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The interplay between motivational climate, competitive anxiety and coping strategies in Portuguese acrobatic gymnasts

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THE INTERPLAY BETWEEN MOTIVATIONAL CLIMATE, COMPETITIVE ANXIETY AND COPING STRATEGIES IN PORTUGUESE ACROBATIC GYMNASTS

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Resumo

Este estudo investigou a interação entre clima motivacional, ansiedade competitiva e estratégias de *coping*, com 106 atletas de ginástica acrobática portugueses/as (M_{idade}=14.08, DP_{idade}=1.99; 90.6% feminino). Os participantes completaram medidas de autorrelato para avaliar os constructos em estudo (*PMCSQ-2, SAS-2, Brief COPE*).

Resultados de análises de mediação evidenciaram o clima orientado para a tarefa negativamente associado à ansiedade e positivamente ao *coping* adaptativo. Inversamente, o clima orientado para o ego relacionou-se com maior ansiedade e *coping* não adaptativo. O *coping* não adaptativo mediou totalmente o efeito do clima orientado para o ego na ansiedade competitiva, indicando que estes ambientes exacerbam a ansiedade ao promover *coping* menos eficaz. Testes t para amostras independentes revelaram que idade e nível competitivo podem ser influentes: atletas mais velhos/as relataram mais preocupação e os de alto nível competitivo demonstraram maior uso de *coping* adaptativo.

Estes resultados realçam a importância dos climas motivacionais na promoção do bem-estar psicológico e desempenho dos/as ginastas. São avançadas implicações práticas focadas na promoção de climas orientados para a tarefa e *coping* adaptativo. As limitações incluem desenho transversal, tamanho/composição da amostra e medidas de autorrelato. Recomenda-se investigação longitudinal futura com amostras maiores, mais diversas e abordagens multi-informantes.

Palavras-chave: Ginástica acrobática, clima motivacional, ansiedade competitiva, estratégias de *coping*, mediação.

Abstract

This study investigated the interplay between motivational climate, competitive anxiety, and coping strategies among 106 Portuguese acrobatic gymnasts (M_{age}=14.08, SD_{age}= 1.99; 90.6% female). Participants completed self-report measures to assess the constructs under study (PMCSQ-2, SAS-2, Brief COPE).

Mediation analysis results showed that a task-oriented climate was negatively associated with anxiety and positively with adaptive coping. Conversely, an ego-oriented climate was linked to higher anxiety and maladaptive coping. Maladaptive coping fully mediated the effect of an ego-oriented climate on competitive anxiety, indicating that these environments exacerbate anxiety by promoting less effective coping. Independent samples t-tests revealed that age and competitive level might be influential: older athletes reported more worry, and high-level competitive athletes demonstrated greater use of adaptive coping.

These findings highlight the importance of motivational climates in promoting gymnasts' psychological well-being and performance. Practical implications are advanced, focusing on fostering task-oriented climates and adaptive coping. Limitations include the cross-sectional design, sample size/composition, and self-report measures. Future longitudinal research with larger, more diverse samples and multi-informant approaches is recommended.

Keywords: Acrobatic gymnastics, motivational climate, competitive anxiety, coping strategies, mediation.

Résumé

Cette étude a examiné l'interaction entre le climat motivationnel, l'anxiété compétitive et les stratégies d'adaptation chez 106 gymnastes acrobatiques portugais(es) ($M_{Âge}$=14,08, $SD_{Âge}$=1,99 ; 90,6 % de femmes). Les participant(e)s ont rempli des mesures d'auto-évaluation pour évaluer les construits étudiés (PMCSQ-2, SAS-2, Brief COPE).

Les résultats des analyses de médiation ont montré qu'un climat orienté vers la tâche était négativement associé à l'anxiété et positivement à l'adaptation. Inversement, un climat orienté vers l'ego était lié à une anxiété plus élevée et à une adaptation inefficace. L'adaptation inefficace a entièrement médiatisé l'effet du climat orienté vers l'ego sur l'anxiété compétitive, indiquant que ces environnements exacerbent l'anxiété en favorisant un coping moins efficace. Des tests t pour échantillons indépendants ont révélé que l'âge et le niveau de compétition pourraient être influents : les athlètes plus âgés(ées) ont rapporté plus d'inquiétude, et ceux de haut niveau compétitif ont démontré une plus grande utilisation de l'adaptation efficace.

Ces résultats soulignent l'importance des climats motivationnels pour promouvoir le bien-être psychologique et la performance des gymnastes. Des implications pratiques sont avancées, axées sur la promotion de climats orientés vers la tâche et l'adaptation efficace. Les limitations incluent la conception transversale, la taille/composition de l'échantillon et les mesures d'auto-évaluation. Des recherches longitudinales futures avec des échantillons plus grands, plus diversifiés et des approches multi-informateurs sont recommandées.

Mots-clés: Gymnastique acrobatique, climat motivationnel, anxiété compétitive, stratégies d'adaptation, médiation.

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List of Abbreviations

Abbreviation	Meaning
FGP	Federação de Ginástica de Portugal
TI Climate	Task-involving motivational climate
EI Climate	Ego-involving motivational climate
A-state	State anxiety
A-trait	Trait anxiety
Competitive A-trait	Competitive trait anxiety
PMCSQ-2	Perceived Motivational Climate in Sport Questionnaire - 2
SAS-2	Sport Anxiety Scale 2
Brief COPE	Brief Coping Orientation to Problems Experienced Inventory
AGN	North Gymnastics Association
RM ANOVA	Repeated Measures ANOVA

Introduction

Acrobatic gymnastics has been growing in Portugal, with a 26.7% increase in affiliated athletes since 2017 (Federação de Ginástica de Portugal [FGP], 2023a), reaching a total of 4377 gymnasts. This unique discipline combines various genders, ages, and number of athletes within each partnership (Marshall & Gibson, 2017). Its collaborative, aesthetic, and physically demanding nature, coupled with high-performance standards, make it an ideal context to study psychological variables relevant to sports performance and athlete well-being. As such, this study explores the interplay between motivational climate, competitive anxiety, and coping strategies within this sport, where individual performance is inseparable from group dynamics (Merida et al., 2008). Such an investigation offers valuable insights for sport psychology practice in Portugal, for both coaches and athletes, aiming to enhance performance and well-being.

This sport may involve partnerships of two women, two men, or mixed pairs, three women or four men, where individual gymnasts' size and skill complement each other (Fédération Internationale de Gymnastique, n.d.). Each group has one or more bases, usually older athletes demonstrating strength and balance, and a top, who is younger and more focused on flexibility and agility (Tatsi et al., 2022). Routines combine human pyramids with flexibility, balance, and agility elements, incorporating choreography for artistic value (Merida et al., 2008).

Athletes compete in national competitions across different levels and categories based on age and technical proficiency (FGP, 2023b; detailed in Annex A). While element difficulty increases with category (either aspire, pre-youth, junior, or senior), this distinction is primarily based on age. The division (either base, second, first, or elite) represents varying difficulty within the same age group, with elite being the highest competitive level. Higher competitive levels often involve increased performance pressure, stricter training, and elevated stress risk (Brand et al., 2012; Daumiller et al., 2022).

The cooperative nature, mixed-gender groups, wide age range, and variable group sizes in acrobatic gymnastics create distinct demands compared to individual sports. These dynamics can intensify performance pressure (Marshall & Gibson, 2017), emphasizing the need for a supportive environment, especially from coaches. Coaches define athletes' goals,

and the personal meaning attached to these goals significantly impacts motivational processes (Duda, 2004). Understanding motivation's behavioral, cognitive, and emotional effects is central to sport psychology for optimizing performance (Roberts, 1982) and promoting athlete well-being (Castro-Sánchez et al., 2019; Morales-Sánchez et al., 2022).

Motivational climate

Within this competitive and evaluative context, achievement motivation becomes particularly relevant (Roberts, 1982; Smith & Crandall, 1959). Research into achievement motivation has been effectively guided by achievement goal theories (Daumiller et al., 2022), originally conceptualized within educational settings (Duda, 2018; Urdan & Kaplan, 2020), but since widely applied to other achievement domains, including sport.

Achievement goal theory examines how individuals engage in competence-related activities by focusing on goals that direct behavior (Elliot & Hulleman, 2017). These goals guide interpretations of tasks, emotional reactions, and behavioral choices (Duda, 2005; Dweck, 1986; Elliot & Hulleman, 2017; Nicholls, 1984). An athlete's adopted goal reflects their conception of competence and definition of success (Newton et al., 2000; Stefanek & Peters, 2011), influencing motivational processes and performance. Building on this foundation, achievement goal theory proposes two primary goal orientations: task-involved and ego-involved goals.

While individual goal orientations are foundational, understanding the situational factors that shape them is crucial. Therefore, this investigation focuses specifically on the motivational climate shaped by coaches, particularly relevant in acrobatic gymnastics due to the young age of many athletes and their dependency on significant adults, such as their coaches (Claringbloud et al., 2014). Motivational climates promote or hinder certain behaviors, emotions and cognitions (Morales-Sánchez et al., 2022) by communicating the orientation toward either task-involving goals or ego-involving goals (Hogue et al., 2017).

Early research in educational contexts by Ames and Archer (1988) identified two classroom motivational climates, based on the types of achievement goals proposed in achievement goal theory. In a task-involving climate (TI climate or mastery climate), emphasizes is put on learning, effort and personal improvement, to develop competence and task mastery. Competence is judge based on personal improvement, skill mastery, and exerted effort. Success, therefore, is defined through self-referenced criteria (Duda, 2004,

2005; Elliot & Hulleman, 2017). Conversely, ego-involving climates (EI climate or performance climate), emphasize social comparison, focusing on demonstrating competence relative to others. Effort is often perceived as evidence of lower ability, if not accompanied by superior performance (Nicholls, 1984, 1989). In this case, success is defined by outperforming others, with competence evaluated against the performance of a relevant peer group (Duda, 2005; Nicholls, 1984, 1989).

In sport, Nicholls (1989) and other researchers (e.g. Erdész et al., 2023; Newton et al., 2000) proposed that athletes perceive similar climates and that coaches act as key social agents capable of actively influencing the motivational environment (Duda et al., 2007).

More specifically, in TI climates athletes perceive that effort, developing skills and overcoming challenges are valued and that every team member is important (Fry et al., 2021; Newton et al., 2000). Mistakes are seen as learning opportunities, while interpersonal relationships and mutual support are fostered (Erdész et al., 2023; Nicholls, 1989). Athletes who perceive this type of climate are more likely to experience intrinsic motivation, greater enjoyment and adaptive achievement behaviors, regardless of their perceived competence (Hogue et al., 2017; Seifriz et al., 1992), also contributing to more positive emotional states and greater psychological resilience (Fry et al., 2021; Seifriz et al., 1992).

On the other hand, within an EI climate, success is attributed primarily to innate ability, with emphasis placed on outperforming others. Coaches may publicly punish mistakes, reward only the most talented athletes and encourage intra-team rivalry (Fry et al., 2021; Newton et al., 2000). This climate has been consistently associated with maladaptive affective and motivational outcomes (Newton et al., 2000), such as increased performance anxiety, diminished intrinsic motivation and avoidance of challenging tasks, particularly when their perceived competence is low (Duda, 2005; Morales-Sánchez et al., 2022).

