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RESEARCH

Beyond the duality: passion profiles on intention, and satisfaction with life in recreational surfers

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Abstract

Surfing is a demanding physical activity that frequently elicits a strong emotional bond in its practitioners. To address the gap in understanding these bonds from a person-centered approach, the present study pursued three primary objectives: (a) to define and identify passion profiles within a sample of recreational surfers; (b) to compare differences among these profiles concerning intention to continue practicing; and (c) to compare differences among profiles with respect to life satisfaction. The study included 132 surfers ($M_{age} = 38.81 \pm 12.19$ years; 78.8% male). Through a cluster analysis based on the dualistic model of passion, three distinct profiles were identified: moderate passion (20.5%), Optimized Passion (37.1%), and Mixed Passion (42.4%). Comparative analysis using the Kruskal–Wallis test revealed that Mixed and Optimized Passion profiles reported significantly higher levels of intention to continue the practice ($H = 32.38$; $p < 0.001$) and life satisfaction ($H = 10.64$; $p = 0.005$) as compared to the Moderate Passion profile. No statistically significant differences were observed between the Mixed and Optimized groups. It is concluded that the predominant motivational configuration designated as Mixed is functional and adaptive in the surfing context, suggesting that the coexistence of harmonious and obsessive passion favors persistence and psychological well-being.

Keywords Surfing · Dualistic model of passion · Cluster analysis · Subjective well-being · Intention

Introduction

Surfing, once associated with a countercultural ethos of lifestyle and freedom, has experienced a significant sociocultural transformation in recent decades [59]. The activity has evolved from its marginal origins to become a multibillion-dollar global industry and, more recently, an Olympic sport. This evolution has driven exponential growth in participation and the development of technological infrastructures, including artificial wave parks [25, 36, 38]. The massification of surfing has resulted in greater demographic diversity, challenging traditional stereotypes [29], and has produced substantial economic impacts on coastal regions through surf tourism [33, 60]. These global changes affect both the industry and individual surfers, making the study of surfers' motivations and psychological engagement increasingly pertinent. Despite this expansion, limited research exists on surfers' motivational profiles, indicating a notable gap in the literature. Functionally, surfing occurs in a stochastic ocean environment, requiring high physical and technical proficiency through alternating periods of aerobic paddling, explosive anaerobic efforts, and complex neuromuscular adaptations [10, 12, 16, 21, 22, 24, 27, 30, 34].

Continued engagement in this demanding activity is often sustained by a strong emotional bond and by the psychological benefits derived from interaction with blue spaces. The literature has consistently documented surfing as a promoter

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of mental health, being associated with reductions in anxiety and depressive symptoms, as well as increases in positive affect and ocean literacy [1, 3, 17, 26, 44]. These benefits have underpinned the emergence of Surf Therapy as an effective intervention across diverse populations [7, 18, 19, 32, 56]. However, the immersive nature of surfing may also entail less adaptive consequences. The persistent pursuit of high-risk sensations (sensation seeking) and the physical risk of chronic and traumatic injuries are well-documented realities [14, 20, 31]. More critically, qualitative studies have highlighted the "dark side" of flow, whereby extreme dedication may evolve into dependency and conflict with other life domains [37].

The Dualistic Model of Passion serves as the principal theoretical framework for understanding the duality between well-being and potential dependency in surfing [55]. Passion is conceptualized as a strong inclination toward an activity that individuals love, value, and dedicate significant time and energy to [53]. The model distinguishes between two dimensions based on the how the activity is internalized: harmonious passion and obsessive passion. Harmonious passion arises from autonomous internalization, enabling flexible integration of surfing into one's identity. In contrast, obsessive passion results from controlled internalization, creating internal pressure to engage in the activity [28, 52, 54]. For example, an individual with harmonious passion may experience joy in surfing without it dominating other commitments, whereas someone with obsessive passion may feel compelled to surf, often prioritizing it over important social engagements and experiencing conflicts in personal life. Applying this model to surfing is particularly relevant for examining long-term outcomes. Evidence indicates that the internalization of passion influences both immediate experiences and broader cognitive and behavioral outcomes [53]. Therefore, understanding how different types of passion affect persistence and overall well-being is essential.

Regarding persistence, intention to continue practicing emerges as a key variable. Within the Theory of Planned Behaviour [2], intention is considered the strongest proximal predictor of future behavior. Empirical evidence indicates that passion provides the motivational energy required to sustain engagement in demanding activities such as surfing [43]. However, the nature of this persistence may vary. Whereas harmonious passion fosters flexible and voluntary engagement, obsessive passion may lead to rigid persistence, whereby individuals continue practicing despite adverse consequences or physical risks [11].

