ORIGINAL ARTICLE

Psychological profile of precompetitive anxiety in adolescent canoeists and its relationship with competitive success

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ABSTRACT

Precompetitive anxiety is a psychological factor that significantly influences athletes' performance, particularly among those participating in endurance disciplines such as canoeing. This study aimed to analyse precompetitive anxiety in young canoeists and compare scores across sporting and contextual factors. A descriptive cross-sectional study included 533 federated canoeists in the U14 and U16 categories who participated in the Spanish Olympic Canoeing Championships. The Spanish version of the CSAI-2R was administered, and multivariate analyses of variance, univariate analyses of variance, and correlational analyses were conducted. Mean scores were 2.49 for cognitive anxiety, 2.18 for somatic anxiety, and 2.75 for self-confidence. Significant multivariate effects were found for category, Wilks' $\Lambda = .962$, $F(3, 529) = 7.05$, $p < .001$; modality, Wilks' $\Lambda = .957$, $F(6, 1056) = 3.93$, $p < .001$; years of practice, Wilks' $\Lambda = .948$, $F(6, 1056) = 4.79$, $p < .001$; and championship objective, Wilks' $\Lambda = .959$, $F(9, 1575) = 2.41$, $p = .009$. U14 athletes reported higher self-confidence ($M = 2.88$, $SD = 0.64$) than U16 athletes. Cognitive and somatic anxiety were positively correlated, $r = .55$, $p < .001$. The findings describe differences in anxiety and self-confidence across selected athlete characteristics but do not establish causal effects of sporting participation or experience. Generalizability is limited to Spanish U14 and U16 championship participants. These results may inform future longitudinal research and psychological support for adolescent canoeists.
Keywords: sports psychology; athletic performance; canoeing; young athletes.

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INTRODUCTION

In recent years, pre-competitive anxiety has become established as one of the most influential psychological variables related to athletic performance, especially in athletes who are in a stage of training and specialization (Conde-Ripoll et al., 2024; Freire et al., 2020; Nascimento-Junior et al., 2025; Seco-Terrón & Moral-Jiménez, 2023). From a sports psychology perspective, pre-competitive anxiety can be defined as a complex emotional response, including cognitive, physiological, and behavioural components, to situations that threaten personal sporting goals (Ayuso-Moreno et al., 2020; Ríos-Garit et al., 2024; Rocha & Osório, 2018). Furthermore, in the sports domain, this response is usually divided into cognitive anxiety (worries, doubts about performance, fear of failure), somatic anxiety (physiological symptoms such as tension or tachycardia), and self-confidence, which together influence motor execution and decision-making (Alexe et al., 2021; Bebetsos et al., 2020; Jones et al., 2002; Prieto & González-García, 2022).

Regarding these factors, high levels of cognitive and somatic anxiety are associated with poorer performance outcomes, whereas high self-confidence has a protective effect and improves execution under pressure (Conde-Ripoll et al., 2024; Craft et al., 2003; Domínguez-González et al., 2024; González-Hernández et al., 2024; Prieto & González-García, 2022; Woodman & Hardy, 2003). In the context of school-age sports, these emotional responses are relevant to both competitive results and long-term adherence to physical activity (Conde-Ripoll et al., 2024; González-Hernández et al., 2024; Woodman & Hardy, 2003). Moreover, an athlete's interpretation of their arousal (whether they view it as a resource that facilitates performance or as a sign of threat) is decisive in determining whether the same level of arousal translates into improved or impaired performance (Alexe et al., 2022; Craft et al., 2003; Domínguez-González et al., 2024; González-Hernández et al., 2024; Yu et al., 2024). Therefore, scientific evidence shows that sporting success also depends on the ability to regulate emotions prior to competition (Conde-Ripoll et al., 2024; Domínguez-González et al., 2024; González-Hernández et al., 2024; Nascimento-Junior et al., 2025).

In this regard, current models distinguish between trait predisposition and state anxiety reactions, which are regulated by the competitive context, the perceived importance of the task, and prior experiences (Bebetsos et al., 2020; Prieto & González-García, 2022; Ríos-Garit et al., 2024). These theories have evolved towards more complex approaches that are sensitive to the sporting context (Correia & Rosado, 2019; Eysenck et al., 2007; Ong & Chua, 2021; Woodman & Hardy, 2003), which support 'individual zones of optimal functioning' (IZOF), where anxiety and arousal levels are maximized based on task type, competitive level, and the individual's psychological characteristics (Eysenck et al., 2007; Hanin, 2007a; Ong & Chua, 2021). Additionally, catastrophe and attentional control theories highlight how a combination of high cognitive anxiety and elevated physiological arousal can impair precision-demanding tasks (Eysenck et al., 2007; Hanton et al., 2004; Hardy & Parfitt, 1991; Ong & Chua, 2021; Woodman & Hardy, 2003).

Current research examines pre-competitive anxiety profiles in young athletes, as well as the psychological variables that act as risk or protective factors. These variables include resilience, coping strategies, perfectionism, and training satisfaction (Borges et al., 2020; Li et al., 2025; Nascimento-Junior et al., 2025; Nogueira et al., 2025; Yu et al., 2024). Evidence suggests that maladaptive traits are linked to higher anxiety levels, whereas positive task-oriented attitudes, resilience, and training confidence are associated with lower anxiety levels and greater emotional stability (Borges et al., 2020; Hanin, 2007b; Li et al., 2025; Nogueira et al., 2025; Seco-Terrón & Moral-Jiménez, 2023). From a sports development perspective, identifying these factors is crucial to ensuring that structured youth sports promote sustained engagement in physical activity throughout adolescence. Existing findings emphasize the importance of psychological interventions for anxiety management and developing coping strategies in young athletes (Hanin, 2007b; Si et al., 2024; Trujillo-Torrealva & Reyes-Bossio, 2019).

