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ORIGINAL RESEARCH

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Stress, anxiety and personality in male windsurfers

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Abstract

Background: This qualitative study aims to examine stress and anxiety levels, their sources and coping strategies among male windsurfing athletes, investigates the relationship between personality traits and the management of stress and anxiety, and develop a comprehensive profile of male windsurfers by exploring the interplay between personality, stress and anxiety. **Methods**: Open-ended interviews were conducted with competitive male windsurfers to allow them to discuss their personal experiences with stress, anxiety and the coping strategies they use in response to these challenges. **Results**: The findings suggest that stress and anxiety in windsurfers are primarily influenced by uncontrollable external factors, including environmental changes, equipment malfunctions and injuries. However, anxiety appears more context-specific, often arising from factors such as lack of confidence, inexperience with new maneuvers or locations, and fear of damaging equipment. We also observed that personality traits such as competitiveness, resilience, mental flexibility and openness to new experiences significantly impact how athletes manage stress and anxiety. Individuals with positive personality traits, such as resilience and mental flexibility, typically use coping strategies like self-talk, singing and seeking support from others. In contrast, those with more adventurous and risk-taking tendencies often relied on their connection to nature for stress management. Additionally, personality traits were found to be important predictors of performance, with individuals who were competitive, determined and psychologically flexible demonstrating better performance outcomes in the sport. **Conclusions**: The findings highlight the significant role of personality traits in psychological resilience, mental health and performance in adventure sports. Personality is a key factor in managing stress and anxiety, as well as enhancing performance in windsurfing.

Keywords

Stress; Worry; Male athletes; Surfing

1. Introduction

It has been reported that approximately 18% of the global population suffers from anxiety disorders annually [1]. Neuroscience and psychology research suggests that individuals with higher emotional and mental resilience are better equipped to manage anxiety effectively [2]. Resilience enables individuals to overcome stress, recover from adversity, and adapt to challenges [3] and participation in sports has been shown to enhance mental resilience, aiding in the management of stress and anxiety [4], indicating that resilience and mental health should not be considered in isolation. However, it is important to note that athletes often experience mental health disorders, including anxiety, panic disorders, stress, and specific phobias [5, 6]. In the context of sports performance, anxiety and stress are particularly significant psychological factors, especially in competitive environments [7–9]. The impact of different types of sports on stress and anxiety levels has been previously investigated [10], and Salleh *et al*. [11] reported that elements such as team spirit, shared responsibility and trust among teammates contribute to psychological comfort in team sports. However, this may not apply to individual sports, such as windsurfing, where athletes compete independently. As individual athletes, windsurfers must possess strong concentration and mental resilience to cope with the outcomes of success or failure on their own. Despite these demands, research has indicated that individual sports are associated with fewer positive social and psychological outcomes compared to team sports [12]. Athletes in individual sports may face various stress and anxiety factors during both training and performance. For example, sports that are directly observed and evaluated by referees or critiqued by peers can contribute to increased performance anxiety [13]. In addition, Beidler *et al*. [14] found that anxiety in gymnastics impaired balance and reduced athletic performance. Furthermore, the increased focus on personal performance and goal achievement in individual sports may

further heighten stress and anxiety levels [15].

In the context of windsurfing, both intrinsic and extrinsic factors, such as wind direction and intensity, seasons, weather conditions, equipment and personality traits, are believed to influence athletes' levels of stress and anxiety, raising the question of whether personality traits and emotional states significantly affect participation in windsurfing. In this regard, studies by Habib *et al*. [16] and Kemarat *et al*. [17] have shown that personality is a key predictor of sports performance. Individuals with a high need for excitement and adventure are often drawn to extreme sports [18], and over time, they may seek greater thrills due to desensitization to previous levels of excitement [19]. Tofler *et al*. [20] found that individuals tend to push their perceived limits in pursuit of thrill-seeking, which explains this phenomenon [21]. Extreme sports, such as surfing, skateboarding, mountain sports and snow sports, are all characterized by this need for heightened experiences [22]. Windsurfing, as an extreme sport, may reflect a psychological need linked to personality traits. Furthermore, engaging in windsurfing fosters courage and positive psychological connections with the natural environment [18], and surfing experiences are known to evoke rewarding feelings and deep pleasure [23]. Despite these positive aspects, windsurfing's demanding nature, which requires continuous adaptation to dynamic conditions [24], underscores the importance of effective stress and anxiety management in response to uncontrollable factors (*e.g.*, currents, winds, seasons) for optimal athletic performance. The significance of this research lies in its focus on understanding not only personality traits but also the strategies athletes use to manage stress and anxiety in response to both controllable and uncontrollable factors.