Alongside behavioral commitment, it is essential to assess the psychological impact of practice, particularly through life satisfaction. Conceptualized by Diener et al. [13], life satisfaction reflects a global cognitive evaluation of one's quality of life and is widely used as an indicator of eudaimonic well-being in sport contexts. Research, including studies with Portuguese athletes, has consistently shown that harmonious passion facilitates positive spillover from sport into other life domains, thereby enhancing overall life satisfaction [4–6, 9, 35, 41, 42, 47]. In contrast, the relationship between obsessive passion and life satisfaction is often ambiguous or negative, mainly because it conflicts with other vital areas of life [50, 51]. Examining these two variables concurrently, therefore, provides a more holistic perspective: intention reflects commitment to the sport, whereas life satisfaction captures the personal costs or benefits of that commitment.

Despite these insights, most prior research has utilized a variable-centered approach, examining harmonious and obsessive passion separately. This approach is limited, as individuals rarely exhibit purely harmonious or purely obsessive passion; rather, they often display complex combinations of both [45]. Stenseng and Phelps [48, 49] have proposed that engagement in leisure activities may fulfil different escapist functions, such as self-expansion or self-suppression, which theoretically supports the existence of hybrid motivational profiles. Recently, person-centered approaches have become more prominent, allowing for the identification of intra-individual passion clusters [57, 58, 61]. Employing a quadripartite framework, Schellenberg et al. [46] identified a mixed passion profile, characterized by high levels of both harmonious and obsessive passion, that may coexist with high psychological well-being, thus challenging the traditional dichotomy of the Dualistic Model of Passion.

Although the person-centered approach is theoretically robust, a significant gap persists in the surfing-specific literature. The existing research on surfing has primarily focused on physiological and biomechanical aspects (e.g., [16, 30]) or qualitative sociological dimensions [23, 39, 59], while quantitative studies investigating combined motivational profiles remain limited [8, 15], c et al., 2019). The lack of empirical identification of these profiles restricts theoretical progress and impedes understanding of how different passion combinations manifest in lived experiences. Therefore, the present study is designed as an exploratory theoretical contribution to establish a basis for future experimental research. Prior to developing interventions to mitigate risks or enhance benefits, it is essential to determine whether and how these motivational profiles naturally occur within the surfing population and whether they are linked to distinct levels of psychological adaptation.

Building on the foregoing, the present study pursues three primary objectives: (a) to define and identify passion profiles within a sample of surfers; (b) to compare differences among these profiles concerning intention to continue practicing; and (c) to compare differences among profiles with respect to life satisfaction.

Method

Eligibility criteria and data screening

Participant eligibility was established through the following inclusion criteria: (i) legal age (≥ 18 years); (ii) regular surfing practice (at least two sessions per month); (iii) a continuous surfing history of at least six months, which is considered sufficient for the consolidation of a psychological bond and the internalization of the activity into personal identity [53],(iv) classification as a recreational surfer, defined by self-assessment scores between 1 and 8 on the surfing competence scale developed by Hutt et al. [21], with professional-level surfers (scores 9 and 10) excluded,and (v) voluntary participation through informed consent, with agreement to protocols ensuring anonymity and confidentiality in data handling.

During the data cleaning and screening phase, stringent exclusion criteria were implemented. Questionnaires were excluded if they contained incomplete responses on psychometric scales. Surveys demonstrating invariant or patterned response behaviors, indicative of inattention or low engagement, were also removed. In addition, logical inconsistencies between demographic variables and surfing practice data, such as training volumes inconsistent with the reported level of experience, resulted in further exclusions.

Instruments

Data collection employed a self-administered questionnaire survey, organized into three sections. The initial section described the study objectives and included the informed consent form to ensure compliance with ethical standards. Upon confirmation of voluntary participation, respondents advanced to the second section, which addressed sociodemographic characteristics and surfing practice profiles. This section captured variables such as surfing experience, training volume, and predominant board type (e.g., shortboard, longboard). In addition, self-perceived technical competence was evaluated using the surfing competence taxonomy developed by Hutt et al. [21].

The third section included psychometric instruments designed to assess the study's latent variables. Passion was measured using the Passion Scale [55], which consists of 12 items equally divided between two dimensions: (i) Harmonious Passion (6 items), reflecting autonomous internalization of the activity into identity (e.g., "*This activity allows me to live a variety of experiences*"); and (ii) Obsessive Passion (6 items), indicating controlled internalization and rigid persistence (e.g., "*I have almost an obsessive feeling for this activity*").

Intention to continue practicing was measured using purpose-built items adapted from the literature [2]. This unidimensional measure consists of three items that estimate the likelihood of maintaining regular surfing practice (e.g., "*I intend to continue practicing surfing over the next six months with the same regularity*").

