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ANÁLISE DOS NÍVEIS DE ANSIEDADE DE ATLETAS DE NATAÇÃO NA PRÉ-COMPETIÇÃO
ANXIETY LEVELS ANALYSIS IN SWIMMERS DURING PRE-COMPETITION
ANÁLISIS DE LOS NIVELES DE ANSIEDAD DE LOS ATLETAS DE NATACIÓN EN LA PRECOMPETICIÓN

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RESUMO

Introdução: O desporto revela uma variedade de facetas, contornos, sentidos, atividades, vivências, comportamentos e atitudes. Compreende situações que dizem respeito ao jogo e ao ambiente e contexto que rodeiam as competições: pressão dos técnicos, dirigentes, familiares e dos adeptos que detêm elevadas expetativas quanto à prestação das suas equipas.
Objetivo: Analisar os níveis de ansiedade pré-competitiva e a autoconfiança em jovens nadadores.
Métodos: O grupo de estudo é composto por todas as turmas de natação competitiva de um *Health Club* da cidade de Viseu. Recorreu-se à versão traduzida e validada do *Competitive State Anxiety Inventory 2* para a recolha de dados e para o seu tratamento, descritivo e inferencial, com o software *Statistical Package for the Social Sciences*.
Resultados: Verificou-se que: (1) os níveis de ansiedade variam de acordo com o género, idade, experiência e nível da competição; (2) os atletas mais jovens e com menor experiência competitiva apresentam maiores níveis de ansiedade somática e cognitiva (3) os níveis de autoconfiança variam significativamente de acordo com a experiência competitiva dos atletas; (4) as meninas apresentam maiores índices de ansiedade e menores de autoconfiança, assim como os atletas mais jovens. **Conclusão:** As perceções de ansiedade e autoconfiança são influenciadas pelas experiências e expectativas sociais, pelo que, à medida que os atletas amadurecem, adquirem competências e habilidades que lhes permitem reduzir os estados de ansiedade pré-competitiva e, paralelamente, desenvolver os níveis de confiança.

Palavras-chave: ansiedade; atletas; competição; desporto; natação

ABSTRACT

Introduction: Sport reveals a variety of facets, contours, meanings, activities, experiences, behaviors, and attitudes. It encompasses situations related to the game and the environment surrounding competitions: pressure from coaches, managers, family members, and fans who hold high expectations for their teams' performance.
Objective: Analyse pre-competitive anxiety levels and self-confidence in young swimmers.
Methods: The study group consists of all competitive swimming classes at a Health Club in the city of Viseu. The translated and validated version of the Competitive State Anxiety Inventory 2 was used for data collection and descriptive and inferential analysis using the Statistical Package for the Social Sciences software.
Results: It was found that: (1) anxiety levels vary according to gender, age, experience, and competition level; (2) younger athletes with less competitive experience exhibit higher levels of somatic and cognitive anxiety; (3) self-confidence levels vary significantly according to athletes' competitive experience; (4) girls show higher levels of anxiety and lower self-confidence, as do younger athletes.
Conclusion: Perceptions of anxiety and self-confidence are influenced by social experiences and expectations, so as athletes mature, they acquire skills and abilities that allow them to reduce pre-competitive anxiety states and, simultaneously, develop confidence levels.

Keywords: anxiety; athletes; competition; sport; swimming

RESUMEN

Introducción: El deporte revela una variedad de facetas, contornos, sentidos, actividades, experiencias, comportamientos y actitudes. Comprende situaciones relacionadas con el juego y el ambiente y contexto que rodean las competiciones: la presión de los entrenadores, directivos, familiares y seguidores que tienen altas expectativas sobre el rendimiento de sus equipos.
Objetivo: Analizar los niveles de ansiedad precompetitiva y la autoconfianza en jóvenes nadadores.
Métodos: El grupo de estudio está compuesto por todas las clases de natación competitiva de un *Health Club* de la ciudad de Viseu. Se utilizó la versión traducida y validada del *Competitive State Anxiety Inventory* 2 para la recopilación de datos y su tratamiento, descriptivo e inferencial, con el software *Statistical Package for the Social Sciences*.
Resultados: Se encontró que: (1) los niveles de ansiedad varían según el género, la edad, la experiencia y el nivel de la competencia; (2) los atletas más jóvenes y con menos experiencia competitiva muestran niveles más altos de ansiedad somática y cognitiva; (3) los niveles de autoconfianza varían significativamente según la experiencia competitiva de los atletas; (4) las niñas muestran mayores índices de ansiedad y menor autoconfianza, al igual que los atletas más jóvenes.
Conclusión: Las percepciones de ansiedad y autoconfianza son influenciadas por experiencias y expectativas sociales, por lo que, a medida que los atletas maduran, adquieren habilidades y competencias que les permiten reducir los estados de ansiedad precompetitiva y, simultáneamente, desarrollar niveles de confianza.