Previous research on windsurfing mainly investigated aspects such as athlete performance [25], injuries and physical pain [26], destinations [27], windsurfing-specific equipment design [28] and intrinsic motivation [29]. However, qualitative studies investigating the personality traits of windsurfers, their motivations for participation, and their stress and anxiety management strategies are scarce. Herein, our present study aims to address these gaps by exploring how personality traits influence stress and anxiety management in windsurfers by specifically focusing on male, professional-level windsurfing competitors, a population that has not been extensively studied in the context of psychological factors affecting sports performance. By examining this group, we investigate whether certain personality traits are associated with the ability to manage stress and anxiety, and how these traits may influence participation and performance in windsurfing.

It is hypothesized that individuals who experience difficulty in managing stress and anxiety may be less inclined to engage in windsurfing, a sport that requires significant mental resilience. Conversely, it is expected that experienced windsurfers, due to their training and expertise, are better equipped to cope with the challenges posed by stress and anxiety. The findings of this study could inform the development of tailored coaching practices to improve stress management among windsurfing athletes, and highlight the importance of considering individual personality traits during athlete selection and training processes. Additionally, the results could serve as a basis for future research into the cognitive and emotional skills of windsurfers, an area currently underexplored in the existing literature.

2. Materials and methods

2.1 Research design

This study evaluated the stress and anxiety status of male windsurfing athletes using a qualitative approach. A case study design emphasizing understanding the perspectives of the participants and predicting potential discoveries and evaluations from their experiences was employed with the primary goal of identifying underlying factors through in-depth investigation [30]. According to Creswell JW and Creswell JD [30], case study research is a flexible design suitable for exploring a wide range of issues, from program evaluations to examining the factors influencing individuals' behaviors or understanding their needs in specific contexts, and can answer questions such as "How?", "Why?", "When?" and "Who?" [31].

2.2 Participants

The study included 16 male professional windsurfing competitors aged 18 years or older. Based on their self-reports, all participants had participated in at least one competition, and none of them had a diagnosis of any psychological disorders. The participant characteristics are detailed in Table 1. The sample size was determined based on similar studies in the field [32]. The inclusion criteria were as follows: (1) voluntary participation and (2) having a professional sports background. No participants provided responses that were outside the scope of the study's criteria. The participants were selected using purposive sampling, which targeted individuals who were readily accessible and representative of the study's objectives. Only male professional windsurfers with a history of competition were included, while those without competition experience were excluded. The recruitment occurred before the competition season began to ensure participants' current state of readiness and mental preparedness. This study was initiated following the receipt of ethics committee approval on 30 October 2024.

2.3 Data collection

In the initial stage of analysis, each interview was coded using a participant identification label (P [n]). The data were then analyzed through continuous comparison of the demographic information with responses to the semi-structured questions. A fixed comparative analysis method was employed to identify both intra-textual and inter-textual themes. Content analysis, a systematic and objective approach for analyzing textual data, was used to categorize and define key themes within the data [33], which facilitated the synthesis of similar data into coherent concepts and ensured the findings could be reproducible.

The data analysis was conducted using both manual transcription by the researchers and the MAXQDA 2020 software (MAXQDA VERBI Software, Consult, Sozialforschung, GmbH, Berlin, Germany) program. To ensure the validity and reliability of the findings, several methodological criteria were followed. "Validity" was addressed through a thorough review

TABLE 1. Semi-structured themes and questions used for the data collection tool.

Themes	Questions
Stress and anxiety	1. What is your stress level while windsurfing? Can you describe the most stressful moment you have experienced, and how did you manage the situation?
Stress and coping	2. How do you typically manage stress while windsurfing?
Anxiety and performance	3. Are you generally an anxious person? Do you experience anxiety while windsurfing? If so, what specific concerns do you have, and how do they impact your performance?
Self-perception	4. How would you describe your approach to windsurfing (*e.g.*, confident, risk-taking, cautious)? Please explain.
Personality and sport	5. Has windsurfing influenced your personality in any way? Or do you engage in this sport because of specific personality traits?
Personality and performance	6. Do your personality traits influence your performance while windsurfing? If so, how?
Recommendations for participation	7. Who would you recommend windsurfing to? For example, would you suggest it to individuals with stress or anxiety disorders? Please explain why or why not.

of the literature during the preparation of the interview form, ensuring that the research questions were aligned with established scientific knowledge. "Reliability" was ensured through the reproducibility of the findings, with multiple experts independently analyzing the data. Reliability between coders was assessed using inter-rater reliability measures, and Kappa values were calculated to assess the consistency of the coding process. The detailed documentation of all steps in the data analysis process enhances both internal and external reliability, providing transparency and reproducibility for future studies.