In a sport like acrobatic gymnastics, where performance is determined by the interaction between individuals (Leite et al., 2024), the motivational climate, particularly its cooperative or rivalrous dimensions, significantly impacts performance. Adjusting coach approaches to athlete age and competitive level is also important. Research suggests that different developmental stages require tailored motivational strategies (Szemes, 2017) and highlights a mastery-avoidance tendency of high competition level athletes (Daumiller et al., 2022).

As different motivational climates relate to different affective, cognitive and behavioral adaptive or maladaptive outcomes, it becomes imperative to explore this influence, as one of the most significant maladaptive outcomes in sport psychology is competitive anxiety (Duda, 2005; Fry et al., 2021; Seifriz et al., 1992).

Competitive Anxiety

Competitive anxiety is a specific application of general anxiety, defined as an unpleasant emotional state of tension, apprehension, nervousness, and heightened autonomic nervous system activity (Spielberger et al., 1971). This is particularly relevant in sport, where athletes face regular evaluation of their competencies and self-worth (Grossbard et al., 2009; Hackford & Spielberger, 1989). In acrobatic gymnastics, the high risk of injury can further intensify anxiety (Kolt et al., 1995; Martes et al., 1990).

Early anxiety conceptualizations were unidimensional, focused on psychological arousal (Spielberger et al., 1971). However, as empirical research advanced (e.g. Mandler & Sarason, 1952; Spielberger et al., 1971), it became clear that anxiety involved both transitory emotional reactions and stable individual differences in anxiety-proneness. Addressing this complexity, Spielberger (1972) proposed an influential framework distinguishing between state anxiety (A-state) and trait anxiety (A-trait), which became a pivotal multidimensional model (Endler & Kocovski, 2001).

A-state is a temporary emotional condition with conscious apprehension, tension, nervousness, and autonomic nervous system activation (Martens et al., 1990; Spielberger et al., 1971, 1972). In contrast, A-trait is a stable personality characteristic, reflecting a predisposition to perceive situations as threatening and respond with elevated state anxiety (Endler & Parker, 1990; Spielberger, 1972). High A-trait individuals experience A-state more frequently and intensely (Endler & Kocovski, 2001).

A domain-specific extension of this construct can also be highlighted - competitive trait anxiety (competitive A-trait). It reflects an athlete's predisposition to interpret competitive environments as threatening, thereby triggering heightened cognitive and somatic A-state responses (Martens et al., 1990; Smith et al., 2006). Athletes high in competitive A-trait tend to anticipate failure, display greater worry, concentration disruption

and physical tension during competition (Grossbard et al., 2009; Kaiseler et al., 2012; Pineda-Espejel et al., 2018).

While state-trait distinction is important to predict and measure emotional reactions, understanding the experiential components of anxiety is also crucial (Ree et al., 2008). The Multidimensional Anxiety Theory, proposed by Martens and colleagues (1990), explores these components and defines two primary ones of both state and trait anxiety: cognitive anxiety and somatic anxiety. This distinction has since become a foundational principle in both research and applied sport psychology.

Cognitive Anxiety is the mental component of anxiety and involves cognitive processes such as intrusive thoughts, difficulty concentrating and ruminative worry (Grossbard et al., 2009). In sport, it manifests as preoccupation with performance mistakes, self-doubts or hyper-focus on outcomes, disrupting control and decision-making (Kaiseler et al., 2009: Wilson et al., 2009). Smith and colleagues (1990) further identified two aspects of cognitive anxiety, namely worry, which involves apprehension related to the possibility of bad performance and worry about the negative consequences that could derive from it, and concentration disruption, which involves difficulties in maintaining concentration in task-relevant aspects.

Resulting from autonomic nervous system activation, somatic anxiety involves the physiological and affective aspects of the anxiety experience (Martens et al., 1990). It presents as physical symptoms such as trembling, sweating and shortness of breath (Smith et al., 2006; Spielberger & Sydeman, 1994). These reactions often peak shortly before performance and typically subside once it begins (Jones, 1995). Unlike cognitive anxiety, somatic anxiety is typically more transient and situationally bound (Kraiseler et al., 2009).

Both components interact dynamically, influencing performance differently depending on task demands and individual characteristics (Jones 1995; Kaiseler et al., 2009). In acrobatic gymnastics, elevated somatic anxiety might impair precision due to muscle tension (Grossbard et al., 2009), while moderate physiological arousal could benefit endurance components (Grossbard et al., 2009). Cognitive anxiety, however, consistently shows a negative relationship with performance, primarily by narrowing attention, increasing distractibility and undermining self-confidence (Wilson et al., 2009). Furthermore, competitive anxiety may also vary with age, as younger athletes often exhibit higher anxiety

levels, particularly cognitive anxiety, due to less developed emotional regulation (Dias et al., 2010). However, at higher levels of competition, athletes report more frequent experiences of anxiety, particularly somatic anxiety (Brand et al., 2012) and the cognitive component of worry, related to the fear of negative evaluation (Daumiller et al., 2022; Kavussanu et al., 2011).

This nuanced understanding of anxiety's multidimensionality highlights the importance of assessing both cognitive and somatic symptoms due to their meaningful consequences (Martens et al., 1990; Smith et al., 2006). Faced with these, athletes actively manage and regulate internal pressures and physiological responses (Kaiseler et al., 2009; Lazarus & Folkman, 1984).

Coping strategies

This leads to the critical role of coping which, in sport, refers to the cognitive and behavioral efforts athletes employ to manage internal or external demands appraised as exceeding their resources (Lazarus & Folkman, 1984; Ribeiro & Rodrigues, 2004). Effective coping should lead to positive adjustment, evidenced by improved well-being, social functioning and somatic health (Lazarus et al., 1985).

The most influential model in sport stress and coping research is Lazarus and colleagues' transactional approach (Lazarus, 1999; Lazarus & Folkman, 1984). This dynamic perspective emphasizes coping as a continuous interaction between individuals and their environment, shaped by cognitive appraisals that, in turn, influence coping responses.

Lazarus (1999), posited stress as a two-tiered appraisal mechanism followed by coping. Primary appraisal is the initial assessment of an event's significance to personal well-being, goals, values and beliefs (Kaiseler et al., 2013; Nicholls & Polman, 2007). An event is appraised as stressful if perceived as relevant to goals and potentially endangering well-being (Lazarus, 1999), leading to perceptions of harm/loss, threat, challenge or benefit (Nicholls & Polman, 2007). Secondary appraisal involves evaluating available coping options and resources (Kaiseler et al., 2013; Lazarus, 1999), following a primary appraisal of harm/loss. This phase is crucial as it dictates the decision on how to cope (Lazarus, 1999).

The coping response follows these appraisals. Lazarus and Folkman (1984) initially distinguished two broad categories: problem-focused and emotion-focused coping. Problem-

focused strategies directly alter the stress source through problem-solving or changing the situation (Carver et al., 1989; Nicholls & Pollman, 2007). This is prevalent when constructive action can be taken (Folkman & Lazarus, 1984; Ribeiro & Rodrigues, 2004). Emotion-focused coping manages emotional distress, rather than changing the situation itself (Carver et al., 1989; Nicholls & Polman, 2007). These are more common when the stressor is perceived as having to be endured (Folkman & Lazarus, 1984, Ribeiro & Rodrigues, 2004).

However, this initial distinction was deemed too simplistic, as authors argued the heterogeneity and complexity of various coping subtypes (e.g. Carver et al., 1989; Compas et al., 2001). To fill this gap, Carver and colleagues (1989) expanded this framework with the behavioral self-regulation theory. This theory views behavior as a goal-directed, feedback-controlled self-regulatory process. Individuals monitor progress toward goals or disengage from attainable ones (Carver et al., 1989). Within this framework, coping strategies are mechanisms for regulating cognitions and behaviors in response to threats, influencing psychological adjustment and well-being (Carver & Connor-Smith, 2010).

This approach also suggests individuals have stable, preferred coping strategies across situations (Carver et al., 1989; Nicholls & Polman, 2007), contrasting Lazarus and Folkman's dynamic view. Research supports this trait conceptualization, showing older athletes use more emotion-focused and adaptive strategies (acceptance, planning, positive reframing), while younger athletes rely on dysfunctional approaches like behavioral disengagement (Dias et al., 2010). Prior experiences and personality characteristics are thought to shape these enduring patterns (Carver et al., 1989; Holahan & Moos, 1987). However, dispositional coping styles and situational responses are generally considered complementary, with personality traits influencing and interacting with situation-specific efforts (Carver et al., 1989; Rodrigues et al., 2022).

As an implication of the existing literature about the transactional model and his own behavior self-regulation model, Carver (1997) expanded the range of coping strategies, proposing fourteen different strategies. Going beyond the problem-focused or emotion-focused distinction, these coping strategies can also be classified as adaptive or maladaptive, depending on their association with emotional distress or well-being (Meyer, 2001; Rodrigues et al., 2022; Su et al., 2015).

Adaptive coping strategies are associated with positive outcomes such as well-being, while maladaptive coping strategies correlate with negative outcomes like depression and anxiety (Kato, 2015; Rodrigues et al., 2022). Meyer (2001) classified Carver's (1997) behavioral disengagement, denial, self-distraction, self-blaming, substance use, and venting strategies as maladaptive coping (Rodrigues et al., 2022) while other problem-focused coping- active coping, instrumental support, and planning- and emotion-focused coping- acceptance, emotional social support, humor, positive reframing, and religion- were deemed as adaptive strategies. Despite this, emotion-focused strategies often relate negatively to positive outcomes, whereas problem-focused strategies appear more positively associated (Rodrigues et al., 2022).

These individual coping efforts, however, are not isolated, but are deeply connected to the coach-shaped motivational climate and are triggered by the athlete's emotional state. This highlights the intricate and dynamic interplay between the perceived motivational climate, competitive anxiety, and coping strategies.

Interplay between motivational climate, competitive anxiety and coping strategies

The relationship between the perceived motivational climate and competitive anxiety is well documented in sport psychology literature. TI climates, emphasizing effort, learning and cooperation, tend to reduce anxiety (Smith et al., 2006) by fostering control and competence and discouraging social comparison (McArdle & Duda, 2002; Papaioannou & Kouli, 1999). In contrast, EI climates, prioritizing normative success and intra-team rivalry, are consistently associated with higher stress and anxiety (Erdész et al., 2023; Vazou et al., 2006), particularly cognitive anxiety marked by worry and fear of failure (Castro-Sanchéz et al., 2019; Duda, 2005).

However, studies have been suggesting that this relationship between motivational climate and anxiety may not necessarily be direct but can operate through coping strategies (Daumiller et al., 2022; Ntoumains et al., 1999). To understand this, we turn to how motivational climate also shapes the way athletes respond to stress, by influencing their development and selection of coping strategies. A TI climate encourages adaptive coping strategies, typically associated with lower anxiety and effective emotion regulation, by promoting psychological safety and framing mistakes as learning opportunities (Daumiller

et al., 2022; Fry et al., 2021), Conversely, EI climates are linked to the use of maladaptive coping strategies, which are less effective and often exacerbate anxiety symptoms (Ntoumanis et al., 1999).

