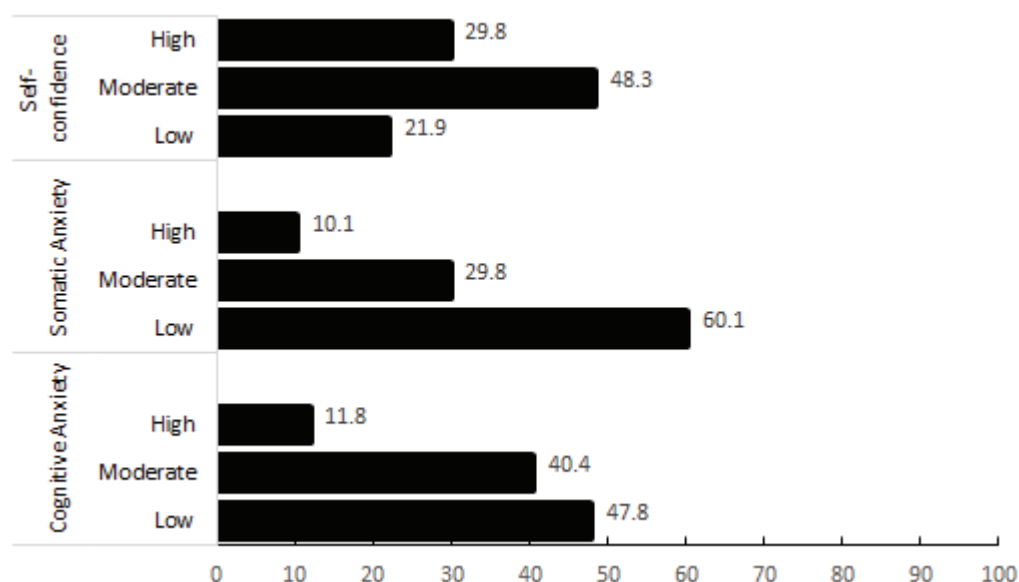


Figure 1. Level of cognitive anxiety, somatic anxiety and self-confidence of young swimmers.

The characteristics of participants and the differences between the sexes are summarized in Table 1. Statistical differences were evidenced for competition time $t(176) -2.36$, $p = 0.010$, CA $U(2987.50)$ $p = 0.012$, and SC $U(2788.00)$ $p = 0.002$, in relation to sex (Table 1), indicating that men presented higher competition time, lower CA and higher SC in detriment of women. To confirm or not, a possible influence of the time of competition on the differences found in the variables CA and SC by sex, a linear regression was used, in which it was demonstrated no influence of the competition time on the CA and the SC. Specifically, the following values are shown for males: CA/competitive experience $R^2 = 0.001$ and SC/competitive experience $R^2 = 0.05$; and female: CA/competitive experience $R^2 = 0.017$ and SC/competitive experience $R^2 = 0.004$.

The results presented for CA did not show significant statistical differences considering the categories (infant, juvenile, junior and senior) and competitive experience, being observed in the variables of ranking of competitions $X^2(5.93)$ $p = 0.049$ and types of competitive events $X^2(5.86)$ $p = 0.045$ (Table 2). For somatic anxiety (SA), significant differences were detected only in the ranking of competitions $X^2(16.52)$ $p = 0.001$. The SC levels showed significant differences in the event $X^2(6.87)$ $p = 0.041$ and ranking of competitions $X^2(6.03)$ $p = 0.047$. It should be noted that the swimmers with the highest competitive ranking (regional/national and regional/national/international) had higher SC scores and lower CA and SA scores. Still, short-distance swimmers had higher CA and lower SC (Table 2).

Table 1. Characteristics of Brazilian young swimmers.

Swimmers	Total	Male (n = 105)	Female (n = 73)	p
Age	15.51 ± 1.9	15.62 ± 2.02	15.34 ± 1.70	0.32
Frequency in training	6.44 ± 1.45	6.61 ± 1.45	6.20 ± 1.44	0.600
Competition time (years)	5.14 ± 2.89	5.60 ± 2.72	4.47 ± 3.10	0.010*
CA	19.85 ± 6.35	18.93 ± 6.40	21.19 ± 6.08	0.019*
SA	18.46 ± 5.42	17.83 ± 5.10	19.35 ± 5.76	0.060
SC	24.1 ± 5.66	25.15 ± 5.48	22.45 ± 5.58	0.002*

*p ≤ 0.05, *Student's t*-test for independent samples: age, frequency in training, competition time (male x female); *p ≤ 0.05, *Mann Whitney U*-test: CA, SA, SC (male x female). CA = Cognitive Anxiety; SA = Somatic Anxiety; SC = Self-confidence.