2.4 Data analysis

The analysis process began with the coding of the data, where each participant was assigned a unique identifier (P [n]), followed by a comparative approach, where demographic data were continuously cross-referenced with the responses from the semi-structured interview questions. A fixed comparative analysis method was utilized to identify key intra-textual and inter-textual themes. Additionally, content analysis was employed to categorize the data and extract the primary themes. Content analysis is a systematic approach that groups similar data into coherent categories and conceptual themes, making it accessible and reproducible, while facilitating an objective and methodical examination of verbal and written materials [33].

The analysis was conducted using researcher-generated transcriptions and MAXQDA software. To ensure the scientific rigor of the study, both validity and reliability measures were rigorously applied. "Validity" refers to the accuracy of the research findings, while "reliability" concerns the reproducibility and consistency of these findings. To ensure internal validity, the literature was reviewed during the preparation of the interview questions. For external validity, the methodology was documented in detail. In terms of internal reliability, findings were reported both numerically and descriptively, with results presented in tables and annotated. External reliability was ensured by providing comprehensive documentation of all procedures and methods. All analyses were conducted impartially, with multiple experts involved in the coding process. Inter-rater reliability was assessed by calculating Kappa compliance values to ensure consistency across different coders.

3. Results

Table 2 presents the demographic breakdown of the sample group. Of the 16 male windsurfing athletes, 3 were aged 18–22, 10 were aged 22–25 and 3 were aged 25 or older. The average age of participants was 22.53 years (standard deviation (Sd = 2.65). Regarding economic status, 1 participant reported an insufficient income, 10 had an average income and 5 indicated a high-income level, suggesting that the majority of windsurfers in this sample fall within an adequate income range. The primary motivations for engaging in windsurfing were also explored. Most participants (n = 12) reported a passion for extreme sports as the reason for starting windsurfing, while 4 participants indicated that their involvement was influenced by family recommendations. Personality traits were assessed through self-reports, revealing that the majority of participants identified as energetic, sociable and helpful (n = 8) or open to innovation, creative and adventurous (n = 7). Only 1 participant described themselves as competitive, critical and self-prioritizing. These findings suggest that windsurfing athletes tend to exhibit positive and dynamic personality traits, with only a small proportion reporting traits that may be considered more competitive or self-focused.

The content analysis of the stress, anxiety, and personality traits of windsurfing participants was organized into three main themes: "stress", "anxiety" and "personality." These were further subdivided into categories that included sources and management strategies for both stress and anxiety, as well as the impact of personality traits on performance. The results are presented in Table 3. Each main category was expanded into subcategories, supported by specific codes, to facilitate a deeper understanding of the findings. In terms of stress sources, the participants identified several key factors contributing to stress during windsurfing. These included high-speed and dangerous situations (n = 8), unexpected events at sea (n = 10), and the social responsibility toward other surfers, as well as the level of experience required for new maneuvers

TABLE 2. Demographic characteristics of the sample group (P [n]).

Variables	N	Category	*f*	x̄	Sd
Age (yr)	16	18–22	3	22.53	2.65
		22–25	10		
		25+	3		
Economic situation	16	Unsatisfactory(1)	1	2	-
		Average level(2)	10		
		Adequate(3)	5		
Reason for starting windsurfing	16	Family referral(1)	4	2	-
		Love for extreme sports(2)	12		
Personality traits	16	Energetic, sociable, helpful(1)	8	1–2	-
		Open to innovations, creative, adventurous(2)	7		
		Competitive, critical, self-prioritizing(3)	1		

(1): Unsatisfactory; Family referral; Energic, sociable, helpful, (2): Average level; Love for extreme sports; Open to innovations, creative, adventurous, (3): Adequate, Competitive, critical, self prioritizing. Sd: standard deviation.

TABLE 3. Content analysis of windsurfers' stress, anxiety and personality traits.