Palabras clave: ansiedad; atletas; competición; deporte; natación

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INTRODUCTION

Sports venues, due to their own characteristics of confrontation, demonstration, comparison, and constant evaluation of all participants, present peculiarities that must be analyzed more deeply in order to understand their implications on athletes' sports performance. Each sport has its own characteristics and demands, which, beyond the physical, technical, and tactical aspects they involve, require certain psychological characteristics that are decisive in athletes' performance (Kemarat et al., 2022; Peng & Zhang, 2021). In sports, the subjective perception of threat arises because the individual considers it important to respond to situational demands but assesses their personal capacity as inadequate to meet those demands. This cognitive perception of the situation can be altered as the generated perception of the entire situation changes, especially concerning threat indicators (Cruz, 1996; Passer, 1983; Woodman & Hardy, 2001).

Indeed, the influence of psychological factors and processes on athletes' sports performance is generally well-demonstrated. It becomes crucial for athletes to master a set of psychological skills in order to have a greater capacity to deal with the demands and adversities of sports contexts (Dias et al., 2009; Serpa, 2017). One of the factors with a significant impact in their performance is anxiety as an unpleasant and negative emotional state, characterized by nervousness, worry, fear, or apprehension and associated with bodily activation or arousal mechanisms. It manifests as fear of negative outcomes or anxious anticipation of an important moment and is characterized by a variety of somatic symptoms – physical component (body agitation, trembling, muscle tension, restlessness, hyperventilation, sweating, palpitations, etc.), or cognitive symptoms – thought component, such as apprehension and mental restlessness, persistent sadness, hypervigilance, and other signs related to altered vigilance, such as lack of attention, loss of concentration, and insomnia, for example (Agaoğlu, 2016; Alejo et al., 2020; Marti, 2000; Silva, 2012; Weinberg & Gould, 2001).

From this perspective, anxiety poses a problem that affects all those who are directly or indirectly linked to competition, including athletes, coaches, parents, referees, and even the general public (Chamberlain & Hale, 2007; Pineda-Espeje et al., 2019). Competitive anxiety can be understood as the tendency to perceive a competitive situation as threatening, sometimes accompanied by a change in the degree of physiological arousal, leading to poor performance during the competition (Serpa, 2017). The study by Cox et al. (2003) states that one of the most influential and significant factors in performance quality is the degree of anxiety during the time preceding the competition (pre-competitive anxiety), so Barbacena and Grisi (2008) assessed the levels of pre-competitive anxiety in swimmers at two competitions of different levels of importance. Their study revealed higher levels of pre-competitive anxiety in more important competitions.

The causes for the emergence of anxiety are subdivided into two factors: the first relates to the individual's uncertainty about the outcome, and the second, to the importance attributed to this outcome for individuals (Martens et al., 1990; Weinberg & Gould, 2001). The effects of anxiety on sports performance are highly individualized and moderated by personality trait variables, sports' characteristics and demands, various sports contexts, cognitive evaluation processes, and coping with competitive situations. Athletes are always vulnerable to emotional factors resulting from anxiety, whether positive, such as personal achievement, environmental tranquility, and emotional balance,/or negative, which manifest as worry, anxiety, various obstacles, discouragement, and fatigue. These emotions can influence performance in the moments preceding a sports competition but are also experienced during learning moments (training and preparation for an important competition), before or during competitions, and equally in various assessment situations that occur throughout different cycles of training (Cruz, 1996; Santos et al., 2013).

In this understanding, stress and anxiety can affect results and sports performance, as well as precipitate the abandonment of a sporting discipline, now considered a threatening practice with a high risk of injury. In addition to these factors, there is also a high level of prevalence of stress and anxiety in sports competition, especially concerning younger athletes (Cruz, 1996; Santos et al., 2013; Serpa, 2017). In studies conducted by Cruz et al. (2006) and Pluhar et al. (2019), differences between participation in team sports and individual sports are demonstrated. The results reveal that athletes in individual sports exhibit higher levels of concern, concentration disturbance, and somatic anxiety compared to participants in team sports. The mental health benefits of organized sports participation can vary between athletes involved in individual sports and those who practice and compete in team sports.