Table 2. Competitive anxiety levels in Brazilian young swimmers.

Categories	Cognitive Anxiety	Somatic Anxiety	Self-confidence
Infant (n = 50)	19.87 ± 5.17	19.06 ± 5.50	24.21 ± 4.86
Juvenile (n = 76)	19.70 ± 6.67	17.80 ± 5.17	23.74 ± 5.80
Junior and Senior (n = 52)	20.62 ± 6.29	20.08 ± 6.34	24.33 ± 5.53
P	p = 0.81	p = 0.27	p = 0.44
Events	Cognitive Anxiety	Somatic Anxiety	Self-confidence
Short-distance (n = 86)	20.69 ± 6.13	19.46 ± 5.50	23.31 ± 5.41
Middle-distance (n = 68)	19.67 ± 6.53	17.66 ± 5.26	24.11 ± 5.68
Long-distance (n = 24)	17.37 ± 6.19	17.12 ± 5.12	26.45 ± 6.05
P	p = 0.045*	p = 0.07	p = 0.041*
Ranking of competitions	Cognitive Anxiety	Somatic Anxiety	Self-confidence
Regional (n = 30)	23.20 ± 7.58	24.46 ± 6.80	21.33 ± 5.19
Reg. and Nat. (n = 74)	20.37 ± 5.39	19.08 ± 5.70	24.10 ± 5.47
Reg. Nat. and Inter. (n = 59)	21.17 ± 6.45	20.03 ± 5.0	24.96 ± 5.80
P	p = 0.049*	p = 0.001*	p = 0.047*
Competitive experience (years)	Cognitive Anxiety	Somatic Anxiety	Self-confidence
1-3 (n = 20)	20.54 ± 6.77	20.32 ± 6.65	23.18 ± 5.62
4-7 (n = 35)	19.03 ± 6.06	17.41 ± 4.61	24.40 ± 5.28
≥ 8 (n = 28)	20.66 ± 6.46	18.82 ± 5.42	24.07 ± 5.66
p	p = 0.29	p = 0.10	p = 0.54

*p ≤ 0.05, Significant difference (*Kruskal Wallis*) – Tests: CA and SC: Short with middle- and long-distance; Ranking of competitions: CA, SA and SC: Regional with Reg./Nat and Reg/Nat/Inter. CA = Cognitive Anxiety; SA = Somatic Anxiety; SC = Self-confidence.

In Brazilian swimmers, the correlation between the subgroups of competitive anxiety was moderate between CA and SA ($r = 0.68$, $p = 0.001$); moderate negative for CA and SC ($r = -0.55$, $p = 0.001$) and weak negative for SA and SC ($r = -0.33$, $p = 0.001$). When considering the subdivision by gender, male athletes presented a moderate positive association between CA and SA ($r = 0.68$, $p = 0.001$) and moderate negative associations between CA and SC ($r = -0.55$, $p = 0.001$) and CA and SC ($r = -0.042$, $p = 0.001$). The female gender also presented a moderate positive association between CA and SC ($r = 0.65$, $p = 0.001$) and moderate negative for CA and SC ($r = -0.52$, $p = 0.001$) and weak negative for SA and SC ($r = -0.30$, $p = 0.010$).

Discussion

The aim of the study was to compare the intensity of pre-competitive anxiety of swimmers according to sex, categories, events, ranking of competitions and competitive experience, as well as to analyze the correlation between CA, SA and SC between the sexes. In general, the results showed low to moderate levels of competitive anxiety (CA and SA) and SC, presenting differences between the sexes, type of event and ranking in competitions.

The comparison of competitive anxiety of athletes according to sex showed differences for CA and SC, indicating that male athletes are more self-confident profile and felt less worried and showed less negative thoughts in moments before the competition. Our findings corroborate previous studies, such as Fernandes et al. (2013) and Souza et al. (2012), who pointed out higher CA scores for females. Coutinho, Giovanini, Pavini, Ventura, Elias and Silva (2015) affirm that women's emotional responses are more intense due to the biological and hormonal factors of the different phases of women's lives, such as hormonal regulation and the menstrual cycle, besides various social roles women have in the current society. In this perspective, the differences found in the present study can be explained by the greater disturbance of the autonomic nervous system that women demonstrate at competitive moments, since CA and SA are associated with the highest

degree of disturbance of the autonomic nervous system (Fortes et al., 2017). The results of the present study become relevant in that it shows that women present more intense emotional reactions at competitive moments, since there is evidence in the literature that young swimmers of both sexes have similar characteristics of trait anxiety (Silva, Araújo, Arantes, Neto, & Melo, 2018).