Theme	Category	Subcategory	*F*	Code (s)
Stress				
	Source of stress	Speed and dangerous situations	8	Depth, wind, hard fall, speed equipment breakdown, difficult movements other marine vessels, wave formation not being noticed at sea, disability
		Contingencies at sea	10	
		Social responsibility and experience level	9	
	Stress management strategies	Self-relaxation techniques	13	Inner talk, asking for help swearing, singing not giving up, imagining the result
		Taking time for breaks and self-reflection	8	
Worry				
	Worry-free	Self-confidence	10	Anxiety when trying new movements harm to self and equipment
	Source of worry	Inexperience-based anxiety	6	
		Anxiety about harm	3	
	Anxiety management techniques	Calming and focusing practices	6	Deep breathing, focus on the result, location recognizing, self-knowledge, risk taking
		A sense of trust in the sea and nature	2	
Stress, anxiety and personality				
	Stress and anxiety management with personality traits	Self-confidence and courage	9	Adrenaline desire, self-confidence, freedom, individuality, sense of competition, self-awareness
		Intrinsic sources of motivation		
	Effects of personality on performance	Personality has no influence on windsurfing performance	5	-
		Personality has an impact on windsurfing performance	11	Being competitive and driven flexible and comfortable personality structures

and unfamiliar locations (n = 9). The stress induced by these factors often involves life-threatening situations, such as the risk of becoming lost at sea, being unnoticed by other vessels or facing sudden increases in wind and wave intensity. These findings highlight the importance of stress management for windsurfers, as these high-risk situations demand both mental and physical adaptation to ensure safety and performance. For example, one participant (K3) shared an account of a particularly stressful experience on the water:

K3: "*I was drifting while surfing, the wind was strong, and I was far out. My board flipped over, my sail was underwater, and I couldn't flip it back. A wave came, and a ship was approaching. I became even more stressed. I called out to my friends, but they didn't hear me. Eventually, someone responded and helped me. I would have been much more stressed if I were alone, but when my friend arrived, I calmed down and managed to surf back to shore.*"

This testimony illustrates how extreme stress can arise from perceived danger and the lack of immediate support. The presence of a helping person significantly alleviates stress, allowing the individual to regain composure and safely navigate back.

Regarding stress management, the participants employed various self-relaxation techniques to cope with stress. Common strategies included positive self-talk, seeking help from others, visualizing success, singing, swearing and reframing stressful situations. Many participants also emphasized the importance of taking breaks and resting to recover. These findings highlight that the management of stress in windsurfing is closely linked to individual mental resilience, psycho-physical balance, and self-confidence. Athletes are largely responsible for regulating these aspects during their performance. For instance, one participant explained their approach to managing stress:

K10: "*I get frustrated when things don't go as planned, but I use positive affirmations to calm myself and stay focused. I rely on techniques I've learned to keep my mind clear and my emotions in check.*"

In the analysis of anxiety, a unique category titled "lack of anxiety" (n = 10) was identified, reflecting the participants' confidence in their windsurfing abilities. This finding contrasts with the stress theme, suggesting that many participants experience minimal anxiety due to their self-assurance. However, anxiety was still present, primarily in relation to specific sources, such as inexperience with new maneuvers (n = 9) and concerns about damaging the equipment (n = 8). These findings indicate that windsurfers remain particularly focused on their physical performance and the preservation of their equipment during moments of anxiety. To manage these anxious moments, participants employed various techniques, including calming focus strategies such as deep breathing and concentrating on the desired outcome. Additionally, participants expressed a strong sense of trust in the sea and nature, which they drew on to help navigate these challenging situations. This trust allows them to approach the inherent risks of windsurfing with excitement rather than fear, ultimately enhancing their enjoyment of the sport's extreme nature. When examining both stress and anxiety together, a consistent theme emerged: the negative emotions associated with attempting new movements or confronting unfamiliar conditions. In response to these emotional challenges, participants applied similar calming and focusing techniques to manage both stress and anxiety. This suggests that these emotional states are closely linked and often influence windsurfers in similar ways during unexpected situations. The shared management strategies indicate that stress and anxiety often co-occur, influencing each other in parallel. For example:

K11: "*When I'm windsurfing, I'm just worried about damaging the material, and sometimes I hesitate to try something new because of that.*"

K12: "*I'm not usually anxious, but I can easily manage any nervousness or stress when surfing.*"

In the analysis of the relationship between stress, anxiety and personality, the category of personality traits and their role in stress and anxiety management revealed that self-confidence, courage and intrinsic motivation sources (n = 9) were identified as key determinants. The subcategories associated with these factors included adrenaline-seeking, self-confidence, freedom, individuality, sense of competition and self-awareness, which reflect the expectations of individuals involved in extreme sports, aligned with their personality traits. Specifically, freedom, adrenaline enjoyment, the desire for individual success and the tendency to understand oneself were identified as intrinsic motivations for athletes who prioritize individuality. In the next category, the effect of personality on performance included participants who indicated that personality did not have a significant impact on their performance (n = 5). However, a higher number of athletes (n = 11) believed that personality did affect their performance, indicating that personality traits may influence performance in windsurfing. In particular, it was observed that athletes who are competitive, determined, maintain cognitive flexibility during unexpected events, and remain calm tend to perform better. Thus, through in-depth analysis, it was determined that the source and management of stress and anxiety, along with the personality traits influenced by these factors, are closely related to windsurfing performance. For instance, some of the participants reported:

K8: "*I am drawn to windsurfing because it aligns with my personality traits. My individualism and competitive nature are the biggest factors in my choice of sport.*"

K13: "*While I can't fully describe how windsurfing impacts my personality, it has certainly helped me recognize more about myself. My self-confidence has grown, I fulfill my need for adrenaline, and I face many challenges that test my courage. If I were to describe this in terms of personality, I would say that windsurfing is a sport perfectly suited to my personality.*"

To better understand the frequency of relaxation techniques employed by male windsurfers during moments of stress and anxiety, a frequency chart was created (Fig. 1). The chart reveals that most male windsurfers utilize various methods, either consciously or unconsciously, to relax. The most commonly used relaxation techniques include engaging in positive self-talk (*e.g.*, Participant 10), singing loudly, seeking help from others within audible range, swearing to suppress anger related to stress, mentally visualizing their success and persisting without giving up. The prevalence of these methods underscores their strong association with mental health and

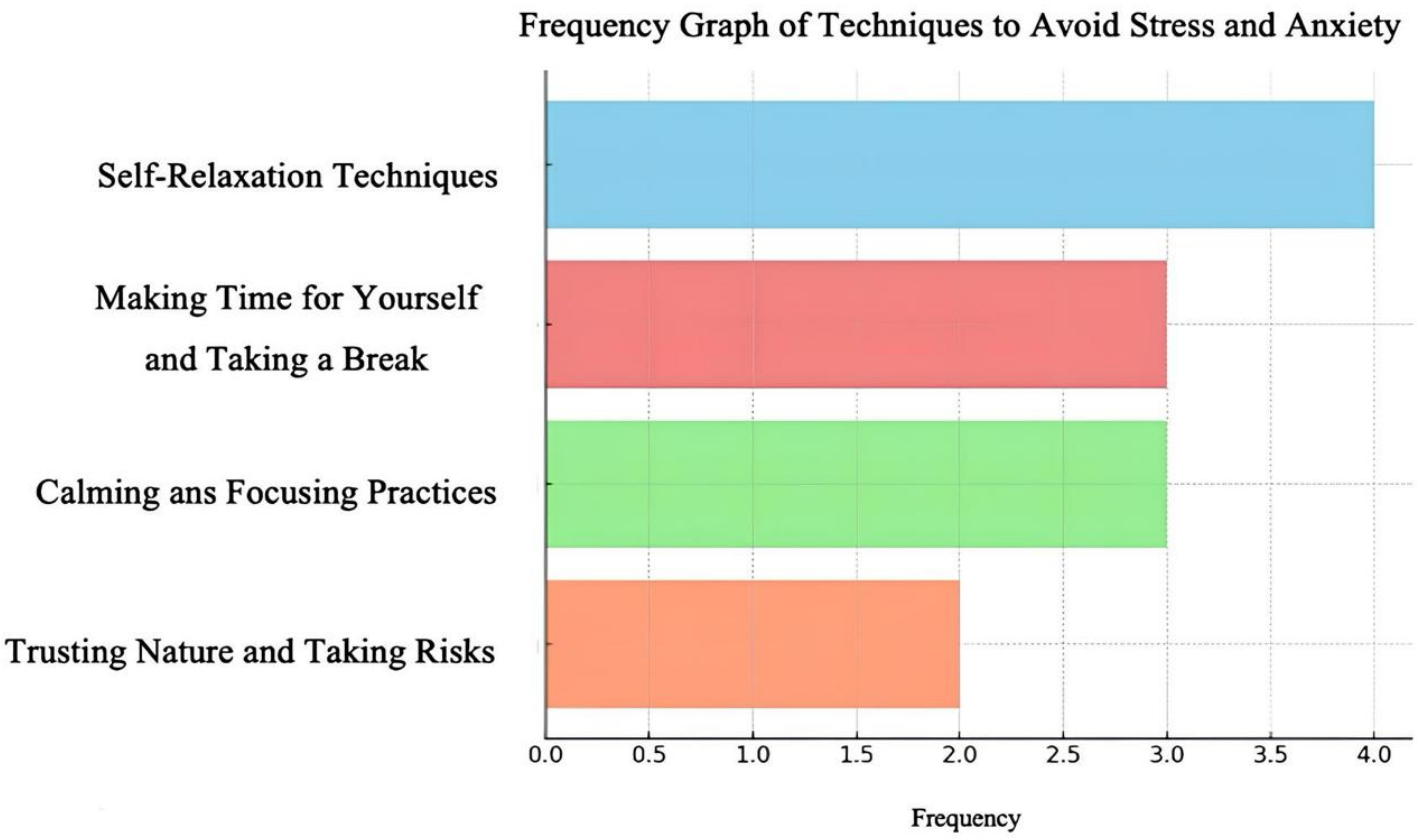

FIGURE 1. Techniques windsurfers often use to manage stress and anxiety.

resilience, highlighting the importance of these strategies in stress management. Another category of relaxation techniques involves taking time for oneself, pausing and calming down to refocus. According to the chart, these methods are employed at similar rates during both stress and anxiety. Unlike the techniques aimed at relaxing through distraction, such as self-talk or seeking help, these methods seem to focus less on escaping the stressful situation and more on centering attention on personal skills, goals and experiences, indicating that while male windsurfers tend to redirect their focus to external or mental cues to cope with stress, they place greater emphasis on self-control and mindfulness when managing anxiety. The final category explores trust in the sea and nature as a source of relaxation. This technique, while less commonly employed, appears to be strongly influenced by personality traits that favor seeking adrenaline and new experiences. Notably, this category represents the smallest proportion among all relaxation techniques, indicating that not all windsurfers utilize this source of calmness.