In water sports and endurance disciplines such as canoeing, the study of pre-competitive anxiety is particularly relevant due to the high level of competition, long-term expectations, and developmental processes involved (Correia & Rosado, 2019; Manna, 2025; Nascimento-Junior et al., 2025; Ríos-Garit et al., 2024; Saies, 2017). Jointly assessing cognitive and somatic anxiety alongside self-confidence can help identify emotional profiles related to contextual variables (Alexe et al., 2021; Conde-Ripoll et al., 2024; Hanin, 2007b). Recent studies show that anxiety and self-confidence vary according to competition experience, training volume, and event difficulty (Alexe et al., 2021; Correia & Rosado, 2019); in fact, young canoeists exhibit lower anxiety levels as they gain experience (Correia & Rosado, 2019; Saies, 2017). Furthermore, high conditional demands coupled with environmental instability (wind and waves) can exacerbate anxiety, particularly during the initial stages of high-performance training (Manna, 2025; Saies, 2017).

Despite prior studies on anxiety in canoeing (Alexe et al., 2021; Correia & Rosado, 2019; Manna, 2025; Saies, 2017), this sport remains comparatively underrepresented in the literature, which traditionally focuses on football, basketball, or combat sports. Furthermore, little research has characterized profiles in Spanish U14–U16 federated canoeists across categories, modalities, years of practice, and participation in national championships using the CSAI-2R. Therefore, the main objective of this study is to analyse pre-competitive anxiety in young canoeists and compare their levels based on relevant sporting and contextual variables (category, modality, years of experience, participation in Spanish championships, and their objectives in them). This research aims to characterize the psychological response associated with competitive canoeing participation during adolescence, emphasizing how self-confidence and emotional regulation evolve. Additionally, it seeks to provide evidence on the correlational relationship between regular sports practice and broader athlete-development processes in this population.

MATERIAL AND METHODS

The research conducted was descriptive and cross-sectional in nature and had a quantitative approach, aimed at analysing the levels of pre-competitive state anxiety in canoeists classified as 'young Olympic hopefuls' (Ato et al., 2013). In this regard, the sampling was non-probabilistic by convenience. It targeted all the federated U14/U16 canoeists who were registered to compete in the 2024 national-level canoeing championships. The initial population comprised 1191 individuals, of whom 638 had parental consent. After excluding 105 incomplete questionnaires, duplicates, and injuries that failed to meet the inclusion criteria, the final sample size was 533 individuals (Otzen & Manterola, 2017). Therefore, all participants had to:

- Belong to the U14 or U16 category in 2024.
- Be federated in the canoeing modality.
- Participate in a Spanish Championship event during 2024.
- Train for at least three hours per week.
- Have parental/guardian informed consent and the athlete's agreement.

Incomplete questionnaires, duplicate responses, and athletes who indicated injuries that affected their participation were excluded. Data collection was carried out during the Spanish Championships for Olympic canoeing disciplines and specialties.

Participants

The sample consisted of 533 federated canoeists with a mean age of 14.54 years (*SD* = 1.10), belonging to the U14 (*n* = 254) and U16 (*n* = 279) categories. In terms of discipline, 401 kayakers, 73 canoeists, and 59 slalom canoeists participated; in terms of experience, 215 athletes had between 1 and 3 years of practice, 186 between 4 and 5 years, and 132 had 6 years or more. Based on the number of national championships,

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165 had competed in 1–2, 195 in 3–4, and 173 in 5 or more championships. Finally, the stated competitive objectives were winning a medal (*n* = 149), finishing in the top 15 (*n* = 184), finishing in the top 30 (*n* = 103), and enjoying the experience of participating in the championship (*n* = 97).

Measures

Pre-competitive state anxiety was assessed using the Spanish version of the Revised Competitive State Anxiety Inventory-2 (CSAI-2R), which had been previously validated in Spanish athletes with an established factorial structure and psychometric properties (Andrade et al., 2007). This instrument comprises 16 items distributed across three factors: cognitive anxiety, somatic anxiety and self-confidence. Each item was rated on a Likert scale from 1 (not at all) to 4 (very much). In addition, the internal reliability of the three dimensions of the questionnaire was tested using Cronbach's alpha coefficient, obtaining values of 0.83 for somatic anxiety, 0.83 for cognitive anxiety, and 0.79 for self-confidence, reflecting adequate internal consistency, in accordance with the usual criteria that consider coefficients equal to or greater than 0.80 to be optimal (George & Mallery, 2003).

The sociodemographic and sporting variables included competitive category, sport, years of practice, number of championships competed in, and competitive objective of the championship.