Individual differences, captured by the competitive A-trait concept, add complexity. Athletes with highly competitive A-trait are more prone to interpret performance situations as threatening and adopt maladaptive coping strategies (Dias et al., 2012; Giacobbi & Weinberg, 2000). Thus, the same climate can have different emotional outcomes depending on an athlete's coping predispositions.

As the empirical validation of this model is still scarce, particularly in Portugal and in Acrobatic Gymnastics, this study aims to explore the relationship between perceived motivational climate, the multidimensional components of competitive anxiety and the use of coping strategies, particularly investigating the mediating role of coping strategies. From a practical standpoint, this work contributes to a more process-oriented understanding of how emotional regulation in sport is shaped by social, environmental, and individual factors. It also intends to provide practical insights that encourage the integration of these psychological principles into coach education and practices, ultimately enhancing athletes' psychological well-being and performance outcomes.

Method

Aims, Hypotheses and Research Questions

This study primarily aims to examine the relationship between perceived motivational climate, competitive anxiety and coping strategies among acrobatic gymnastics athletes. Based on the theoretical framework established and the objectives of the research, the following hypotheses were formulated:

- **H1:** Perceptions of TI climate will be negatively associated with competitive anxiety and positively associated with adaptive coping strategies.
- **H2:** Perceptions of EI climate will be positively associated with competitive anxiety and with the use of maladaptive coping strategies.

- **H3:** The use of adaptive coping strategies will be negatively associated with competitive anxiety.
- **H4:** Coping strategies are hypothesized to mediate the relationship between motivational climate and competitive anxiety. More precisely, adaptive coping strategies are expected to mediate the negative effect of TI climate on competitive anxiety, while maladaptive coping strategies are expected to mediate the positive effect of EI climate on competitive anxiety.

Alongside these hypotheses, a set of exploratory research questions was proposed to investigate the influence of individual and contextual factors:

- **RQ1:** Do perceptions of motivational climate, level of competitive anxiety and use of coping strategies vary across age groups or competitive levels?
- **RQ2:** Do the associations between motivational climate, competitive anxiety, and coping strategies differ across age groups or competition levels?

Participants

The sample consisted of 106 athletes that practiced acrobatic gymnastics in the 2023/2024 season, in Portugal. Of those, the majority were female (n=96) and 10 were male. Participants ranged in age from 10 to 19 years (M=14.08, SD=1.99). All of them reported being enrolled in school and only 2 of them reported being in college. The sample included 100 Portuguese athletes, 3 athletes with dual nationality and 3 athletes with other nationalities, mainly in Europe.

As to the distribution across the four competitive divisions established by the FGP (2023b), the largest group was base (n=44), followed by second division (n=28), first division (n=22) and elite (n=12). Regarding categories, participants competed mostly in pre-youth (n=40) and aspire (n=28), followed by junior (n=19) and senior (n=10). When combining division and category, most athletes reported competing as aspire base (n=17) or pre-youth base (n=16), followed by aspire second division and pre-youth second division (n=12, each).

Athletes' experience in the sport ranged from 1 to 13 years (M=5.12, SD=2.05). The number of coaches that accompanied them during the 2023/2024 season ranged from 1 to 7 (M=4.04, SD=1.52), and the average duration of the coach–athlete relationship was 2.74

years (SD=1.24), with reported durations spanning from 1 to 8 years. Weekly training ranged between 9 and 30 hours (M=15.36, SD=6.74).

Instruments

The survey used in the present study included an initial section regarding sociodemographic information and three main instruments: *Questionário de Clima Motivacional Percecionado no Desporto 2* (PMCSQ-2; Santos et al., 2023), a Portuguese version translated and adapted from the *Perceived Motivations Climate in Sport Questionnaire 2* (Newton et al., 2000); *Escala de Ansiedade no Desporto 2* (SAS-2, Cruz & Gomes, 2007), which was translated and adapted from the *Sport Anxiety Scale 2* (Smith et al., 2006); and *Brief Coping Orientation to Problems Experienced Inventory* (Brief COPE; Ribeiro & Rodrigues, 2004), translated and adapted from the original instrument (Carver, 1997).

Given the target age group (athletes aged 11 years or older) and the specific context of this study, there were concerns about ensuring the clarity and appropriateness of the survey instruments. Across all measures, adaptations were made to employ gender-inclusive language by using variations such as *"o/a treinador/a"* (the coach [masculine/ feminine]) and "os/as atletas" (the athletes [masculine/ feminine]). The instructions of each instrument were also adapted to include explicit reference to the period participants should reflect on when answering, last year's season (2023/2024) and to maintain consistent language across instruments.

Specifically, in PMCSQ-2, *"Por favor, pensa no que sentes ao jogar na tua equipa durante esta época."* (Please think about how you feel when playing in your team during this season) was adapted to *"Por favor, pensa no que sentiste ao competir na tua equipa durant*e *a época 2023/2024."* (Please think about how you felt when competing in your team during the 2023/2024 season). In SAS-2, *"Depois, assinale o número que diz como é que se sente, geralmente, antes ou durante a competição."* (Then, mark the number that shows how you generally feel before or during competition) was modified to *"Depois, assinala o número que corresponde a como te sentiste antes ou durante as competições em que participaste na época desportiva 2023/2024."* (Then, mark the number that reflects how you felt before or during the competitions you participated in during the 2023/2024 sports season). The same

was done with Brief COPE: *"Responde sobre o modo como lidas com problemas da vida"* (Answer about how you deal with life issues) was adapted to *"Responde sobre o modo como lidas com problemas da vida, nomeadamente nas competições da época 2024/2025"* (Answer about how you deal with life issues, especially those related to competitions in the 2023/2024 season). The full protocol used is available in Annex B.

Sociodemographic Information

This section (Annex B, Figure B1) was developed for the purpose of the present study. It included questions regarding participants' age, gender, nationality and educational status, with the aim of providing a comprehensive characterization of the sample.

In addition, sport-specific questions were included to gather contextual information that could help interpret the variation of the psychological variables under study. These questions address the number of years of sport involvement, weekly hours of practice, number of coaches and time spent with each one, as well as their competition level, the number of competitions they participated in, and the awards and medals obtained in those competitions. These variables were included as they may reflect differences in athletes' experience, training intensity, exposure to competitive environments and stability of coach-athlete relationships, all of which are relevant factors when examining motivational and emotional processes in youth sport contexts.

Questionário de Clima Motivacional Percecionado no Desporto 2 (Perceived Motivational Climate in Sport Questionnaire 2)

The PMCSQ-2 (Annex B, Figure B2-B5; Santos et al., 2023) was employed to assess athletes' perceptions of motivational climate. The questionnaire includes 33 items that measure two dimensions of the construct – TI climate and EI climate- as well as 5 subscales, detailed in Table 1. Participants are asked to indicate the level of agreement with each statement on a 5-point Likert rating scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Given the specific context of this study, there were concerns about ensuring the clarity and appropriateness of the instrument. This required the clarification of some items.

Table 1

Subscales assessed by the PMCSQ-2

Dimension	Subscale	Description	Example Item
TI Climate (sixteen items; α=.91*; α=.80**)	Effort/Improvement (eight items; α=.80*; α=.78**)	Focus on individual effort and personal improvement.	"Trying hard is rewarded."
	Cooperative Learning (four items; α=.84*; α=.82**)	Cooperation and mutual support among teammates.	"Players work together as a team."
	Important Role (four items; α=.84*; α=.80**)	Recognizes the value of each player in the team.	"Every player has an important role."
EI Climate (eleven items; α=.83*; α=.84**)	Punishment for Mistakes (four items; α=.61*; α=.80**)	Mistakes are met with punishment from the coach.	"The coach gets mad when a player makes a mistake."
	Unequal Recognition (seven items; α=.83*; α=.83**)	Coaches give more attention and recognition to the most talented athletes.	"The coach gives most of his or her attention to the stars."

** Santos et al., 2023*
*** Newton et al., 2000*

To align the instruments' language with the terminology used in this sport, all instances of the words *"jogador"* (player) and *"jogo"* (game) were systematically replaced with *"atleta"* (athlete) and *"desempenho"* (performance), respectively. Furthermore, the verb *"jogar"* (play) was consistently replaced by *"competir"* (compete) or *"desempenhar"* (perform), depending on the context. For example, item 6, *"O treinador felicita os jogadores apenas quando jogam melhor que os companheiros de equipa."* (The coach praises players only when they play better than their teammates.), was adapted to *"O/A treinador/a felicita os/as atletas apenas quando têm um desempenho melhor do que os companheiros de equipa"* (The coach praises athletes only when they perform better than their teammates). Similarly, item 24, *"Quem quiser jogar tem de ser um dos melhores jogadores*" (Those who want to play must be one of the best players) was changed to *"Quem quer competir tem de ser um/uma dos/das melhores atletas"* (Those who want to compete must be one of the best athletes). Other minor adaptations were also introduced to enhance the athlete's comprehension and the ecological validity of the instrument in this specific context. Namely,

item 7, *"O treinador pensa que só os titulares contribuem para o sucesso da equipa"* (The coach thinks only starters contribute to the team's success) was adapted to "*O/A treinador/a pensa que só os/as mais experientes contribuem para o sucesso da equipa"* (The coach thinks only the more experienced athletes contribute to the team's success*)*. Likewise, item 17, *"só os jogadores com melhores "estatisticas" são elogiados"* (Only the players with the best stats are praised), was modified to *"só os/as atletas com melhores resultados são elogiados"* (Only the athletes with the best results are praised).

Escala de Ansiedade no Desporto 2 (Sport Anxiety Scale 2)

Participants' competitive anxiety was assessed using the SAS-2 (Annex B, Figure B6-B7; Cruz & Gomes, 2007). Its 15 items focus on three dimensions detailed in Table 2 and their total sum provides a global score (α=.89*; α=.91**). Participants are asked to rate the intensity of their feelings and thoughts before or during competitions on a 4-point Likert rating scale ranging from 1 (Not at all) to 4 (Very much so).

The items in the SAS-2 were retained in their original wording as they were deemed suitable for the sport's context.

Table 2

Dimensions of Competitive Anxiety assessed in SAS-2

Dimension	Description	Example Item
Somatic Anxiety (five items; α=.85*; α=.84**)	Physical symptoms of anxiety	"My body feels tense."
Worry (five items; α=.88*; α=.89**)	Cognitive concerns about performance outcomes and fear of failure.	"I worry that I will not perform my best."
Concentration Disruption (five items; α=.82*; α=.84**)	Difficulty maintaining focus during competition.	"It is hard to concentrate on the competition."

** Cruz & Gomes, 2007*
*** Smith et al., 2006*

Brief COPE

Athletes' coping strategies in response to stressful situations in sport were assessed using the Portuguese version of *Brief COPE* (Annex B, Figure B8-B10; Ribeiro & Rodrigues,

2004). This 28-item scale consists of 14 subscales (2 items each), measuring different coping mechanisms (Table 3) Participants are asked to rate how often they typically use each coping strategy when they experience stress, using a 4-point Likert rating scale ranging from 0 (I never do this) to 3 (I always do this).

The items in the Brief COPE were retained in their original wording as they were deemed suitable for the sport's context.

Procedure

This study received ethical approval from *Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto*'s Ethics Committee (Annex C).