In line with the previous thoughts, the present study aimed to analyze the level of pre-competitive anxiety in young swimmers, specifically assessing the influence of gender and age on cognitive and somatic anxiety states, as well as on the level of self-confidence.

1. METHODS

Study Sample

The study group consisted of athletes from the competitive swimming classes at a health club in Viseu, all of whom had received medical clearance to engage in physical activities, specifically swimming. Inclusion criteria required participants to have at least 6 months of swimming experience to ensure a basic level of familiarity with swimming techniques. Additionally, participants were required to be actively enrolled in training programs at the time of the study. For the competitive context, athletes were involved in Entry-Level competitive swimming, meaning they compete occasionally or participate in regional meets. In this case, FINA points were not applicable due to the entry-level competition status. Regarding training frequency, participants were required to train 3 to 5 times per week, with a focus on both technique (improving stroke mechanics, starts, turns, and breathing patterns) and speed and power drills (focusing on sprints and explosive movements in the water to enhance anaerobic capacity).

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45.8% were male and 54.2% were female, with ages ranging from 10 to 18 years old. Since participation in competitions was one of the inclusion criteria, all athletes competed in events, distributed across their respective age categories as follows: approximately 29% were cadets, 25% were juveniles, 21% were juniors, and 4% were seniors.

Data collection instruments

The instrument used for data collection was the *Competitive State Anxiety Inventory 2* (CSAI-2) by Martens et al. (1983), translated and adapted specifically for the Portuguese population by Cruz and Viana (1993), consisting of two parts and specifically designed to measure anxiety in sports contexts. The first part is informative and, at the same time, descriptive as it includes the identification and respective set of information about the respondent.

The second part of the inventory (questionnaire) consists of a multidimensional measure, composed of 27 items aimed at collecting data about the perceptions of the respondents involved in the sports process. From this interpretation, three subscales were created, each containing 9 items, to assess somatic anxiety (for example, "I feel tension in my stomach"), cognitive anxiety ("I am worried about this competition"), and self-confidence ("I feel at ease"). The Likert scale, conveniently modified for this purpose, aims to measure the degree of agreement with the corresponding items, ranging from six degrees of agreement, ranging from complete disagreement ("completely disagree"), at degree one, to complete agreement ("completely agree"), at degree six. Cruz et al. (2006) analyzed the psychometric characteristics of the instrument, showing an acceptable coefficient of internal consistency (α = 0.7-0.9).

Data was collected in triplicate to minimize potential biases. To this end, the instrument was administered by the Internship Coordinator, who is also a University Professor with extensive experience in both coaching and action research. The two athletes' coaches also participated in the recording process, each conducting an individual analysis. Data was then compared to ensure information consistency.

Procedures

Regarding the methodological aspects leading to the organization and acquisition of data, the first step involved gathering the address, telephone contact, and respective email address of the aforementioned Health Club through research on its institutional website. Subsequently, the organization's representatives were contacted via email and telephone to explain the study's objectives and request permission to contact the athletes and provide them with the data collection instrument. Upon obtaining the necessary consent from the institution, all participants received and signed an informed consent form before their participation, a document detailing the research objectives, procedures involved, potential benefits, as well as addressing any questions the participants may have had. To ensure the participation of minor athletes, informed consent forms were provided to their legal guardians, and only after receiving proper authorization from them were the athletes integrated into the study. Since the study was conducted in a private school, there was a strong commitment to adhering to the highest ethical standards in all operations and activities. In recognition of the importance of safeguarding the rights and well-being of all participants, every aspect of the procedures was carefully designed and executed with ethical considerations at the forefront. As the initiative in question pertains to a curricular internship, it is important to note that, in accordance with institutional guidelines, there was no requirement to submit the project to an ethics committee. Nevertheless, rigorous ethical practices were conducted with the utmost respect for the participants' rights and well-being. Rigorous measures were also implemented to preserve the anonymity and confidentiality of the participants, as the collected information was processed strictly confidentially, with no personally identifiable information disclosed. The data were coded and stored securely, accessible only to the research team. Furthermore, the absence of the researchers during the completion period was ensured to avoid influencing the responses.

Data analysis

In accordance with the study's objectives, we conducted two processes of analysis: initially descriptive, to characterize the participants, and later inferential, for comparison purposes, using version 29 of the IBM Statistical Package for the Social Sciences (SPSS). To enhance the intelligibility and understanding of the comparison process, the "age" variable was recoded into two levels, based on the mean value as a cutoff point, so that the three aforementioned subscales could be analyzed in comparison between genders and between younger (up to mean) and older (above mean) individuals. After defining the appropriate statistical techniques for this context, we set the confidence interval at 95%, thus defining the significance level of the study (p-value) at 0.05. The use, when necessary, of non-parametric mean comparison tests (in this case, the Mann-Whitney U test instead of the Student's t-test) was due to the sensitivity of the questionnaire items, as they did not meet one of the conditioning requirements for the application of parametric tests, in this case, the normality of their distributions (Maroco, 2021).