Procedures

Data were collected using a paper questionnaire, which was distributed to athletes during the bib collection process in collaboration with the national sports federation and the organizing regional federations. Informed consent forms were obtained from all parents or legal guardians prior to participation, and athletes provided their assent before completing the questionnaire. Questionnaires were administered in person at the competition venues within 24 hours of the start of the events to ensure that the responses reflected the athletes' immediate pre-competitive state. Before completing the questionnaire, the athletes were informed that their participation was voluntary and that their responses would be anonymous and confidential. They were also instructed to answer according to how they felt immediately before the competition. Each participant completed the questionnaire only once, even if they took part in more than one championship, to avoid duplicate responses. The questionnaire included sociodemographic and sports-related variables, as well as a pre-competitive anxiety scale. Furthermore, this study adhered to the principles of anonymous data processing: at no time were the data associated with participants' identities, and statistical confidentiality is guaranteed under Organic Law 3/2018 and Regulation (EU) 2016/679. In all cases, the ethical standards of the Declaration of Helsinki (2024 revision) were observed.

Statistical analysis

Data analysis was performed using IBM SPSS Statistics version 27 (SPSS, Inc., Chicago, IL, USA). The normality of the variables was verified using the Kolmogorov–Smirnov test and the asymmetry and kurtosis indices (Blanca et al., 2017; Fernández-Río et al., 2022). The internal consistency of the subscales was calculated using Cronbach's alpha coefficient.

Descriptive statistics (mean, standard deviation, minimum, and maximum values) were obtained for the three dimensions of anxiety. Subsequently, multivariate analyses of variance (MANOVA) were performed to analyse possible significant differences based on the variables analysed. In addition, univariate analyses (ANOVA) were performed on each dimension when the multivariate effect was significant (Wilks' Λ). Club and coach were not included as covariates in the MANOVA analyses. The design of the national Spanish Championship, which involves participants from multiple regional federations, inherently reduces the risk of confounding factors relating to clubs and coaches. Therefore, analyses focused strictly on the main effects

of interest. Furthermore, it should be noted that separate MANOVAs and ANOVAs were performed across multiple grouping variables without correction for multiple testing. Consequently, there is an increased risk of Type I error. Given that the observed effect sizes were generally small, these inferential findings should be interpreted with caution. Finally, Pearson's bivariate correlations were found between the three factors that make up pre-competitive anxiety.

RESULTS

First, Table 1 presents descriptive statistics and correlations for cognitive anxiety, somatic anxiety, and self-confidence. Cognitive anxiety had a mean of 2.49 (*SD* = 0.73), somatic anxiety had a mean of 2.18 (*SD* = 0.67), and self-confidence had a mean of 2.75 (*SD* = 0.68). Cognitive anxiety was positively correlated with somatic anxiety, $r = .55$, $p < .001$, and negatively correlated with self-confidence, $r = -.28$, $p < .001$. Somatic anxiety was also negatively correlated with self-confidence, $r = -.41$, $p < .001$.

Table 1. Descriptive statistics and Pearson correlations for precompetitive anxiety.

Variable	*M*	*SD*	Cognitive anxiety	Somatic anxiety	Self-confidence
Cognitive anxiety	2.49	0.73	—	.55**	−.28**
Somatic anxiety	2.18	0.67	.55**	—	−.41**
Self-confidence	2.75	0.68	−.28**	−.41**	—

Note. M = mean; *SD* = standard deviation. ** $p < .01$.

Second, results by competitive category are shown in Table 2. The multivariate analysis indicated a significant overall effect of category on the combined dependent variables, Wilks' $\Lambda = .962$, $F(3, 529) = 7.05$, $p < .001$, $\eta^2p = .038$. Cognitive and somatic anxiety did not differ significantly between categories, whereas self-confidence was higher among U14 athletes (*M* = 2.88, *SD* = 0.64) than among U16 athletes (*M* = 2.62, *SD* = 0.70), $F(1, 531) = 19.88$, $p < .001$, $\eta^2p = .036$.

Table 2. Precompetitive anxiety by competitive category.

Variable	U14, M (SD)	U16, M (SD)	F(1, 531)	*p*	η^2_p
Cognitive anxiety	2.45 (0.73)	2.52 (0.73)	1.34	.247	.003
Somatic anxiety	2.16 (0.66)	2.21 (0.69)	0.76	.383	.001
Self-confidence	2.88 (0.64)	2.62 (0.70)	19.88	< .001	.036

Note. Values are *M* (*SD*). η^2_p = partial eta squared.

Third, results by modality are presented in Table 3. The multivariate analysis revealed a significant overall effect of modality on the combined dependent variables, Wilks' $\Lambda = .957$, $F(6, 1056) = 3.93$, $p < .001$, $\eta^2_p = .022$. Somatic anxiety did not differ significantly among modalities. Slalom athletes reported higher cognitive anxiety (*M* = 2.78, *SD* = 0.79) and lower self-confidence (*M* = 2.47, *SD* = 0.71) than kayakers (cognitive anxiety: *M* = 2.43, *SD* = 0.72; self-confidence: *M* = 2.79, *SD* = 0.67).

Table 3. Precompetitive anxiety by modality.

Variable	Kayak, M (SD)	Canoe, M (SD)	Slalom, M (SD)	F(2, 530)	*p*	η^2_p
Cognitive anxiety	2.43 (0.72)[3]	2.56 (0.68)	2.78 (0.79)[1]	6.44	.002	.024
Somatic anxiety	2.17 (0.68)	2.17 (0.59)	2.27 (0.74)	0.49	.616	.002
Self-confidence	2.79 (0.67)[3]	2.74 (0.67)	2.47 (0.71)[1]	5.46	.004	.020

Note. Values are *M* (*SD*). η^2_p = partial eta squared. Superscripts indicate Bonferroni-adjusted pairwise differences: [1] significantly different from kayak; [3] significantly different from slalom.