Fig. 2 further illustrates the relationship between personality traits and stress/anxiety management and demonstrates that windsurfers who describe themselves as energetic, talkative, social and helpful (*e.g.*, Participant 8) tend to favor self-relaxation techniques and actively seek help during stressful or anxious moments. In contrast, individuals who are open to new experiences, creative, and adventurous often manage stress by surrendering themselves to nature. On the other hand, competitive, critical and self-prioritizing windsurfers tend to prefer calming techniques, focusing strategies, and taking breaks. This diagram further supports the overall findings, showing that personality traits are closely linked to the ways windsurfers respond to stress and anxiety, thus reinforcing the validity and reliability of the study's conclusions.

4. Discussion

This study qualitatively examined the sources of stress and anxiety experienced by male windsurfers in challenging situations, as well as the coping strategies they employ. A secondary objective was to investigate the relationship between personality traits and factors contributing to stress and anxiety, with the aim of developing a comprehensive profile of male windsurfing athletes, which could help assist coaches during the exploratory phase of training by enabling them to identify key characteristics of their athletes and address any personal or mental challenges. However, the study's limitation lies in the small sample size of only 16 professional male windsurfers, which may restrict the generalizability of the findings. Therefore, future research with a larger participant pool would be valuable in expanding the literature.

Our study findings highlight the interconnected effects of stress, anxiety, personality and performance. Stressors identified among male windsurfers include situations that require rescue, such as falling at high speeds or during dangerous moments, sustaining injuries or experiencing equipment failure. Additional significant stressors involve life-threatening situations at sea, such as collisions with other vessels, getting lost, increased wind and wave intensity, and risks associated