A preliminary cognitive briefing was conducted with 14 acrobatic gymnastics athletes (between 11 and 19 years, M=14.3, SD=2.05) to assess the clarity and appropriateness of the survey, including instrument adaptations.

Prior to the cognitive briefing session, informed consent was obtained via email from parents and adult athletes. Participants were introduced to the study as well as explained their role in providing insights into the survey's comprehensibility. Following the athletes' verbal assent to participation, they were instructed to complete the paper-based survey, with encouragement to ask questions whenever necessary.

Completion of the survey took between 15 and 20 minutes, as expected. During the briefing, participants completed the survey, providing feedback on comprehensibility and clarity. Specifically, athletes demonstrated greater doubts about specific hard-to-understand wording and the sociodemographic section's competitive categories. Along with observational notes on non-verbal cues, the documented inquiries informed minor adjustments, such as adding examples for competition types and preparing a simpler synonym for "vitais" (vitals) for clarification during administration. Athletes also demonstrated a clear understanding of the study´s general theme and were able to explain most items in their own words.

Following these adjustments, we sought the collaboration of the North Gymnastics Association (AGN, Annex D), to facilitate participant recruitment

Table 3

Coping strategies assessed by the Brief COPE inventory

Coping Strategy	Brief Description	Example Item
Self-distraction (α=.67*; α=.71**)	Engaging in enjoyable activities to cope with the situation.	"I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping."
Active coping (α=.65*; α=.68**)	Taking action to remove the stressor or to reduce its effects.	"I've been concentrating my efforts on doing something about the situation."
Denial (α=.72*; α=.54**)	Refusing to believe that the problem exists.	"I've been refusing to believe that it has happened."
Substance use (α=.81*; α=.90**)	Using alcohol or other drugs to feel better.	"I've been using alcohol or other drugs to make myself feel better."
Use of emotional support (α=.79*; α=.68**)	Seeking moral support, sympathy, or understanding.	"I've been getting emotional support from others."
Use of instrumental support (α=.81*; α=.64**)	Seeking advice, assistance, or information.	"I've been getting help and advice from other people."
Behavioral disengagement (α=.78*; α=.65**)	Giving up trying to deal with the stressor.	"I've been giving up trying to deal with it."
Venting (α=.84*; α=.50**)	Focusing on and venting one's emotions.	"I've been expressing my negative feelings."
Positive reframing (α=.74*; α=.64**)	Trying to see the situation in a more positive light.	"I've been trying to see it in a different light, to make it seem more positive."
Planning (α=.70*; α=.73**)	Thinking about what steps to take to handle the problem.	"I've been trying to come up with a strategy about what to do."
Humor (α=.83*; α=.73**)	Making jokes about the situation.	"I've been making jokes about it."
Acceptance (α=.55*; α=.57*)	Accepting the reality of the situation.	"I've been accepting the reality of the fact that it has happened."
Religion (α=.80*; α=.82**)	Turning to religion for guidance.	"I've been praying or meditating."
Self-blame (α=.62*; α=.69**)	Criticizing oneself for what has happened.	"I've been blaming myself for things that happened."

** Ribeiro & Rodrigues, 2004*
*** Carver, 1997*

The AGN sent an invitation to all registered coaches (Annex E), requesting they contact the research team if interested in participating. Once coaches expressed their willingness to take part in the study, parental consent was obtained via email (Annex F) before scheduling a suitable time to administer the surveys at the athletes' respective training facilities.

On the scheduled day, athletes were given a brief introduction to the study, and their verbal assent was obtained, as well as informed consent from the athletes 18 or older (Annex G). They then completed the survey using their personal smartphones, accessing the SurveyMonkey platform through a QR Code provided by the research team, a process that took approximately 15 to 20 minutes.

Data analysis was conducted using SPSS 28v. Initially, reliability analysis was performed to assess the internal consistency of the measures, utilizing Cronbach's alpha. To provide a more detailed description of the data and compare means across related measures, Repeated Measures ANOVA (RM ANOVA) was employed.

For the primary hypothesis testing (Hypotheses 1 through 4), two mediation analyses and a linear regression were conducted. These were specifically performed using Hayes' PROCESS Model 4 for SPSS. To address Research Question 1, independent samples t-tests were utilized. Subsequently, linear regressions were performed to explore Research Question 2.

For all statistical tests, the predetermined level of significance was set at $p<.05$.

Results

Reliability analysis

The internal consistency of the scales measuring various constructs in the study was assessed using Cronbach's alpha, as detailed in Table 4. All scales exhibited satisfactory or good internal consistency, except for the positive reinterpretation and substance use scales, which showed low reliability. Consequently, the four items from these two scales were excluded from further analysis.

Table 4

Reliability analysis using Cronbach's Alpha

Scale	Number of items	Cronbach's α
PMCSQ-2		
TI Climate	16	α=.95
EI Climate	11	α=.86
Effort/Improvement	8	α=.94
Cooperative Learning	4	α=.88
Important Role	4	α=.91
Punishment for Mistakes	4	α=.56
Unequal Recognition	7	α=.80
SAS-2		
Competitive Anxiety	15	α=.95
Somatic Anxiety	5	α=.90
Worry	5	α=.93
Concentration Disruption	5	α=.88
BriefCOPE		
Active coping	2	α=.72
Planning	2	α=.64
Instrumental Support	2	α=.81
Emotional Support	2	α=.83
Religion	2	α=.69
Positive Reinterpretation	2	α=.41
Self-blame	2	α=.64
Acceptance	2	α=.74
Venting	2	α=.82
Denial	2	α=.74
Self-distraction	2	α=.74
Behavior disengagement	2	α=.84
Substance use	2	α=.00
Humor	2	α=.74

Descriptive Statistics

Descriptive statistics for the study variables are presented in Appendix A (Table ApA1). To further understand the characteristics of each variable and to compare means across related measures, a series of repeated measures ANOVAs were conducted (detailed in Appendix A, Table ApA2).

These analyses revealed that athletes reported significantly greater perceptions of a TI climate compared to an EI climate ($p<.001$). Within the TI climate, athletes also reported

significantly higher levels on the important role subscale than on the effort/improvement ($p=.003$) and cooperative learning ($p<.001$) subscales. Reports of EI climate's subscale of punishment for mistakes were also significantly higher than reports of unequal recognition ($p<.001$)

Participants demonstrated significantly different levels across the components of competitive anxiety. Concentration disruption was the least reported component, showing significantly lower levels compared to both somatic anxiety ($p<.001$) and worry ($p<.001$). Conversely, somatic anxiety emerged as the most reported component, with significantly higher levels than both worry ($p<.001$) and concentration disruption.

Regarding coping strategies, athletes did not report significantly different use of adaptive versus maladaptive coping strategies. However, within adaptive coping strategies, religion was reported significantly less often ($p<.001$).

Among maladaptive coping strategies, behavioral disengagement was the least utilized strategy when compared to all others ($p<.001$), followed by denial as the second least used strategy ($p<.001$).

Prior to these analyses, initial data screening confirmed that all variables exhibited normal distribution, with skewness and kurtosis values falling within the acceptable range (below ±2).

Mediation Analyses and Variable Relationships

A mediation analysis (Hayes' PROCESS Model 4) was conducted to examine whether adaptive coping strategies mediated the relationship between TI climate and competitive anxiety (Figure 1), as hypothesized in H4. This analysis also provided path coefficients relevant to H1.

The findings (detailed in Table 5) indicated that TI climate significantly predicted adaptive coping, demonstrating a positive association. Additionally, the total effect of TI climate on competitive anxiety was significant and negative. However, within this model, adaptive coping did not exhibit a significant association with competitive anxiety, resulting in a non-significant indirect effect through adaptive coping.

Figure 1

Model of mediation between adaptive coping strategies, TI climate and competitive anxiety

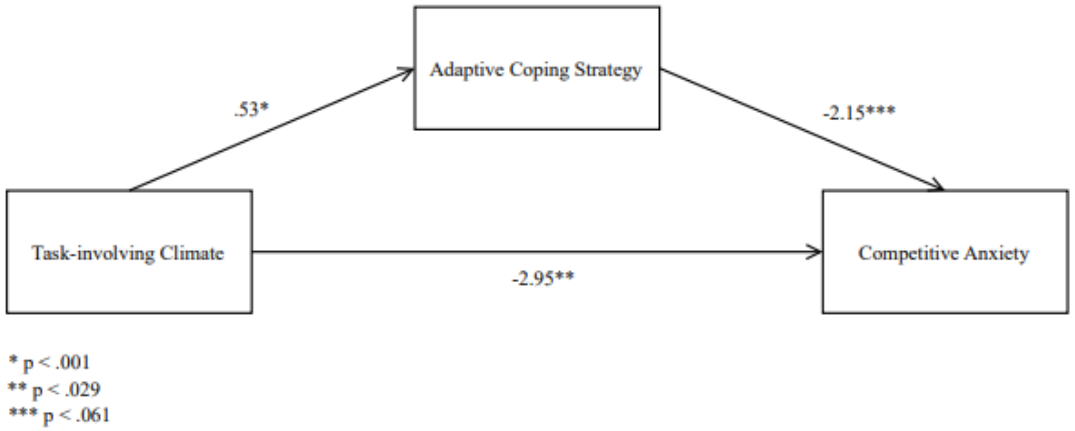

Table 5

Results of mediation analysis to explore if adaptive coping strategies mediate the relationship between TI climate and competitive anxiety

	Path Coeficients				Indirect		
	β	t	p	R^2	Effect	BootSE	95% CI
TI Climate → Adaptive Coping	.53	5.15	< .001	.20			
Adaptive Coping → Competitive Anxiety	-2.95	-2.22	.029	.13			
TI Climate → Competitive Anxiety	-2.15	1.90	.061	.10			
TI Climate → Adaptive Coping → Competitive Anxiety					-1.20	.85	[-3.09; .31]

A subsequent mediation analysis was performed to examine whether maladaptive coping strategies mediated the relationship between EI climate and competitive anxiety (Figure 2).

Figure 2

Model of mediation between maladaptive coping strategies, EI climate and competitive anxiety

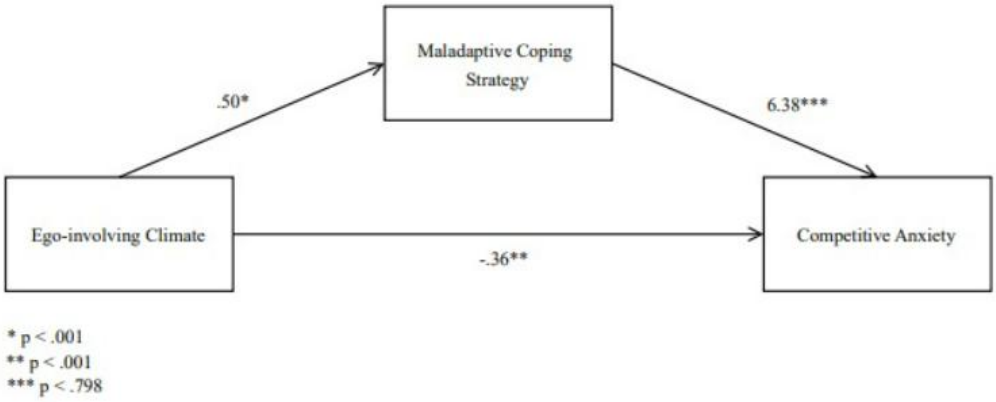

Table 6

Results of mediation analysis to explore if maladaptive coping strategies mediate the relationship between EI climate and competitive anxiety

	Path Coefficients				Indirect		
	β	t	p	R^2	Effect	BootSE	95% CI
EI Climate → Maladaptive Coping	.50	3.00	< .001	.08			
Maladaptive Coping → Competitive Anxiety	6.38	8.05	< .001	.40			
EI Climate → Competitive Anxiety	-.36	.26	.798	.40			
EI Climate → Maladaptive Coping → Competitive Anxiety					3.16	1.20	[.797; 5.551]

This procedure (detailed in Table 6) revealed a significant positive association between EI climate and both maladaptive coping strategies and competitive anxiety. While the direct effect of EI climate on competitive anxiety proved not significant in this model the

indirect effect through maladaptive coping strategies proved to be significant, suggesting full mediation.