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Fourth, results by years of practice are shown in Table 4. The multivariate analysis indicated a significant overall effect of experience on the combined dependent variables, Wilks' Λ = .948, $F(6, 1056) = 4.79$, $p < .001$, $\eta^2_p = .026$. Cognitive anxiety did not differ significantly among groups. Somatic anxiety was higher among athletes with 1–3 years of experience ($M = 2.25$, $SD = 0.63$) than among those with 6 years or more ($M = 2.06$, $SD = 0.74$). Self-confidence differed across all three groups: athletes with 6 years or more of experience had the highest scores ($M = 2.94$, $SD = 0.71$), followed by those with 4–5 years ($M = 2.79$, $SD = 0.64$) and those with 1–3 years ($M = 2.59$, $SD = 0.67$).

Table 4. Precompetitive anxiety by years of practice.

Variable	1–3 years, M (SD)	4–5 years, M (SD)	≥ 6 years, M (SD)	F(2, 530)	*p*	η^2_p
Cognitive anxiety	2.49 (0.77)	2.50 (0.67)	2.48 (0.76)	0.01	.988	< .001
Somatic anxiety	2.25 (0.63)[3]	2.20 (0.66)	2.06 (0.74)[1]	3.12	.045	.012
Self-confidence	2.59 (0.67)[2,3]	2.79 (0.64)[1]	2.94 (0.71)[1]	12.03	< .001	.043

Note. Values are *M* (*SD*). η^2_p = partial eta squared. Superscripts indicate Bonferroni-adjusted pairwise differences: [1] significantly different from 1–3 years; [2] significantly different from 4–5 years; [3] significantly different from 6 years or more.

Fifth, results by number of previous championships are presented in Table 5. The MANOVA did not show a significant overall effect of the number of championships, Wilks' Λ = .985, $F(6, 1056) = 1.30$, $p = .255$, $\eta^2_p = .007$. The univariate analyses likewise showed no significant differences in cognitive anxiety, somatic anxiety, or self-confidence.

Table 5. Precompetitive anxiety by number of previous national championships.

Variable	1–2 NC, M (SD)	3–4 NC, M (SD)	≥ 5 NC, M (SD)	F(2, 530)	*p*	η^2_p
Cognitive anxiety	2.41 (0.80)	2.53 (0.70)	2.52 (0.70)	1.56	.210	.006
Somatic anxiety	2.19 (0.66)	2.16 (0.65)	2.21 (0.71)	0.36	.701	.001
Self-confidence	2.77 (0.72)	2.78 (0.65)	2.68 (0.68)	1.19	.304	.004

Note. Values are *M* (*SD*). NC = national championships; η^2_p = partial eta squared.

Sixth, results by championship objective are shown in Table 6. The multivariate analysis revealed a significant overall effect of objective on the combined dependent variables, Wilks' Λ = .959, $F(9, 1575) = 2.41$, $p = .009$, $\eta^2_p = .013$. Somatic anxiety did not differ significantly among groups. Athletes whose objective was to enjoy the experience reported lower cognitive anxiety ($M = 2.18$, $SD = 0.71$) than those aiming for a medal ($M = 2.58$, $SD = 0.70$), a top-15 finish ($M = 2.56$, $SD = 0.76$), or a top-30 finish ($M = 2.52$, $SD = 0.71$). Self-confidence was higher in the medal group ($M = 2.90$, $SD = 0.71$) than in the top-15 group ($M = 2.69$, $SD = 0.68$).

Table 6. Precompetitive anxiety by championship objective.

Variable	Medal, M (SD)	Top 15, M (SD)	Top 30, M (SD)	Enjoyment, M (SD)	F(3, 529)	*p*	η^2_p
Cognitive anxiety	2.58 (0.70)[4]	2.56 (0.76)[4]	2.52 (0.71)[4]	2.18 (0.71)[1,2,3]	7.54	< .001	.041
Somatic anxiety	2.26 (0.68)	2.19 (0.73)	2.14 (0.61)	2.10 (0.60)	1.26	.288	.007
Self-confidence	2.90 (0.71)[2]	2.69 (0.68)[1]	2.70 (0.66)	2.67 (0.66)	3.45	.017	.019

Note. Values are *M* (*SD*). η^2_p = partial eta squared. Superscripts indicate Bonferroni-adjusted pairwise differences: [1] significantly different from medal; [2] significantly different from top 15; [3] significantly different from top 30; [4] significantly different from enjoying the experience.

DISCUSSION

The main objective of this study was to analyse pre-competitive anxiety in young canoeists and compare their levels based on different relevant sporting and contextual variables, such as category, modality, years of experience, participation in Spanish championships, and their objectives in these. The aim was to

characterize the psychological response associated with participation in canoeing competitions during adolescence and to provide evidence on how regular sports practice is related to emotional stability and competitive adaptation in this population.

The overall results of the study showed that self-confidence appears to vary more consistently than anxiety across category, experience, modality, and competitive goals, acting as a highly sensitive psychological differentiator in young canoeists. Furthermore, self-confidence ranks above cognitive and somatic anxiety, indicating a pre-competitive profile characterized by a sense of control over anxiety responses. Similar tendencies have been observed in young athletes from other sports, such as padel, athletics, volleyball, and football, where self-confidence often emerges as the most dominant component compared to cognitive and somatic anxiety (Conde-Ripoll et al., 2024; Domínguez-González et al., 2024; Mediavilla, 2022; Pineda-Espejel et al., 2021; Prieto & González-García, 2022; Silva et al., 2022). In contrast, other studies reported higher levels of somatic than cognitive anxiety (Cardozo et al., 2022; Orozco & Aldas, 2023; Riquelme et al., 2020; Ruiz-Juan et al., 2016). From a psychological preparation and sports development perspective, these findings suggest that young canoeists have low anxiety levels and high self-confidence, highlighting the importance of psychological monitoring in competitive adolescent contexts.