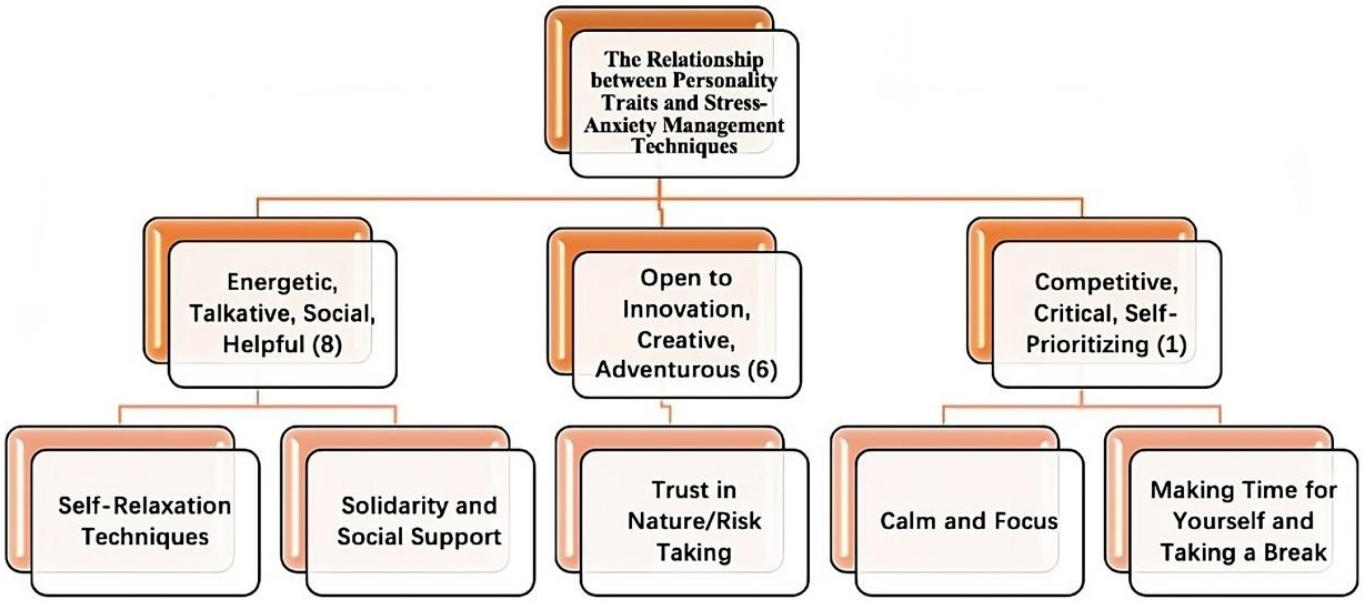

FIGURE 2. Personality traits of windsurfers and the relationship between stress and anxiety management techniques.

with depth. These stressors are consistent with the findings of Dean and Bundon [34], who reported that over half of the participants in their study of 12 surfers had experienced at least one concussion from contact with themselves, the water surface, the surfboard, or other surfers. Similarly, Maynard [35] identified uncontrollable stress factors specific to windsurfing. Other stressors included responsibilities towards fellow surfers, inexperience with new maneuvers, and unfamiliarity with locations. Overall, these results suggest that male windsurfers perceive uncontrollable situations as significant stressors, which may challenge their sense of competence and self-sufficiency, qualities often associated with gender identity. However, contrary to these findings, another study concluded that the interaction between sports and gender does not significantly influence personality traits [36]. Additionally, Dean and Bundon [34] highlighted that inexperience increases the risk of injury in windsurfing. While windsurfing exposes athletes to potentially hazardous conditions, it also provides an effective outlet for stress. Lakde *et al.* [37] emphasized that participation in adventure sports such as windsurfing offers a release from suppressed stress, allowing athletes to feel rejuvenated. In contrast to stress, anxiety appears to be less prevalent among male windsurfers. The findings suggest that self-confidence plays a critical role in preventing anxiety. This distinction implies that while stress is a constant presence, anxiety only arises under certain circumstances, such as inexperience with new locations or maneuvers or concerns about damaging equipment.

Anxiety levels were also found to be influenced by the participants' age and economic circumstances. At an average age of 22, many competitive athletes still require additional training to master new techniques and set goals. Furthermore, athletes with limited financial resources often rely on club-provided equipment, which heightens their concerns about potential damage. Boudreau *et al.* [38] found that greater experience enhances both competence and self-confidence, while Caraballo *et al.* [29] identified spatial orientation as a key factor in sailing athletes' performance. Their research suggests that 60% of windsurfers' performance is attributed to their sailing experience and age, underscoring the importance of both experience and development in understanding anxiety among male windsurfers.

Inadequate mental preparation may increase the likelihood of stress and anxiety among male windsurfers. The final theme explored in this study focuses on the interplay between stress, anxiety and personality, specifically examining how personality traits influence the management of these challenges and their subsequent impact on windsurfing performance. The findings indicate that individuals who are competitive, determined, mentally resilient and relaxed tend to perform better in windsurfing. Moreover, self-confidence and courage were identified as important traits in effectively managing undesirable situations, with these individuals being driven by intrinsic motivational factors such as the pursuit of success, the thrill of adrenaline, the desire for freedom, individuality and competitiveness. Weishaar *et al.* [39] highlighted that a lack of risk-taking and perseverance increases the risk of injury in extreme sports, supporting that mental resilience is essential for windsurfers. Additionally, a study examining individual and team athletes concluded that motivations for participating in sports are influenced by personal interests and environmental factors within the sport [40]. These results align with the findings of this study, suggesting that windsurfers are primarily motivated by personal interests when they first engage in the sport. Similarly, Simpson *et al.* [41], in their phenomenological study of adventure sports participants, identified perseverance as a key strategy for overcoming stress and emphasized that a strong competitive drive is essential for achieving success, further corroborating the conclusions drawn from this research.