Finally, in a linear regression to assess H3, the relationship between adaptive coping and competitive anxiety proved significant and negative, as detailed in table 7.

Table 7

Linear regression with adaptive coping strategies and competitive anxiety

Competitive Anxiety	β	t	p	R^2
Adaptive Coping	-.30	-3.19	.002	.09

Differences in Variables According to Age Groups and Competitive Levels

To investigate age-related differences, athletes were categorized into two groups for independent samples t-tests: younger athletes (under 15 years old, N=57) and older athletes (15 years or older, N=49). Significant differences emerged in the worry component of competitive anxiety, with older athletes reporting significantly higher levels (M=18.23, SD=2.6) than younger athletes (M=16.77, SD=4.06). Additionally, a difference was observed in the coping strategy of acceptance, where younger athletes reported more frequent use (M=5.69, SD=1.43) compared to older athletes (M=5.62, SD=1.64). The full results are available in Appendix B (Table ApB1).

To explore differences based on competition level, athletes were divided into two groups: low competitive level (athletes from base and second division, N=72) and high competitive level (athletes from first division and elite, N=34). Differences were found in the punishment subscale of EI climate, with athletes at a high competitive level reporting higher scores (M=3.20, SD=.63) than those at a low competitive level (M=2.91, SD=.45). Furthermore, high competitive level athletes demonstrated greater use of adaptive coping strategies (M=5.55, SD=1.11) compared to low competitive level athletes (M=5.27, SD=.86). This pattern was also evident for the strategy of instrumental support (M=5.47, SD=2.08; M=5.31, SD=1.70). Conversely, behavioral disengagement was reported more by low competitive level athletes (M=3.43, SD=1.54) than by high competitive level athletes (M=2.94, SD=.95). The full results are available in Appendix C (Table ApC1).

Variable Relationships, Within Age Groups and Competitive Levels

To address Research Question 2, further linear regressions were conducted to investigate potential differences in the associations among motivational climates, competitive anxiety, and coping strategies based on athletes' age and competitive level.

For the younger athlete group (under 15 years old, N=59), all previously observed significant associations were maintained, with slightly larger effect sizes. Comprehensive results for this group are provided in Appendix B (Table ApB2). Conversely, among older athletes (15 years or older, N=47), the only significant association identified was a positive relationship between TI climate and adaptive coping strategies. Detailed analyses for this group can also be found in Appendix B (Table ApB3).

Analysis within a low competitive level (base and second division, N=72) revealed results largely consistent with the overall findings, with exception of the association between EI climate and competitive anxiety that is not significan. Full details of this analysis are available in Appendix C (Table ApC2). For athletes at a high competition level (first division and elite, N=34), TI climate was only significantly associated with adaptive coping while EI climate proved all relationships previously found in other groups, with, however, a non-significant association with adaptive coping. Detailed analyses can be found in Appendix C (Table ApC3).

Discussion

This study aimed to unravel the interplay between perceived motivational climate, competitive anxiety and coping strategies among Portuguese acrobatic gymnastics athletes. The investigation also explored the influence of age and competitive level in those associations.

Motivational Climate and Its Impact

Results showed that athletes with greater perceptions of TI motivational climate had lower levels of competitive anxiety and more often used adaptive coping strategies, fully supporting Hypothesis 1. This aligns with prior research highlighting that climates

emphasizing effort, learning, and cooperation foster adaptive outcomes (Fry et al., 2021; Hogue et al., 2017; Seifriz et al., 1992). The overall higher perception of a TI climate among athletes is promising, suggesting coaches largely cultivate growth-oriented environments.

Conversely, Hypothesis 2 posited that greater perceptions of EI motivational climate would be related to higher levels of competitive anxiety and to the use of more maladaptive coping. This was found to be significant and true for this study, confirming the detrimental effects of environments prioritizing social comparison and outperforming others (Duda, 2005; Morales-Sánchez et al., 2022).

Competitive Anxiety and Coping Strategies

Findings on competitive anxiety components revealed that somatic anxiety was the most reported, followed by worry, with concentration disruption being the least reported. This multidimensional understanding aligns with Martens and colleagues' (1990) theory. The prominence of somatic anxiety, involving physiological symptoms, is particularly relevant in acrobatic gymnastics due to its high-risk, precision-demanding nature (Grossbard et al., 2009). While worry was less frequent, its presence indicates the expected cognitive apprehension about performance outcomes (Martens et al., 1990; Smith et al., 2006).

Interestingly, when it came to coping, athletes did not report significantly different overall use of adaptive versus maladaptive strategies, suggesting a mixed coping repertoire within the sample. Religion was significantly less reported among adaptive strategies, which might be a cultural or sport-specific trend. Positively, behavioral disengagement and denial were the least utilized maladaptive strategies, which are typically considered less effective (Meyer, 2001).

Supporting Hypothesis 3, the use of adaptive coping strategies was associated with lower levels of competitive anxiety. This highlights the crucial role of effective coping in managing sport-related emotional distress (Lazarus & Folkman, 1984; Ribeiro & Rodrigues, 2004), also reaffirming that adaptive strategies like active coping, instrumental support, planning, acceptance, and positive reframing likely contribute to positive adjustment and well-being (Carver et al., 1989; Rodrigues et al., 2022).

The mediating role of coping strategies

Hypothesis 4, which proposed that motivational climates would impact competitive anxiety through coping strategies, was partially supported.

For the TI climate and competitive anxiety relationship, adaptive coping strategies did not act as a mediator. Although a TI climate promoted adaptive coping and reduced anxiety, its anxiety-reducing effects may operate through other, more direct pathways, such as fostering a sense of control and competence (McArdle & Duda, 2002; Papaioannou & Kouli, 1999).

However, the second part of Hypothesis 4 was fully supported: EI climate is related to higher levels of competitive anxiety entirely through its significant promotion of maladaptive coping strategies. This crucial finding suggests that the heightened competitive anxiety linked to EI climates is largely explained by athletes' increased reliance on ineffective, maladaptive coping mechanisms in this type of climate. This aligns with prior research (Ntoumanis et al., 1999) and emphasizes the importance of developing adaptive coping skills, especially in normatively judged environments.

Differences Across Age and Competitive level

Exploration of individual and contextual factors revealed several key findings. Regarding age-related differences, older athletes reported significantly higher levels of worry than younger athletes. This contrasts with some previous findings (Dias et al., 2010) but aligns with research suggesting that higher levels of competition can increase cognitive components like worry in older athletes, related to fear of negative evaluation (Daumiller et al., 2022; Kavussanu et al., 2011). Younger athletes, conversely, reported more frequent use of acceptance as a coping strategy, potentially indicating a developmental difference in emotional regulation.

For competitive level differences, athletes at a highly competitive level reported higher scores on the punishment subscale of EI climate compared to those at a low competitive level. This may reflect the increased performance pressure and stricter training often accompanying higher competitive levels (Brand et al., 2012; Daumiller et al., 2022). Furthermore, highly competitive level athletes demonstrated greater overall use of adaptive coping strategies, particularly instrumental support, than low competitive level athletes. This

suggests that advanced gymnasts may have developed a more sophisticated and effective repertoire of coping skills, potentially contributing to their success. Conversely, behavioral disengagement was reported more by low competitive level athletes, indicating a less adaptive response to stress in this group, consistent with findings for less experienced athletes (Dias et al., 2010).

When examining associations between variables across age groups, the younger athlete group maintained all previously observed significant associations, often with larger effect sizes, suggesting a more straightforward relationship between climate, anxiety, and coping. For older athletes, however, the only significant association found was that greater perceptions of TI climate are associated with more use of adaptive coping strategies. This indicates that while TI climates still promote adaptive coping in older gymnasts, their overall psychological responses might be more complex or influenced by unmeasured factors, or their often more extensive experience may have contributed to developing more stable coping repertoire (Carver et al., 1989; Holahan & Moos, 1987).

Regarding relationships across competitive levels, the low competitive level group largely mirrored the overall findings, with the exception that the association between ego-involving climate (EI) and competitive anxiety was not significant in this cohort. This non-significant link might suggest that at lower competitive levels, where stakes may be perceived as less critical, the negative aspects of an EI climate (e.g., emphasis on normative comparison, fear of punishment) do not translate as strongly or directly into heightened anxiety as they might in more high-pressure contexts.

For athletes of a high competitive level, distinct patterns emerged. Here, TI climate was only significantly associated with adaptive coping. This suggests that while a TI climate continues to promote adaptive coping strategies, its direct influence on anxiety might operate through more complex pathways. Conversely, EI climate demonstrated all relationships previously found in other groups. This reinforces the detrimental impact of EI climates on maladaptive coping and competitive anxiety (Fry & Gano-Overway, 2010; Ntoumanis et al., 1999), aligning with the notion that higher competitive levels often involve increased performance pressure and elevated stress risk (Brand et al., 2012; Daumiller et al., 2022).

Despite its relevance, this study presents several limitations. The relatively reduced number of participants may have limited the statistical power to detect smaller effects and

nuanced relationships. This, coupled with the sample's composition – notably its very few male participants and limited representation of older or senior-level athletes – restricts the generalizability of findings and a deeper examination of gender, age, experience, and competition level differences. Thus, future studies should prioritize larger, more balanced, and diverse samples. Additionally, its cross-sectional design primarily allows for analyzing associations, restricting causal interpretations; future research would significantly benefit from the exploration of cause-effect relationships through other study designs. Furthermore, reliance on self-report measures may introduce social desirability bias, and necessary instrument adaptations could affect their psychometric properties. Therefore, multi-informant designs and qualitative approaches are recommended for a deeper understanding of athletes' psychological experiences.

Beyond methodological improvements, our findings highlight specific avenues for practical application. The observed higher ratings for the important role subscale within TI climates suggest an opportunity to further emphasize process-oriented values in training. Moreover, the heightened perception of punishment for mistakes over unequal recognition within EI climates points to a critical area for coach development. Finally, exploring additional moderating variables, such as individual goal orientations or team cohesion, could further unravel the complex interplay between motivational climate, competitive anxiety, and coping strategies.