Unlike other studies that have demonstrated a correlation between higher competitive categories and greater confidence as well as lower anxiety levels (Domínguez-González et al., 2024; Riquelme et al., 2020; Rodríguez-Gómez & Granero-Gallegos, 2014), the under-14 canoeists in this study exhibited greater self-confidence than the under-16 athletes despite experiencing comparable anxiety levels. This discrepancy may be attributed to the specific developmental challenges faced by adolescent canoeists during category transitions, when increased demands exceed psychological preparedness. This factor is less pronounced in more established sports (Marín-González et al., 2022; Orozco & Aldas, 2023). Consequently, this transitional phase may represent a critical period for athletes' psychological development and preparation for competition, during which the balance between training load, competition and psychological support can determine their emotional outcomes. Rather than viewing these responses solely in terms of anxiety management, they should be framed within broader athlete-development processes, illustrating how confidence and emotional regulation dynamically evolve during adolescence.

With regard to results based on the type of boat, there are no studies that examine or compare this variable, but the results of this study showed that slalom canoeists had higher levels of cognitive anxiety and lower levels of self-confidence than kayakers, while somatic anxiety did not differ significantly between the two disciplines. This result may be related to the fact that athletes who compete in boats that require greater technical and postural demands (canoes or slalom boats) face more competitions in a single weekend, less rest time, and greater exposure to possible accumulated errors, which increases their uncertainty and, consequently, cognitive anxiety, while at the same time decreasing their self-confidence compared to those who only compete in kayaking, a discipline that is usually the first one that rowers take up and which, as a result, is more familiar to most rowers. However, it must be noted that variables such as technical complexity and accumulated errors were not empirically measured in this study, and this explanation remains a plausible but speculative interpretation.

The most experienced canoeists exhibited lower somatic anxiety and greater self-confidence, with no change observed in cognitive anxiety. These findings are consistent with those observed in many other sports (Armada et al., 2021; Borges et al., 2020; Seco-Terrón & Moral-Jiménez, 2023; Vaca et al., 2017; Vasconcelos-Raposo et al., 2024; Zhang et al., 2024). This is in contrast to studies in which experienced athletes exhibit heightened anxiety as a result of deliberate emotional control in challenging situations

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(Hogrefe et al., 2018). This pattern suggests that prolonged canoeing practice fosters adaptive anxiety responses by enhancing emotional regulation and promoting athletic maturity in young people.

Although not statistically significant, canoeists with more championship experience reported slightly higher levels of somatic anxiety, in line with findings from other sports where repeated competition increases performance pressure (Moreno-Murcia & Cervelló-Gimeno, 2010; Salom et al., 2020; Vasconcelos-Raposo et al., 2024). This trend suggests that accumulated exposure to high-stakes events may be associated with elevated physiological arousal as an adaptive readiness mechanism, rather than as a sign of maladaptive stress.

In relation to the championship objective, the results found a significant overall effect, such that canoeists aiming for a medal exhibited the highest profile across all three pre-competitive factors, with notably greater self-confidence than those targeting a top-fifteen finish. This aligns with scientific literature indicating that ambitious yet achievable goals can bolster perceived competence (Jamshidi et al., 2011; Weinberg & Gould, 2019), a finding that can be interpreted through Achievement Goal Theory, where performance-oriented goals enhance perceived ability. Conversely, athletes prioritizing 'enjoyment of the experience' displayed the lowest levels... reflecting a less performance-pressured approach tied to intrinsic motivation (Salom et al., 2020), aligning closely with Self-Determination Theory's principles regarding autonomous motivational orientations. These contrasting profiles illustrate how young athletes' goal framing shapes emotional responses and competitive adaptation, underscoring coaches' and families' critical role in fostering protective motivational structures.

Overall, these findings suggest young canoeists experienced pre-competitive states more as functional anticipatory arousal than as a threat, supporting psychoeducational efforts to reframe such responses as normal in demanding sports and thereby enhance the psychological benefits and developmental outcomes derived from regular practice.

CONCLUSIONS

This study provides a critical foundation for future research into pre-competitive anxiety in young canoeists. Serving as a foundational profiling study rather than an investigation of underlying mechanisms, it identifies specific situations in which anxiety is higher and self-confidence is lower in relation to category, competition type, experience, and exposure to high-level championships. These results reveal differences in pre-competitive anxiety levels among participants at different championship levels. This opens avenues for future studies to compare psychological interventions, analyse the motivational climate created by coaches and families, and explore anxiety profiles in different competitive contexts.

However, the findings should be interpreted with caution. The cross-sectional design prevents the establishment of causal relationships between the analysed sporting variables and pre-competitive anxiety levels. Furthermore, the number of previous studies on canoeing is very small, and the sample is restricted to U14 and U16 athletes within a specific national context. This restricts the generalizability of the results and limits comparisons with other age groups or elite senior categories. Additionally, several potentially important contextual variables were not collected, including sex, weekly training volume, competitive level within categories, socioeconomic context, family involvement, and coaching climate. These unmeasured factors may influence anxiety and self-confidence and must be acknowledged as possible confounders.