Individuals engaged in inherently dangerous sports often share common traits, including sensation-seeking tendencies [42]. The secondary objective of this study was to evaluate the relationship between stress and anxiety management and

personality traits from a multifaceted perspective. The findings indicate that male athletes who identify as energetic, talkative and helpful tend to employ self-developed mental techniques for managing stress and anxiety, such as positive self-talk, singing aloud, vocalizing frustrations (*e.g.*, swearing), seeking assistance, persevering and visualizing successful outcomes. In contrast, male windsurfers characterized by openness to new experiences, creativity and adventurousness demonstrated that their approach to stress and anxiety management often relies on curiosity and a trust in nature, with risk-taking playing a significant role. Kopp *et al.* [43] suggested that while most athletes aim to minimize risks, certain profiles, particularly those of adventure enthusiasts, deliberately engage in risk-taking behaviors. Sensation-seeking, as a personality trait, encompasses a desire for novel and thrilling experiences, paired with a willingness to accept risks to achieve them. This notion is supported by Simpson *et al.* [41], whose research found that adventure sports participants derive pleasure from dangerous moments and challenging weather conditions, rather than being adversely affected by them. Male windsurfers who exhibited competitive, critical-thinking and self-prioritizing traits reported using techniques such as deep breathing and outcome-focused strategies to manage stress and anxiety. These findings underscore the significant influence of personality traits on stress and anxiety management within adventure sports and emphasize their role in shaping participation preferences. Lastly, windsurfing's contribution to mental clarity, decision-making, observational skills and problem-solving abilities further highlights its importance in promoting psychological well-being [44, 45].

5. Conclusions

The findings of this study reveal a complex interplay between stress, anxiety and personality traits in male windsurfing athletes, suggesting that personality not only influences how athletes perceive and manage stress and anxiety but also impacts their overall performance in windsurfing. Athletes with traits such as competitiveness, determination, psychological flexibility and openness to new experiences tend to exhibit more effective strategies for coping with adverse situations, enabling them to perform successfully in a demanding and high-risk sport like windsurfing.

Stress among male windsurfers often arises from uncontrollable external factors, such as sudden environmental changes, equipment failure or the inherent risks of the sport, including injuries and navigation challenges. However, anxiety appears more situational and is linked to a lack of confidence, unfamiliarity with new destinations or maneuvers, or concerns over damaging equipment. These findings highlight that while stress is a constant factor in the sport, anxiety varies according to personal and situational factors. Personality traits significantly shape athletes' coping mechanisms. Energetic, talkative and cooperative athletes tend to rely on self-developed mental techniques, such as positive self-talk, singing or seeking help from others, reflecting their social and adaptive nature. Conversely, athletes with adventurous and creative traits often draw on their deep connection with nature and a willingness to take calculated risks, leveraging their intrinsic curiosity and resilience to manage challenges. These findings align with existing literature, which emphasizes that sensation-seeking and risk-taking are defining traits of individuals engaged in extreme sports. These traits drive athletes toward novel experiences and enhance their ability to manage stress and anxiety, ultimately improving performance. Additionally, competitive and self-motivated windsurfers demonstrate a strong focus on achieving results, employing targeted techniques such as deep breathing to maintain composure during high-pressure moments.

In conclusion, the study highlights the essential role of personality in shaping stress and anxiety management strategies, as well as performance in windsurfing. Recognizing these individual differences may enable coaches and trainers to tailor their development strategies, fostering skills that enhance mental resilience and overall performance. Furthermore, the findings contribute to the broader understanding of the psychological and emotional dimensions of adventure sports. They highlight the potential of these activities to promote positive psychological well-being and personal growth. Based on the results, it is recommended that sports professionals incorporate stress management training programs to improve athletes' health and well-being. Additionally, recreational windsurfing should be encouraged as it can be transformative in many ways, fostering self-awareness and providing significant psychological benefits, including stress relief, inner pleasure and enhanced social connections.

AVAILABILITY OF DATA AND MATERIALS

The data presented in this study can be shared with other researchers after obtaining the approval of all authors at the request of the relevant researchers.

AUTHOR CONTRIBUTIONS

GA, YY and DBAG—designed the research study and performed the research. GA, DBAG and SD—methodology, data collection, data analysis. FK and YY—investigation, project administration, writing-original draft preparation. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The research was conducted with the permission of Aydin Adnan Menderes University Rectorate Social and Human Sciences Research Ethics Committee dated 30 October 2024 and numbered 18/07 31906847/050.04.04-10. The participants reported that they participated voluntarily before starting the interviews.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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