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Annex A

Competitive categories and divisions of acrobatic gymnastics

Table A1

Access ages of competitive categories and divisions, as defined by the FGP (2023b)

Division / Category	Base	Second Division	First Division	Elite
Iniciado (Aspire)	8-15 years old	8-15 years old	-	-
Juvenil (Pre-Youth)	9-16 years old	9-16 years old	10-16 years old	-
Júnior (Junior)	10-18 years old	10-18 years old	12-19 years old	12-19 years old*
Sénior (Senior)	≥ 12 years old	≥ 12 years old	≥ 14 years old	≥ 14 years old*

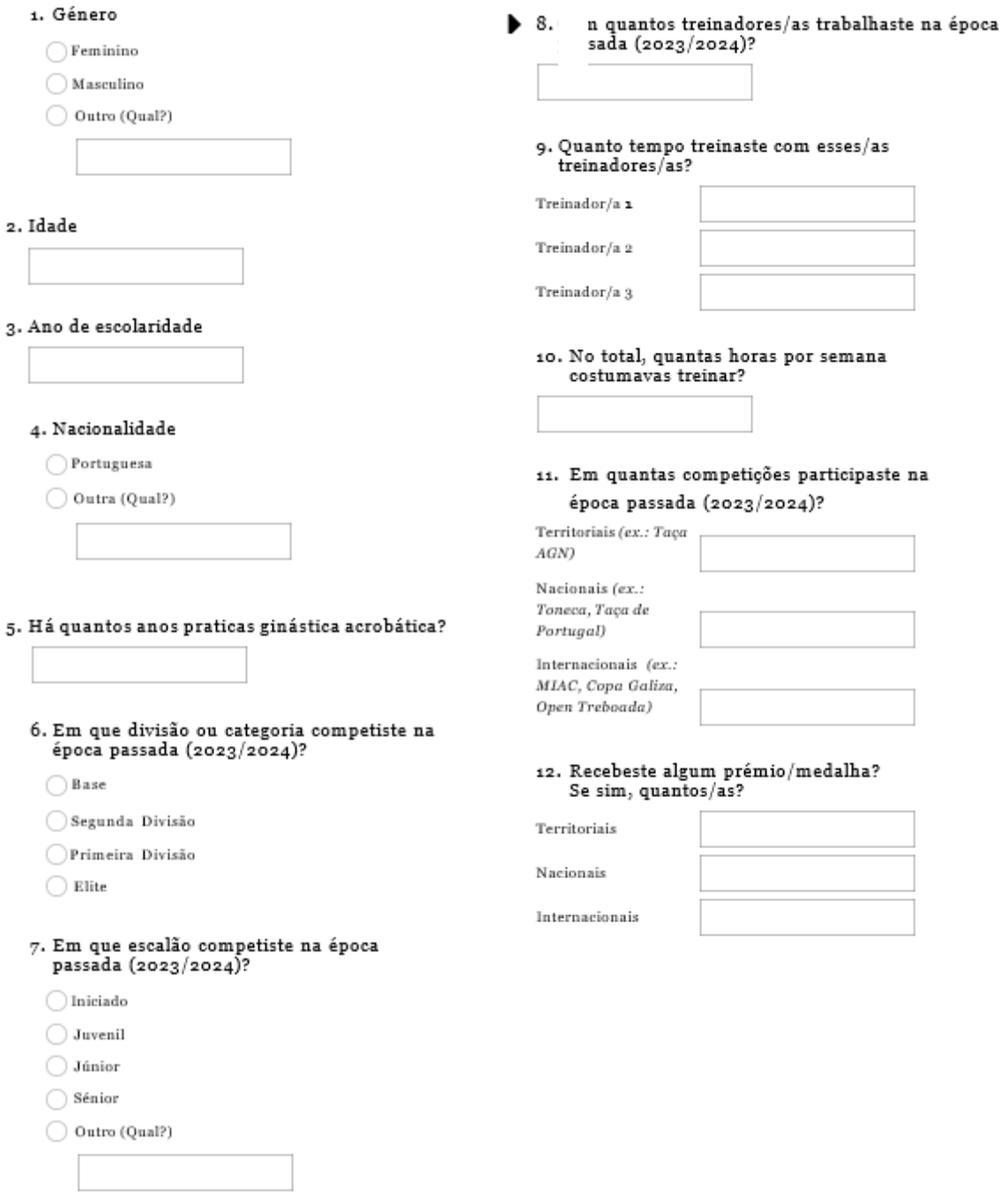
*Access dependent on technical classifications

Annex B

Full protocol

Figure B1

Sociodemographic information section retrieved from SurveyMonkey platform



1. Género
   - Feminino
   - Masculino
   - Outro (Qual?)

2. Idade

3. Ano de escolaridade

4. Nacionalidade
   - Portuguesa
   - Outra (Qual?)

5. Há quantos anos praticas ginástica acrobática?

6. Em que divisão ou categoria competiste na época passada (2023/2024)?
   - Base
   - Segunda Divisão
   - Primeira Divisão
   - Elite

7. Em que escalão competiste na época passada (2023/2024)?
   - Iniciado
   - Juvenil
   - Júnior
   - Sénior
   - Outro (Qual?)

8. n quantos treinadores/as trabalhaste na época sada (2023/2024)?

9. Quanto tempo treinaste com esses/as treinadores/as?
   - Treinador/a 1
   - Treinador/a 2
   - Treinador/a 3

10. No total, quantas horas por semana costumavas treinar?

11. Em quantas competições participaste na época passada (2023/2024)?
    - Territoriais *(ex.: Taça AGN)*
    - Nacionais *(ex.: Toneca, Taça de Portugal)*
    - Internacionais *(ex.: MIAC, Copa Galiza, Open Treboada)*

12. Recebeste algum prémio/medalha? Se sim, quantos/as?
    - Territoriais
    - Nacionais
    - Internacionais

Figure B2-B5

Adapted PMCSQ-2 section retrieved from SurveyMonkey platform

Motivação

Por favor, pensa no que sentiste ao competir na tua equipa durante a época 2023/2024. É assim habitualmente na tua equipa? Lê as frases seguintes com cuidado e responde de acordo com a tua opinião sobre o ambiente na tua equipa. Portanto, leva o tempo que quiseres e responde o mais honestamente possível. Assinala o algarismo que melhor representa aquilo que sentes.

1. O/a treinador/a quer que nós experimentemos novas técnicas.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

2. O/a treinador/a zanga-se quando um/a atleta comete um erro.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

3. O/a treinador/a presta a maior parte da atenção aos/às melhores atletas.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

4. Todos/as os/as atletas contribuem de forma importante.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

5. O/a treinador/a acredita que todos/as somos vitais para o sucesso da equipa.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

6. O/a treinador/a felicita os/as atletas apenas quando têm um desempenho melhor do que os companheiros de equipa.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

7. O/a treinador/a pensa que só os/as mais experientes contribuem para o sucesso da equipa.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

8. Os/as atletas sentem-se bem quando dão o seu melhor.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

9. Os/as atletas são substituídos/as por cometerem erros.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

10. Todos/as atletas desempenham um papel importante, seja qual for o seu nível técnico.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

11. Os/as atletas ajudam-se uns aos outros para melhorar.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

12. Os/as atletas são encorajados/as a serem melhores do que os outros.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

13. O/a treinador/a tem os/as seus/suas atletas favoritos/as.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

14. O/a treinador/a preocupa-se com o aperfeiçoamento das técnicas em que os/as atletas não são bons/boas.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

23. Os/as atletas ficam “malucos/as” quando desempenham melhor do que os/as companheiros/as.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

24. Quem quiser competir tem de ser um/uma dos/das melhores atletas.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

25. O/a treinador/a confere sempre importância a quem dá o seu melhor.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

26. Só os/as melhores atletas merecem a atenção do/a treinador/a.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

27. Os/as atletas têm medo de cometer erros.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

28. Os/as atletas são encorajados/as a trabalhar os seus pontos fracos.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

29. O/a treinador/a favorece alguns/algumas atletas mais do que outros/as.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

30. O essencial é melhorar em cada treino e em cada competição.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

31. Os/as atletas trabalham realmente juntos, como uma equipa.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

32. Cada atleta sente-se um membro importante da equipa.

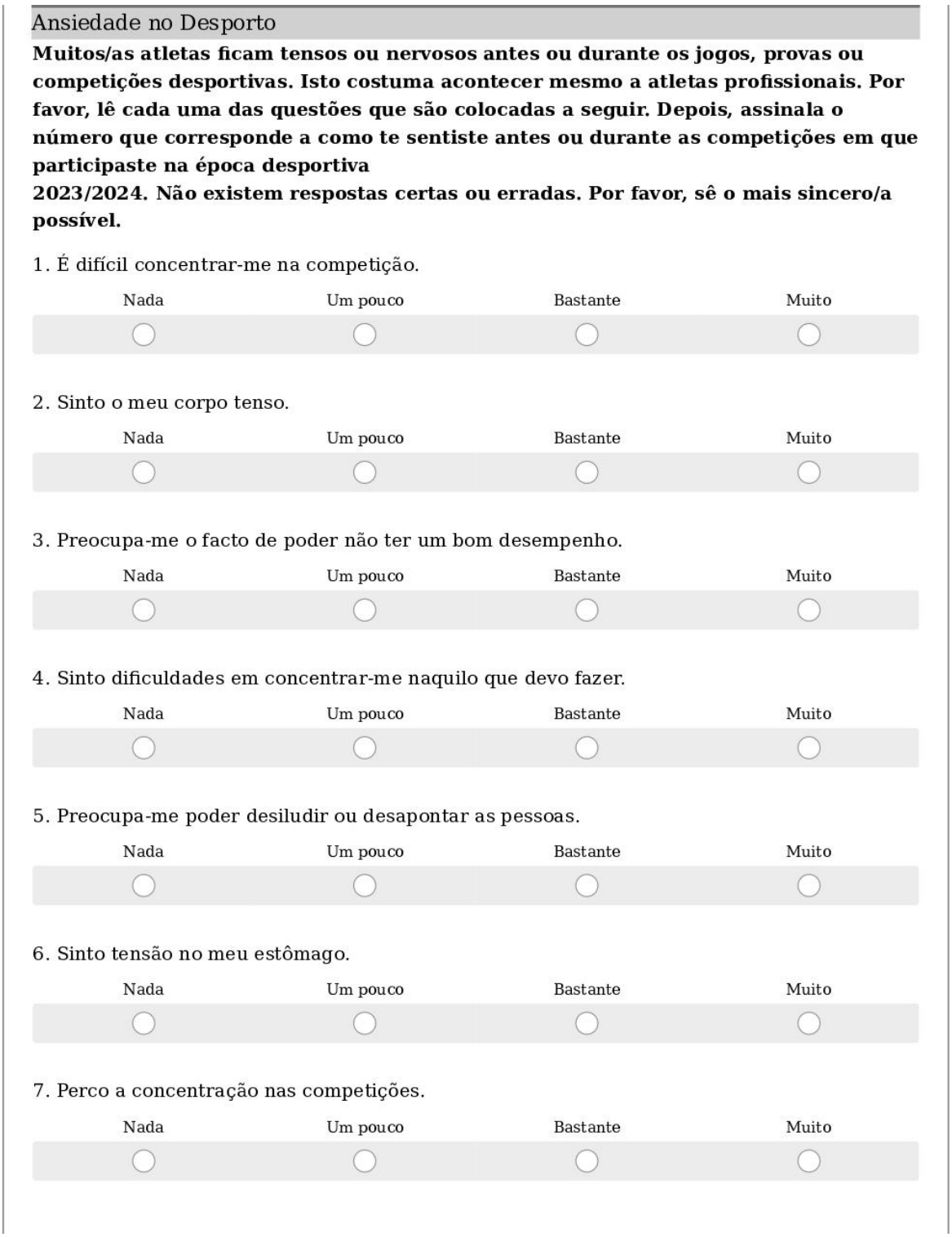
Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

33. Os/as atletas ajudam-se uns aos outros/as para melhorarem e se superarem.

Discordo totalmente	Discordo	Nem concordo, nem discordo	Concordo	Concordo totalmente
○	○	○	○	○

Figures B6-B7

Adapted SAS-2 retrieved from SurveyMonkey platform



Ansiedade no Desporto

Muitos/as atletas ficam tensos ou nervosos antes ou durante os jogos, provas ou competições desportivas. Isto costuma acontecer mesmo a atletas profissionais. Por favor, lê cada uma das questões que são colocadas a seguir. Depois, assinala o número que corresponde a como te sentiste antes ou durante as competições em que participaste na época desportiva 2023/2024. Não existem respostas certas ou erradas. Por favor, sê o mais sincero/a possível.