Future research could assess anxiety regulation programs for trainee canoeists, compare pre-competitive patterns across comparable sports, and investigate variables such as sex, training hours, participation in other sports, and parental involvement. Longitudinal designs tracking anxiety evolution across seasons, alongside mixed quantitative and qualitative measures, would further clarify how young athletes interpret arousal as a facilitative challenge or a debilitating threat.

In conclusion, these results highlight specific psychological patterns that could inform the development of targeted psychological support strategies for adolescent canoeists. Implementing tailored mental training, such as specific confidence development interventions during category transitions, adapted mental preparation routines for slalom athletes facing high technical complexity, and goal-setting programs aligned with differing competitive objectives, can optimize athletes' emotional stability, enhance their ability to cope with pressure, and foster positive, long-term athletic development.

AUTHOR CONTRIBUTIONS

All authors meet the criteria for authorship in accordance with established ethical guidelines. Contributions are specified according to the CRediT (Contributor Roles Taxonomy) as follows:

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All authors have critically reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

DATA AVAILABILITY STATEMENT

The datasets analysed during the current study are not publicly available but may be obtained from the corresponding author upon reasonable request, subject to applicable ethical and data-protection restrictions.

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AI USE DISCLOSURE

In accordance with current publishing ethics and transparency recommendations, artificial intelligence (AI) tools were used solely to assist with translation and language editing, with the aim of improving clarity and readability. No AI tools were used in the generation of scientific content, including the study design, data collection, analysis, interpretation of results, or the formulation of conclusions. The authors retain full responsibility for the content of the manuscript and confirm its originality, integrity, and accuracy.

REFERENCES

Alexe, D. I., Abalasei, B. A., Mares, G., Rata, B. C., Iconomescu, T. M., Mitrache, G., & Burgueño, R. (2022). Psychometric assessment of the Need Satisfaction and Frustration Scale with professional Romanian athletes. *International Journal of Environmental Research and Public Health, 19*(3), Article 1696. https://doi.org/10.3390/ijerph19031696

Alexe, D. I., Sandovici, A., Robu, V., Burgueño, R., Tohănean, D. I., Larion, A. C., & Alexe, C. I. (2021). Measuring perceived social support in elite athletes: Psychometric properties of the Romanian version of the Multidimensional Scale of Perceived Social Support. *Perceptual and Motor Skills, 128*(3), 1197–1214. https://doi.org/10.1177/00315125211005235

Andrade, E. M., Lois, G., & Arce, C. (2007). Propiedades psicométricas de la versión española del Inventario de Ansiedad Competitiva CSAI-2R en deportistas. *Psicothema, 19*(1), 150–155.

Armada, C., Cavas-García, F., Díaz-Suárez, A., & Martínez-Moreno, A. (2021). Psychological profile and competitive performance in group aesthetic gymnastics. *Frontiers in Sports and Active Living, 3*, Article 625944. https://doi.org/10.3389/fspor.2021.625944

Ato, M., López, J. J., & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología, 29*(3), 1038–1059. https://doi.org/10.6018/analesps.29.3.178511

Ayuso-Moreno, R., Fuentes-García, J. P., Collado-Mateo, D., & Gutiérrez-Santiago, A. (2020). Heart rate variability and pre-competitive anxiety according to the demanding level of the match in female soccer players. *Physiology & Behavior, 222*, Article 112926. https://doi.org/10.1016/j.physbeh.2020.112926

Bebetsos, E., Aggelakis, E., Bebetsos, G., & Gargalianos, D. (2020). Motivation psychological characteristics of canoe-kayak sprint elite youth athletes. *Physical Culture and Sport. Studies and Research, 85*(1), 22–29. https://doi.org/10.2478/pcssr-2020-0003

Blanca, M. J., Alarcón, R., Arnau, J., Bono, R., & Bendayan, R. (2017). Non-normal data: Is ANOVA still a valid option? *Psicothema, 29*(4), 552–557. https://doi.org/10.7334/psicothema2016.383

Borges, P. J., Argudo, F. M., Ruiz, R., & Ruiz-Lara, E. (2020). Análisis de la ansiedad competitiva en jugadores jóvenes de waterpolo en función del género y rendimiento. *Retos, 38*, 20–25. https://doi.org/10.47197/retos.v38i38.73450

Cardozo, L. A., López, A. M., Pérez, J. A., & González, D. M. (2022). Ansiedad precompetitiva en taekwondocas. *Cuaderno de Investigaciones: Semilleros Andina, 11*, 1–10.

Conde-Ripoll, R., Escudero-Tena, A., & Bustamante-Sánchez, Á. (2024). Pre- and post-competitive anxiety and self-confidence and their relationship with technical-tactical performance in high-level men's padel players. *Frontiers in Sports and Active Living, 6*, Article 1393980. https://doi.org/10.3389/fspor.2024.1393980

Correia, M., & Rosado, A. (2019). Anxiety in athletes: Gender and type of sport differences. *International Journal of Psychological Research, 12*(1), 9–17. https://doi.org/10.21500/20112084.3552

Craft, L. L., Magyar, T. M., Becker, B. J., & Feltz, D. L. (2003). The relationship between the Competitive State Anxiety Inventory-2 and sport performance: A meta-analysis. *Journal of Sport & Exercise Psychology, 25*(1), 44–65. https://doi.org/10.1123/jsep.25.1.44