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2. RESULTS

It was found that: (1) anxiety levels vary according to gender, age, experience, and competition level; (2) younger athletes with less competitive experience exhibit higher levels of somatic and cognitive anxiety; (3) self-confidence levels vary significantly according to athletes' competitive experience; (4) girls show higher levels of anxiety and lower self-confidence, as do younger athletes.

3. DISCUSSION

Regarding the level of pre-competitive anxiety in young swimmers and considering anxiety as a natural response of the human body to situations that it perceives as threatening to its integrity, it is necessary to emphasize that these manifestations take on different forms. Alongside the physical factors that affect an athlete's performance, psychological factors are equally important and responsible for their performance (Kemarat et al., 2022; Peng & Zhang, 2021). Assuming anxiety as an integral part of everyday life in different moments of our lives, athletes are constantly confronted with this emotional state (Gubbels et al., 2016), thus they tend to have different levels of anxiety, whether high or low, depending on the occasion. The concept of anxiety has been used as a clinical diagnosis (Horwitz, 2013), and when introduced into the sports context, it attempts to perceive the athletes' state before a competition and interpret how a change in stimulus can be beneficial or detrimental to their performance (Vasconcelos-Raposo, 2000; Weinberg & Gould, 2001).

According to the previously defined subscales measured by the instrument, the primary approach focuses on indicators of somatic anxiety and cognitive anxiety. The former refers to physical responses and symptoms of the body, such as muscle tension, tremors, and headaches (Alejo et al., 2020), while cognitive anxiety points to a psychological nature, inherent to thoughts and expectations about a particular action or event (Freire et al., 2020). For example, if the racing heartbeat before giving a lecture is closely related to somatic anxiety, someone who worries about their future and thus imagines negative scenarios and thoughts about what might not work out demonstrates a case of cognitive anxiety. It should be noted that these two forms of anxiety manifestation are not mutually exclusive; on the contrary, they often coexist, leading to a comprehensive experience of discomfort and apprehension. Finally, according to the previously defined Multidimensional Anxiety Theory (Martens et al., 1990), self-confidence refers to perceived abilities and the belief in the ability to successfully perform tasks (Grossbard et al., 2009; Martens et al., 1990).

Significant differences were found between genders, as girls presented significantly higher levels of both somatic ($p < .00$) and cognitive anxiety ($p < .00$) compared to boys. Similar results were obtained by Souza et al. (2012) and Ariffin et al. (2024), indicating that female athletes, younger individuals, and those with less competitive experience exhibit higher state anxiety-somatic and cognitive. In the study by Freire et al. (2020), it is indicated that female athletes show more symptoms of somatic and cognitive anxiety than males ($p = .00$). These findings seem to be associated with the fact that boys present higher levels of socialization to suppress vulnerabilities found in sports (Cowden et al., 2019; Doherty et al., 2016). On the other hand, sports initiation in a school context, according to Silva et al. (2021), may be one of the main reasons for the sensitivity and insecurity manifested by girls, as the encouragement and content of sports practice are inferior compared to boys.

This set of processes and social interactions leads to higher levels of self-confidence, which, in turn, are closely associated with lower rates of pre-competitive anxiety, according to Pineda-Espeje et al. (2019). The authors argue that, conversely, anxiety can stem from different perceptions of criticism from various social agents (parents, friends, coaches, teammates, among others). In line with this perspective, studies by Zarauz and Ruiz-Juan (2014) and Garcia-Mas et al. (2015) have shown a positive relationship between motivation and self-confidence, with no influence on the likelihood of experiencing anxiety. The study by Pineda-Espejel et al. (2020) also revealed a significant correlation between cognitive anxiety, somatic anxiety, and self-confidence. While the former relationship, that is, the analysis of different types of anxiety, is directly proportional when confronted with self-confidence, the relationship is inversely proportional, confirming the data obtained by Quinlan (2010), Sánchez-Oliva et al. (2012), and Zarauz and Ruiz-Juan (2014).