1. É difícil concentrar-me na competição.

Nada | Um pouco | Bastante | Muito

2. Sinto o meu corpo tenso.

Nada | Um pouco | Bastante | Muito

3. Preocupa-me o facto de poder não ter um bom desempenho.

Nada | Um pouco | Bastante | Muito

4. Sinto dificuldades em concentrar-me naquilo que devo fazer.

Nada | Um pouco | Bastante | Muito

5. Preocupa-me poder desiludir ou desapontar as pessoas.

Nada | Um pouco | Bastante | Muito

6. Sinto tensão no meu estômago.

Nada | Um pouco | Bastante | Muito

7. Perco a concentração nas competições.

Nada | Um pouco | Bastante | Muito

8. Eu preocupo-me com o facto de poder não competir ao meu melhor nível.

Nada	Um pouco	Bastante	Muito
○	○	○	○

9. Eu preocupo-me com o facto de poder ter um mau desempenho.

Nada	Um pouco	Bastante	Muito
○	○	○	○

10. Sinto os meus músculos trémulos (a tremer).

Nada	Um pouco	Bastante	Muito
○	○	○	○

11. Eu preocupo-me com o facto de "poder fazer asneiras" ou "estragar tudo" durante as competições.

Nada	Um pouco	Bastante	Muito
○	○	○	○

12. Sinto o meu estômago indisposto ("às voltas").

Nada	Um pouco	Bastante	Muito
○	○	○	○

13. Eu não consigo pensar claramente durante as competições.

Nada	Um pouco	Bastante	Muito
○	○	○	○

14. Sinto os meus músculos "duros" ou rígidos (tensos) porque estou nervoso/a.

Nada	Um pouco	Bastante	Muito
○	○	○	○

15. Eu passo uma "data de tempo" a tentar concentrar-me naquilo que o/a treinador/a me disse para fazer.

Nada	Um pouco	Bastante	Muito
○	○	○	○

Figures B8-B10

Adapted Brief COPE retrieved from SurveyMonkey platform

Estratégias para lidar com problemas

Por favor, lê cada uma das questões que são colocadas a seguir. Responde sobre o modo como lidas com os problemas da vida, nomeadamente as competições desportivas em que participaste na época desportiva 2023/2024.

1. Concentro os meus esforços para fazer alguma coisa que me permita enfrentar a situação.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

2. Tomo medidas para tentar melhorar a minha situação (desempenho).

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

3. Tento encontrar uma estratégia que me ajude no que tenho de fazer.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

4. Penso muito sobre a melhor forma de lidar com a situação.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

5. Peço conselhos e ajuda a outras pessoas para enfrentar melhor a situação.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

6. Peço conselhos e ajuda a pessoas que passaram pelo mesmo.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

7. Procuro apoio emocional de alguém (família, amigos).

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

8. Procuro o conforto e compreensão de alguém.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

9. Tento encontrar conforto na minha religião ou crença espiritual.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

10. Tento analisar a situação de maneira diferente, de forma a torná-la mais positiva.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

11. Rezo ou medito.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

12. Tento analisar a situação de maneira diferente, de forma a torná-la mais positiva.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

13. Procuro algo positivo em tudo o que está a acontecer.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

14. Faço críticas a mim próprio/a.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

15. Culpo-me pelo que está a acontecer.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

16. Tento aceitar as coisas tal como estão a acontecer.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

17. Tento aprender a viver com a situação.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

18. Fico aborrecido/a e expresso os meus sentimentos (emoções).

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

19. Sinto e expresso os meus sentimentos de aborrecimento.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

20. Tenho dito para mim próprio/a: "isto não é verdade".

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

21. Recuso-me a acreditar que isto esteja a acontecer desta forma comigo.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

22. Refugio-me noutras atividades para me abstrair da situação

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

23. Faço outras coisas para pensar menos na situação, tal como ir ao cinema, ver TV, ler, sonhar, ou ir às compras

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

24. Desisto de me esforçar para obter o que quero.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

25. Simplesmente desisto de tentar atingir o meu objetivo.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

26. Refugio-me no álcool ou noutras drogas (comprimidos, etc.) para me sentir melhor.

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

27. Uso álcool ou outras drogas (comprimidos) para me ajudar a ultrapassar os problemas

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

28. Enfrento a situação levando-a para a brincadeira

Nunca faço isto	Faço isto poucas vezes	Faço isto com frequência	Faço sempre isto
○	○	○	○

Annex C

Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto's ethics committee approval letter

Figure C1

Ethics committee approval letter

U.PORTO
FACULDADE DE PSICOLOGIA E DE CIÊNCIAS DA EDUCAÇÃO UNIVERSIDADE DO PORTO

COMISSÃO DE ÉTICA

PARECER (Ref.ª 2024-10-06b)

A Comissão de Ética (CdE) da Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto, tendo reapreciado os documentos do projeto de investigação denominado **"A relação entre a perceção do clima motivacional no desporto, a ansiedade e as estratégias de *coping* em atletas de ginástica acrobática",** submetidos para apreciação ética por **Sofia Brandão** e com orientação **da Profª Doutora Luísa Faria**, emitiu um **Parecer Favorável** à realização da pesquisa.

Parecer favorável
A CdE é favorável à realização do projeto tal como apresentado.

FPCEUP, 07 de janeiro de 2025

O Presidente da CdE,

Prof. Doutor Rui Alexandre Alves

Rua Alfredo Allen – 4200-135 – Porto – Portugal - TEL.: 351 226079700 – FAX: 351 226079725 –URL: www.fpce.up.pt

Annex D

Email sent to AGN to request their collaboration

Ex.mo Sr. Presidente da Direção da Associação de Ginástica do Norte (AGN),

Apresento a V. Exa. as melhores saudações pessoais e desportivas.
O meu nome é Sofia Brandão e sou estudante do Mestrado de Psicologia na Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto (FPCEUP). Estou atualmente a desenvolver a minha dissertação de mestrado, sob a orientação da Prof.ª Luísa Faria da FPCEUP, que visa explorar a relação entre o clima motivacional, a ansiedade no desporto e as estratégias para lidar com a ansiedade em atletas de ginástica acrobática. Na dupla qualidade de finalista do mestrado de Psicologia e de juíza de ginástica acrobática, pretendo, com esta investigação, contribuir para explorar o bem-estar e o rendimento de atletas, gerando informação útil para enriquecer a formação no domínio e sensibilizando os/as atletas para o papel de variáveis pessoais e contextuais no seu desempenho e desenvolvimento desportivo.
A recolha de dados envolve a aplicação de um questionário que abrangerá todos os escalões a partir do Iniciado e se destina a atletas maiores de 11 anos, que tenham participado em competições na época desportiva 2023/24. A vossa colaboração será fundamental nesta etapa, para fazer chegar o convite de participação diretamente às instituições do Norte e respetivos/as treinadores/as.

Deste modo, gostaria de averiguar a possibilidade de enviar, em meu nome e da minha orientadora, um email às instituições e treinadores/as associados à AGN, na modalidade de ginástica acrobática, apresentando o objetivo do estudo e convidando os/as treinadores/as a colaborar, permitindo que me respondam diretamente, caso estejam interessados/as em participar. Para este efeito, irei fornecer um email modelo, que anexo, facilitando o processo.
Desde já agradeço a vossa atenção e estou disponível para esclarecer qualquer questão que julguem necessário, ficando na expectativa de uma resposta favorável.
Com os melhores cumprimentos,

Sofia Brandão & Luísa Faria

Annex E

Email sent to registered coaches, through AGN

Caros/as Treinadores/as,

Apresento a todos/as as melhores saudações pessoais e desportivas.
O meu nome é Sofia Brandão e sou estudante do Mestrado de Psicologia na Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto (FPCEUP).
Estou atualmente a desenvolver a minha dissertação de mestrado, sob a orientação da Prof.ª Luísa Faria da FPCEUP, que visa explorar a relação entre o clima motivacional, a ansiedade no desporto e as estratégias para lidar com a ansiedade em atletas de ginástica acrobática. Na dupla qualidade de finalista do mestrado de Psicologia e de juíza de ginástica acrobática, pretendo, com esta investigação, contribuir para explorar o bem-estar e o rendimento de atletas, gerando informação útil para enriquecer a formação no domínio e sensibilizando os/as atletas para o papel de variáveis pessoais e contextuais no seu desempenho e desenvolvimento desportivo. A vossa colaboração, assim como a dos/as vossos/as atletas, será fundamental para o sucesso desta investigação. A participação dos/as atletas consiste em responder a um breve questionário anónimo, com duração de 15 minutos, que será aplicado presencialmente nas vossas instalações, em data e horário a combinar, de forma a respeitar a rotina de treinos. A recolha de dados envolverá todos os escalões a partir do Iniciado e destina-se a atletas maiores de 11 anos, que tenham participado em competições na época desportiva 2023/24.
Caso estejam interessados em participar, agradeço que entrem em contacto direto comigo, através do email up202005335@up.pt ou do telefone 966 222 142 para discutir os próximos passos e coordenar a aplicação do questionário.

Agradeço desde já a vossa atenção e colaboração neste estudo, que estamos certos poder vir a oferecer contributos para o desenvolvimento dos nossos atletas e da ginástica acrobática em Portugal!
Com os melhores cumprimentos,
Sofia Brandão & Luísa Faria

Annex F

Email sent to parents to obtain informed consent, through coaches

Caro/a encarregado/a de educação,

Informamos que está a decorrer um estudo na nossa Instituição em colaboração com a Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto, destinado a praticantes de ginástica acrobática, com 11 ou mais anos de idade e com participação em competições durante a época desportiva 2023/2024. O objetivo do trabalho é analisar a **relação entre um conjunto de variáveis psicológicas importantes no contexto desportivo.**

A equipa do/a seu/sua educando/a vai ser incluída neste estudo, que irá envolver o preenchimento de um conjunto de questionários adequados à idade do/a seu/sua educando/a, com a duração máxima de 15 minutos, a serem aplicados depois do treino, em articulação com o/a treinador/a. Se não pretender que o/a seu/sua educando/a participe, responda a este email indicando que não autoriza a sua inclusão no estudo.