Domínguez-González, J. A., Reigal, R. E., Morales-Sánchez, V., & Hernández-Mendo, A. (2024). Analysis of the sports psychological profile, competitive anxiety, self-confidence and flow state in young football players. *Sports, 12*(1), Article 20. https://doi.org/10.3390/sports12010020

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion, 7*(2), 336–353. https://doi.org/10.1037/1528-3542.7.2.336

Fernández-Río, J., Zumajo-Flores, M., & Flores-Aguilar, G. (2022). Motivation, basic psychological needs and intention to be physically active after a gamified intervention programme. *European Physical Education Review, 28*(2), 432–445. https://doi.org/10.1177/1356336X211052883

Freire, G. L. M., Sousa, V. C., Alves, J. F. N., Moraes, J. F. V. N., Oliveira, D. V., & Nascimento Junior, J. R. A. (2020). Are the traits of perfectionism associated with pre-competitive anxiety in young athletes? *Cuadernos de Psicología del Deporte, 20*(2), 37–46. https://doi.org/10.6018/cpd.406031

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference, 11.0 update* (4th ed.). Allyn & Bacon.

González-Hernández, J., Barrera-Vázquez, D., & Gómez-López, M. (2024). Self-confidence in young athletes: A protective factor against perfectionism and anxiety in competitive grassroots sport. *Perceptual and Motor Skills*. Advance online publication. https://doi.org/10.1177/00315125241290563

Hanin, Y. L. (2007a). Emotions and athletic performance: Individual zones of optimal functioning model. In D. Smith & M. Bar-Eli (Eds.), *Essential readings in sport and exercise psychology* (pp. 55–73). Human Kinetics.

Hanin, Y. L. (2007b). Emotions in sport: Current issues and perspectives. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (3rd ed., pp. 31–58). Wiley. https://doi.org/10.1002/9781118270011.ch2

Hanton, S., Thomas, O., & Maynard, I. (2004). Competitive anxiety responses in the week leading up to competition: The role of intensity, direction and frequency dimensions. *Psychology of Sport and Exercise, 5*(2), 169–181. https://doi.org/10.1016/S1469-0292(02)00042-0

Hardy, L., & Parfitt, G. (1991). A catastrophe model of anxiety and performance. *British Journal of Psychology, 82*(2), 163–178. https://doi.org/10.1111/j.2044-8295.1991.tb02391.x

Hogrefe, S., Ruiz-Barquín, R., & Molinero, O. (2018). Ansiedad y estrategias de afrontamiento en judokas de competición. *Revista de Artes Marciales Asiáticas, 13*(2), 23–26. https://doi.org/10.18002/rama.v13i2s.5501

Jamshidi, A., Talebi, H., Sajadi, S., Safari, K., & Zare, G. (2011). The relationship between sport orientation and competitive anxiety in elite athletes. *Procedia—Social and Behavioral Sciences, 30*, 1161–1165. https://doi.org/10.1016/j.sbspro.2011.10.226

Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology, 14*(3), 205–218. https://doi.org/10.1080/10413200290103509

Li, Y., Ren, Y., Du, Z., Li, M., & Jiang, J. (2025). Competitive pressure, psychological resilience, and coping strategies in athletes' pre-competition anxiety. *Scientific Reports, 15*, Article 35467. https://doi.org/10.1038/s41598-025-19213-1

Manna, T. (2025). Canoeing, kayaking, and rowing: An extensive analysis. *International Journal of Science and Research Archive, 15*(1), 105–111. https://doi.org/10.30574/ijsra.2025.15.1.0812

Marín-González, F. H., Portela-Pino, I., Fuentes-García, J. P., & Martínez-Patiño, M. J. (2022). Relationship between sports and personal variables and the competitive anxiety of Colombian elite athletes of

 © 2027 ARD Asociación Española

Olympic and Paralympic sports. *International Journal of Environmental Research and Public Health, 19*(13), Article 7791. https://doi.org/10.3390/ijerph19137791

Mediavilla, A. A. (2022). Ansiedad precompetitiva y su influencia en aspectos psicológicos del rendimiento deportivo en jugadoras profesionales de fútbol. *Ciencia Latina Revista Científica Multidisciplinar, 6*(2), 439–454. https://doi.org/10.37811/cl_rcm.v6i2.1894

Moreno-Murcia, J. A., & Cervelló-Gimeno, E. M. (2010). *Motivación en la actividad física y el deporte*. Wanceulen Editorial.

Nascimento-Junior, J. R. A., Paixão, C. B., Damasceno, V. O., Freire, G. L. M., & Oliveira, D. V. (2025). Estrategias de afrontamiento como factores protectores de la ansiedad precompetitiva en deportistas jóvenes. *Cuadernos de Educación y Desarrollo, 17*(12), Article e10232. https://doi.org/10.55905/cuadv17n12-012

Nogueira, J. M., Simães, C., Morais, C., Mansell, P., & Gomes, A. R. (2025). Coping strategies before competition: The role of stress, cognitive appraisal, and emotions. *Sports, 13*(10), Article 366. https://doi.org/10.3390/sports13100366

Ong, N. C. H., & Chua, J. H. E. (2021). Effects of psychological interventions on competitive anxiety in sport: A meta-analysis. *Psychology of Sport and Exercise, 52*, Article 101836. https://doi.org/10.1016/j.psychsport.2020.101836

Orozco, C. R., & Aldas, H. G. (2023). La ansiedad precompetitiva y su incidencia en el rendimiento deportivo en los futbolistas. *MQRInvestigar, 7*(1), 3168–3179. https://doi.org/10.56048/MQR20225.7.1.2023.3168-3179