In general, swimming athletes have moderate self-confidence. This fact may be explained by the specific characteristics of this modality, such as domain of the body in liquid medium, early competitive stimuli in the basic categories and competitive environment during daily training focused on pre-established goals and marks. According to Santos and Alves (2018), such experienced emotions become adaptive mechanisms, generating self-regulation in athletes to promote emotional control and maintain high levels of performance.

Furthermore, the swimmers' specialties demonstrated significant differences on CA and SC. According to Hanton, Mellalieu, Hall (2004), higher values of self-confidence improve the feeling of emotional control on performance, being a determining factor for performance. This fact outlines a sensitive difference in the behavioral patterns of competitive anxiety between shot- and long-distance swimmers. A possible explanation for the percentage variations between AS and SC intensities can be tied to the different psychological strategies developed within the daily events and training, for example, events of long distances of submaximal intensities require concentration, self-control over swimming rhythm, realistic goals, while short tests require maximum effort, attention to the minimum details during the beginning of the event, turns, number of breaths, and the proximity of opponents' times.

Differences such as these may contribute positively to CA and SC values found. It is worth emphasizing the need for more studies involving the psychological characteristics of short- and long-distance swimmers in order to reach a common sense about the differences of swimming athletes.

CA, SA, and SC did not differ significantly between age categories, and did not validate the findings of Souza et al. (2012), who reported lower values of CA and SA in more advanced categories. Some authors (Wallhead & Ntoumanis, 2004; Interdonato, 2010) have reported that anxiety becomes more evident in adolescence, with a tendency to decrease as they age, indicating a greater ability to interpret and control their anxiety. Such assumption is not supported by the present study, since anxiety did not show variation according to age.

When analyzing the ranking of competition, differences were presented on the three subscales of competitive anxiety state, corroborating with the findings of Souza et al. (2012), on the ranking of competitions for CA, SA and SC. In general, swimmers participating in competitions with higher competitive rankings had higher SC scores and lower CA and SA scores. These findings corroborate previous research, which showed that athletes participating in national and international competitions had lower SA scores, leading to an increase in performance (Bertuol & Valentini, 2006; Souza et al., 2012; Parnabas et al., 2015).

Correlations between SC, CA and SA were classified as moderate and weak. According to Vasconcelos-Raposo, Lázaro, Teixeira, Mota, and Fernandes (2007), the lower the CA and SA values, the higher the SC scores. The correlations showed that men have moderate negative correlations for SA and SC, while women have shown a low correlation between SA and SC. Goldstein, Jerram, Abbs, Whitfiels-Gabrieli, and Makris (2010) presented that, in stress situations, women interpret their mental activity in a singular and instinctive way under a stressor event and that this is associated with a biosocial interpretation of the external factor, mainly associated with judgments before a group.

As previously mentioned, this relationship is still not well understood, and the possibility of different psychophysiological activation thresholds between the sexes should be investigated in future studies. In addition to this limitation, there is still a need to include the performance variable, which was not included in the present study. This prevented further clarification on the relationship between the presented results of SC, CA, SA and performance. Another variable not addressed that constituted a limitation in the study was the lack of information on which athletes performed psychological counseling and counseling time, potentially influencing the response of competitive anxiety. And as a last limitation, the cross-sectional design, which precludes interpretations of causal relations over time. In view of this, future research should identify comparisons and relationships of intensity and direction of anxiety on the studied variables and performance, in order to more effectively clarify the effects of anxiety on the performance of swimming athletes.

Conclusion

The research findings show that swimming athletes differ on CA and SC by sex, and that athletes who participate in competitions of better ranking are more self-confident than those of lower competitive level. In general, swimming athletes had higher self-confidence scores than cognitive and somatic anxiety, which suggests a greater capacity to interpret the competitive context as a challenge to be overcome. The findings described herein may serve as a basis for interventions by sports coaches and psychologists. Such interventions should be based on the control of the negative psychological reactions of the athletes, aiming at a maximization of self-confidence, and thus an increase in performance. The athletes of regional ranking, short-distances and of the female sex should be main targets of these works, since they presented profile more negative than the other athletes.

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