Realçam-se algumas informações relativamente às condições de participação:

• Só pode participar se tiver 11 ou mais anos de idade e tiver competido na época desportiva 2023/2024;

• A respetiva participação é totalmente voluntária, **anónima e confidencial**, sendo que pode desistir a qualquer momento, sem que isso implique qualquer consequência;

• Os dados recolhidos ao longo do estudo serão tratados de acordo com o novo Regulamento Geral de Proteção de Dados e serão apenas utilizados para fins de investigação, aos quais só as investigadoras responsáveis deste estudo terão acesso;

• Nenhum dado será divulgado a nível individual aos/às participantes ou a terceiros, incluindo treinadores e dirigentes desportivos;

• Caso tenha alguma dúvida sobre o preenchimento, por favor contacte as investigadoras responsáveis através dos e-mails fornecidos abaixo.

• No final do estudo, será convidado/a para uma sessão de divulgação dos resultados.

Agradecemos desde já a sua disponibilidade para colaborar neste estudo.

Investigadores responsáveis:

Sofia Brandão, Estudante de Mestrado em Psicologia Clínica e da Saúde (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto) | Contacto: up202005335@fpce.up.pt

Luísa Faria, Professora Catedrática (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto) | Contacto: lfaria@fpce.up.pt

Annex G

Informed consent for athletes 18 or older

No âmbito da minha Dissertação de Mestrado estou a conduzir um estudo destinado a praticantes de ginástica acrobática, com 11 ou mais anos de idade e com participação em competições durante a época desportiva 2023/2024. O objetivo do trabalho é analisar a **relação entre um conjunto de variáveis psicológicas importantes no contexto desportivo.** Para participar terás apenas de responder a um conjunto de questões, com uma duração estimada de 15 minutos.

Informações relativas às condições de participação:

• Só podes participar se tiveres 11 ou mais anos de idade e tiveres competido na época desportiva 2023/2024;

• A tua participação é totalmente voluntária, **anónima e confidencial** sendo que podes desistir a qualquer momento, sem que isso implique qualquer consequência;

• Os dados recolhidos ao longo do estudo serão tratados de acordo com o novo Regulamento Geral de Proteção de Dados e serão apenas utilizados para fins de investigação, aos quais só as investigadoras responsáveis deste estudo terão acesso;

• Nenhum dado será divulgado a nível individual aos/às participantes ou a terceiros, incluindo treinadores e dirigentes desportivos;

• Caso tenhas alguma dúvida sobre o preenchimento, por favor contacta as investigadoras responsáveis através dos e-mails fornecidos abaixo.

• No final do estudo, serás convidado/a para uma sessão de divulgação dos resultados.

Agradecemos desde já a tua disponibilidade para colaborar neste estudo.

Investigadores responsáveis:

Sofia Brandão, Estudante de Mestrado em Psicologia Clínica e da Saúde (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto) | Contacto: up202005335@fpce.up.pt

Luísa Faria, Professora Catedrática (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto) | Contacto: lfaria@fpce.up.pt

Consentimento informado:

Declaro que li e compreendi as informações acima apresentadas e que, sendo maior de idade,

- ❑ Pretendo participar no estudo.
- ❑ Não aceito participar no estudo.

Appendix A

Descriptive statistics and results from RM ANOVA

Table ApA1

Descriptive statistics

	Min.	Max.	Mean	SD
Motivational Climate				
Task-involving	1	5	4.19	.812
Ego-involving	1	5	2.90	.60
Competitive anxiety	15	60	44,17	10.49
Somatic Anxiety	5	20	17.42	3.56
Worry	5	20	14.56	4.10
Concentration Disruption	5	20	12.19	4.10
Coping Strategies				
Active coping	2	8	6.10	1.41
Planning	2	8	6.03	1.52
Instrumental Support	2	8	5.36	1.82
Emotional Support	2	8	6.09	1.65
Religion	2	8	3.67	1.37
Self-blame	2	8	6.17	1.51
Acceptance	2	8	5.66	1.52
Venting	2	8	5.96	1.78
Denial	2	8	5.07	1.39
Self-distraction	2	8	6.23	1.64
Behavior disengagement	2	8	3.27	1.39
Humor	2	8	4.65	1.56

Table ApA2

Results of RM ANOVAs

Factors	F	DF	p	η^2
Motivational Climate	180.00	(1 , 104)	< .001	.64
Task-Involving Climate				
Ego-Involving Climate				
Task-involving	10.07	(2 , 210)	< .001	.09
Effort/Improvement				
Cooperative Learning				
Important role				
Ego-involving	16.73	(1 , 104)	< .001	.14
Punishment				
Unequal Recognition				
Competitive Anxiety	157.22	(2 , 210)	< .001	.60
Somatic Anxiety				
Worry				
Concentration Disruption				
Coping strategies	.02	(1 , 105)	.883	.00
Adaptive				
Maladaptive				
Adaptive coping	49.31	(6 , 630)	< .001	.32
Active coping				
Planning				
Instrumental Support				
Emotional Support				
Religion				
Humor				
Acceptance				
Maladaptive Coping	105.03	(4 , 420)	< .001	.50
Venting				
Denial				
Self-distraction				
Behavior disengagement				
Self-blame				

Appendix B
Full analysis within age groups

This appendix contains the comprehensive results of statistical analyses conducted to explore age-related differences. Specifically, it includes independent samples t-tests comparing younger and older age groups across all study variables. Additionally, it presents detailed results from linear regressions that examined the associations between motivational climate (including its components), competitive anxiety (and its dimensions), and coping strategies, stratified by age group. For these analyses, participants were categorized into two distinct groups: younger athletes (under 15 years old, N=59) and older athletes (15 years or older, N=47).

Table ApB1

Independent samples t-tests comparing younger and older athletes

Variables	t	p	d
Motivational Climate			
Task-Involving Climate	1.19	.205	.81
Ego-Involving Climate	2.36	.848	.59
Task-involving			
Effort/Improvement	1.44	.172	.85
Cooperative Learning	1.13	.070	.87
Important role	.58	.693	.88
Ego-involving			
Punishment	2.67	.041	.51
Unequal Recognition	2.17	.944	.75
Competitive Anxiety	-.41	.888	10.53
Somatic Anxiety	-.81	.702	4.07
Worry	-.20	.980	3.58
Concentration Disruption	-.07	.530	4.11
Coping strategies			
Adaptive	1.44	.022	.95

Table ApB1 - Continuation

Independent samples t-tests comparing younger and older athletes

Variables	t	p	d
Maladaptive	-.88	.473	1.07
Adaptive coping			
Active coping	1.35	.261	1.40
Planning	.28	.888	1.53
Instrumental Support	.43	.035	1.83
Emotional Support	-.07	.652	1.66
Religion	-.57	.512	1.38
Humor	2.16	.651	1.53
Acceptance	2.76	.193	1.47
Maladaptive Coping			
Venting	-.90	.340	1.78
Denial	-2.17	.895	1.36
Self-distraction	.80	.859	1.64
Behavior disengagement	-1.71	< .001	1.38
Self-blame	.58	.136	1.51

Table ApB2

Linear regressions with motivational climate and competitive anxiety, motivational climate and coping strategies, in younger athletes

	Competitive anxiety				Adaptive coping strategies				Maladaptive coping strategies			
	β	t	p	R^2	β	t	p	R^2	β	t	p	R^2
Task-Involving Motivational Climate	-.44	-3.65	<.001	.19	.45	3.84	<.001	.21	-.57	-5.19	<.001	.32
Ego-Involving Motivational Climate	.16	1.19	.241	.02	-.10	-.66	.511	.01	.40	3.25	.002	.16

Table ApB3

Linear regressions with motivational climate and competitive anxiety, motivational climate and coping strategies, in older athletes.

	Competitive anxiety				Adaptive coping strategies				Maladaptive coping strategies			
	β	t	p	R^2	β	t	p	R^2	β	t	p	R^2
Task-Involving Motivational Climate	-.13	-.86	.397	.02	.46	3.43	.001	.21	-.07	-.46	.646	.01
Ego-Involving Motivational Climate	.12	.79	.434	0.1	.11	.75	.457	.01	.08	.51	.614	.01

Appendix C

Full analysis within competition levels

This appendix contains the comprehensive results of statistical analyses conducted to explore competitive level differences. Specifically, it includes independent samples t-tests comparing low and high competitive level across all study variables. Additionally, it presents detailed results from linear regressions that examine the associations between motivational climate (including its components), competitive anxiety and coping strategies, stratified by competitive level. For these analyses, participants were categorized into two distinct groups: low competitive level (athletes competing in base or second division, N=72) and high competition level (athletes competing in first division or elite, N=34).

Table ApC1

Independent samples t-tests comparing low and high competitive level

Factors	t	p	d
Motivational Climate			
Task-Involving Climate	.17	.435	.82
Ego-Involving Climate	1.30	.256	.60
Task-involving			
Effort/Improvement	.30	.690	.86
Cooperative Learning	-.01	.477	.87
Important role	.08	.304	.88
Ego-involving			
Punishment	1.19	.762	.53
Unequal Recognition	.82	.460	.76
Competitive Anxiety	1.77	.090	10.39
Somatic Anxiety	1.74	.776	4.03
Worry	2.13	< .001	3.50
Concentration Disruption	.96	.672	4.10
Coping strategies			
Adaptive	.09	.285	.96

Table ApC1 - Continuation

Independent samples t-tests comparing younger and older athletes

Factors	t	p	d
Maladaptive	.92	.430	1.07
Adaptive coping			
Active coping	.001	.639	1.42
Planning	-.17	.088	1.53
Instrumental Support	-.91	.908	1.83
Emotional Support	-.42	.715	1.66
Religion	.36	.560	1.38
Humor	1.44	.255	1.55
Acceptance	-.26	.020	1.52
Maladaptive Coping			
Venting	.41	.756	1.78
Denial	.83	.500	1.39
Self-distraction	.16	.841	1.65
Behavior disengagement	-.12	.290	1.40
Self-blame	1.97	.081	1.49

Table ApC2

Linear regressions with motivational climate and competitive anxiety, motivational climate and coping strategies, for low competition levels.

	Competitive anxiety				Adaptive coping strategies				Maladaptive coping strategies			
	β	t	p	R^2	β	t	p	R^2	β	t	p	R^2
Task-Involving Motivational Climate	-.42	-3.82	<.001	.17	.40	3.56	<.001	.15	-.51	-4.89	<.001	.26
Ego-Involving Motivational Climate	.16	1.38	.173	.03	.21	1.79	.079	.04	.31	2.68	.009	.09

Table ApC3

Linear regressions with motivational climate and competitive anxiety, motivational climate and coping strategies, for high competition level.

	Competitive anxiety				Adaptive coping strategies				Maladaptive coping strategies			
	β	t	p	R^2	β	t	p	R^2	β	t	p	R^2
Task-Involving Motivational Climate	-.15	-1.16	.251	.02	.50	4.42	<.001	.25	-.15	-1.20	.237	.30
Ego-Involving Motivational Climate	.27	2.21	.031	.075	.013	.100	.100	.00	.32	2.61	.011	.10