Otzen, T., & Manterola, C. (2017). Técnicas de muestreo sobre una población a estudio. *International Journal of Morphology, 35*(1), 227–232. https://doi.org/10.4067/S0717-95022017000100037

Pineda-Espejel, H. A., Alarcón, E., Morquecho-Sánchez, R., Morales-Sánchez, V., & Gadea-Cavazos, E. (2021). Adaptive social factors and precompetitive anxiety in elite sport. *Frontiers in Psychology, 12*, Article 651169. https://doi.org/10.3389/fpsyg.2021.651169

Prieto, J. M., & González-García, H. (2022). Precompetitive anxiety profiles in runners: Differences in the running motives. *Journal of American College Health, 72*(8), 2512–2519. https://doi.org/10.1080/07448481.2022.2119395

Ríos-Garit, J., Cañizares-Hernández, M., Reyes-Bossio, M., Pérez-Surita, Y., & Touset-Riverí, R. (2024). Competitive anxiety and mood states in high-performance Cuban student athletes. *Psychology in Russia: State of the Art, 17*(3), 50–62. https://doi.org/10.11621/pir.2024.0304

Riquelme, M., Cisternas, C., & Núñez, C. (2020). Relación entre los niveles de ansiedad precompetitiva y rendimiento deportivo en atletas adolescentes. *Archivos de la Sociedad Chilena de Medicina del Deporte, 65*(1), 13–28. https://doi.org/10.59856/arch.soc.chil.med.deporte.v65i1.2

Rocha, V. V. S., & Osório, F. de L. (2018). Associations between competitive anxiety, athlete characteristics and sport context: Evidence from a systematic review and meta-analysis. *Archives of Clinical Psychiatry, 45*(3), 67–74. https://doi.org/10.1590/0101-60830000000160

Rodríguez-Gómez, J. M., & Granero-Gallegos, A. (2014). Mood, self-confidence and pre-competitive anxiety in sport shooting. *Espiral. Cuadernos del Profesorado, 7*(14), 13–23. https://doi.org/10.25115/ecp.v7i14.967

Ruiz-Juan, F., Zarauz, A., & Flores-Allende, G. (2016). Ansiedad precompetitiva en corredores de fondo en ruta en función de sus variables de entrenamiento. *Retos, 30*, 110–113. https://doi.org/10.47197/retos.v0i30.43674

Saies, E. (2017). *Inteligencia emocional y motivación: Diferencias entre piragüistas iniciados, campeones y supercampeones* [Doctoral dissertation, Universidad del País Vasco].

Salom, M., Reigal, R. E., Hernández-Mendo, A., & Morales-Sánchez, V. (2020). Relación entre ansiedad competitiva y autoestima en jóvenes deportistas. *Revista Iberoamericana de Psicología del Ejercicio y el Deporte, 15*(2), 86–91.

Seco-Terrón, B., & Moral-Jiménez, M. V. (2023). Ansiedad precompetitiva y habilidades psicológicas relacionadas con el rendimiento deportivo. *Ansiedad y Estrés, 29*(2), 88–93. https://doi.org/10.5093/anyes2023a10

Si, X. W., Yang, Z. K., & Feng, X. (2024). A meta-analysis of the intervention effect of mindfulness training on athletes' performance. *Frontiers in Psychology, 15*, Article 1375608. https://doi.org/10.3389/fpsyg.2024.1375608

Silva, L. G. da S., Ferreira, R. W., Gaia, J. W. P., & Pires, D. A. (2022). Ansiedad precompetitiva en atletas de voleibol amateur. *Retos, 46*, 574–580. https://doi.org/10.47197/retos.v46.93284

Trujillo-Torrealva, D., & Reyes-Bossio, M. A. (2019). Programa de mindfulness para la reducción de la ansiedad precompetitiva en deportistas de artes marciales. *Retos, 36*, 418–426. https://doi.org/10.47197/retos.v36i36.66589

Vaca, M., Egas, S., García, O., Feriz, L., & Rodríguez, A. (2017). Ansiedad precompetitiva en karatecas de alto rendimiento, amateur y novatos. *Revista Cubana de Investigaciones Biomédicas, 36*(3), 239–247.

Vasconcelos-Raposo, J., Palumbo, J., Carvalho, A., Borges, J., & Teixeira, C. M. (2024). Negative thoughts and self-confidence among athletes with different sports experiences: A meta-analysis. *PsychTech & Health Journal, 7*(2), 5–19. https://doi.org/10.26580/PTHJ.art62-2024

Weinberg, R. S., & Gould, D. (2019). *Foundations of sport and exercise psychology* (7th ed.). Human Kinetics.

Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of Sports Sciences, 21*(6), 443–457. https://doi.org/10.1080/0264041031000101809

Yu, X., Yang, Y., & He, B. (2024). The effect of athletes' training satisfaction on competitive state anxiety: A chain-mediated effect based on psychological resilience and coping strategies. *Frontiers in Psychology, 15*, Article 1409757. https://doi.org/10.3389/fpsyg.2024.1409757

Zhang, Z., Chen, X., Xu, L., Qin, X., & Veloo, A. (2024). Sport anxiety and subjective happiness of college athletes: A self-determination theory perspective. *Frontiers in Psychology, 15*, Article 1400094. https://doi.org/10.3389/fpsyg.2024.1400094

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