The same tendency is denoted by the data obtained in the present study, which indicates a significant relationship ($p < .01$) between cognitive anxiety, somatic anxiety, and self-confidence, both in boys and girls, as well as in younger and older individuals. Thus, increased self-confidence facilitates the reduction and control of anxiety symptoms during training sessions and competitions (Silva et al., 2021). Therefore, the importance of planning in an environment conducive to the development of these feelings of well-being, free from anxiety, which aim to promote a direct positive impact on athletes' performance, is emphasized. Additionally, knowledge of athletes past experiences and emotional states is highlighted to favor and promote effective interventions.

In the concluding process of the inferential analysis, it is noted that although younger individuals present higher indices than older ones, no significant differences were identified regarding the indicators of cognitive anxiety ($p = .946$), somatic anxiety ($p = .820$), and self-confidence ($p = .192$). Gonçalves and Belo (2017) argue, in this regard, that this relationship may vary according to several other factors, such as the perceived difficulty of the task by the athlete, the characteristics of their personality, their previous experiences, family consistency, among others, as competitive sports practice entails peculiarities such as constant confrontation and evaluation of athletes, making it a situation where the participants' development and performance are continuously compared with pre-existing standards (Rice et al., 2016).

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Martínez-Gallego et al. (2022) reported that athletes under 14 years old ("younger juniors") exhibited lower levels of pre-competitive anxiety, both state and somatic, and higher self-confidence post-competition compared to older players (>14 years). Notably, no statistically significant gender differences were observed in anxiety or self-confidence after the competition. Similarly, the study by Domínguez-González et al. (2024), conducted with young football players aged 14–18, found that older athletes and those competing in higher categories demonstrated a more favorable psychological profile, characterized by higher self-confidence, lower anxiety, and an increased propensity to experience "flow."

Sporting experience, including practice duration, prior victories, and coping strategies, have been associated with more effective cognitive strategies, such as reduced negative thinking and enhanced self-confidence, thereby decreasing vulnerability to competitive anxiety (Vasconcelos-Raposo et al., 2024). Nevertheless, the authors note that transitions to more demanding competitions or decisive rounds (e.g., elimination stages or high stakes matches) can reactivate anxiety, even among experienced athletes, as evidenced in sports such as competitive dancesport.

Regarding sport type, Kemarat et al. (2022) found that athletes in individual sports displayed significantly higher levels of competitive anxiety than those in team sports (p = 0.03; d = 0.28 - small effect), consistent with the findings of Correia and Rosado (2019). Conversely, no significant differences were observed in personality traits, including neuroticism, extraversion, openness, agreeableness, and conscientiousness, between athletes in individual versus team sports.

CONCLUSION

Perceptions of anxiety and self-confidence are influenced by social experiences and expectations, so as athletes mature, they acquire skills and abilities that allow them to reduce pre-competitive anxiety states and, simultaneously, develop confidence levels.

Despite the prudence required in the inferences stated, limited by the sample size, we believe that understanding how these variables manifest in coaches' behaviors constitutes a strong foundation for improving training programs and implementing personalized mental preparation strategies aimed at promoting athletes' sports performance and well-being. Athlete development extends beyond physical training, as the psychological component plays a crucial role in performance and well-being. To optimize outcomes, it is essential for coaches to acquire knowledge and techniques to recognize and address anxiety and confidence issues among athletes. Additionally, incorporating mental preparation strategies, such as mindfulness and self-affirmation, into regular training routines can strengthen mental resilience and concentration. Finally, fostering an environment where athletes feel safe expressing concerns and receiving constructive feedback is fundamental to promoting confidence and continuous growth. By integrating these approaches, coaches can play a pivotal role in enhancing both mental and physical athletes' performance.

Given that the present study employed a simple pre-experimental design, evaluating athletes at only one moment during the season, it was not possible to analyze the cause-and-effect relationships between variables. Therefore, it is suggested that future research should not only be replicated in other sports contexts but also conducted on athletes from team sports, in order to consider the involvement of other variables (such as team cohesion, goal orientations, among others), employing a cross-sectional design that allows for the analysis of possible changes in the association between self-confidence and pre-competitive anxiety over time.

AUTHORS´ CONTRIBUTION

Conceptualization, J.T., P.E. and A.A.; data curation, J.T. and A.A.; formal analysis, P.E. and A.A.; funding acquisition, P.E. e A.A.; investigation, J.T., P.E. and A.A.; methodology, A.A.; project administration, J.T., P.E. and A.A.; resources, J.T., P.E. and A.A.; software, J.T., P.E. and A.A.; supervision, P.E. and A.A.; validation, J.T., P.E. and A.A.; visualization, P.E. and A.A.; writing – original draft, J.T., P.E. and A.A.; writing – review & editing, J.T., P.E. and A.A.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

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