Subjective well-being was evaluated using the Satisfaction with Life Scale [13]. This unidimensional scale includes five items that assess individuals' global cognitive judgment of their own lives (e.g., "*I am satisfied with my life*").

Procedures

The present study received favorable approval from the Ethics Committee of the host higher education institution (reference omitted for blind review), ensuring strict compliance with the ethical principles outlined in the Declaration of Helsinki for research involving human participants. Data collection was conducted via a digital survey hosted on Google Forms.

A convenience-based, nonprobabilistic sampling strategy was employed, following a virtual snowball sampling approach. The survey was disseminated within digital environments specific to the surfing community, including thematic groups on social media platforms and institutional communication channels of surfing schools and clubs. Participation was strictly voluntary and uncompensated.

Before accessing the psychometric scales, participants were directed to the informed consent page, which clearly outlined the objectives of the study, the nature of participation, and the guarantees of anonymity and confidentiality in data processing. Progression through the questionnaire was contingent on explicit, mandatory acceptance of these terms via a validation checkbox. To further reassure participants and minimize response bias, they were informed of their right to withdraw from the study at any point without consequence and were allowed to skip nonmandatory items. These safeguards aimed to prevent coercion and enhance the sense of voluntary participation, thereby strengthening the ethical integrity of the research. The estimated average time required to complete the full protocol was approximately 15 min.

Statistical analysis

Data analysis was conducted using IBM SPSS Statistics, version 30.0 (IBM Corp., Armonk, NY, USA). Initially, descriptive statistics were calculated to characterize the sample and study variables. For categorical variables, absolute (n) and relative (%) frequencies were reported. For continuous variables, measures of central tendency and dispersion (standard deviation) were calculated following assessment of normality assumptions through skewness and kurtosis.

To address the first objective and identify motivational profiles, a two-step combined clustering approach was implemented, as recommended in the passion literature [45, 57]. Initially, the clustering variables (Harmonious Passion and Obsessive Passion) were standardized as z-scores to minimize scale effects. A hierarchical cluster analysis using Ward's method and squared Euclidean distance was then conducted to determine the optimal number of clusters, based on dendrogram and agglomeration coefficient inspection. Subsequently, nonhierarchical cluster analyses (K-means clustering) were performed extracting 2-, 3-, and 4-cluster solutions to refine the allocation of participants into profiles. Following best practices for person-centered research, the final cluster solution was selected by evaluating statistical indicators (e.g., maximizing between-group differences and minimizing within-group variability) alongside substantive theoretical criteria, specifically model parsimony and alignment with the Dualistic Model of Passion and recent quadripartite approaches [45, 61].

Differences between the identified clusters regarding intention to continue practicing and life satisfaction were examined using the nonparametric Kruskal–Wallis test (H), due to asymmetrical cluster sizes and violations of normality assumptions. Statistical significance was set at $p < 0.05$. Dunn–Bonferroni post hoc multiple comparisons were used to explore specific between-group differences. Effect size was quantified using the epsilon-squared (ε^2) coefficient, with cut-off values adapted from Cohen (1988): 0.01 (small effect), 0.06 (medium effect), and 0.14 (large effect).

Results

Exclusion criteria were implemented during the data cleaning phase. Questionnaires exhibiting incomplete responses, invariant response patterns, or logical inconsistencies were excluded. Consequently, 12 individuals were removed from the initial 144 responses: six due to professional skill level (level 9 on the [21] scale), three due to incomplete responses, and three due to unrealistic extreme values.

The final valid sample consisted of 132 wave sports practitioners. Males comprised the majority ($n = 104$; 78.8%), while females represented 21.2% ($n = 28$). The mean participant age was 38.81 ± 12.19 years, with an age range of 18 to 62 years. Most participants were Portuguese nationals (87.9%) residing primarily in the Northern region (52.3%), followed by the Lisbon Metropolitan Area (24.2%). The mean accumulated surfing experience was 20.52 ± 3.23 years. On average, participants trained 9.67 ± 7.62 times per month, with each session lasting 1.89 ± 0.65 h. Shortboard was the most frequently practiced discipline (53.0%), followed by bodyboard (22.0%) and longboard (15.2%). The mean self-assessed technical competence score was 4.99 ± 1.63 on a scale from 1 to 8. Table 1 provides a detailed characterization of the sample.

Alternative 2-cluster and 4-cluster models were inspected but discarded based on substantive and statistical criteria. The 2-cluster solution merely dichotomized overall passion, failing to theoretically capture the distinct dualistic combinations proposed by recent frameworks. The 4-cluster solution overly fragmented the sample, generating two small, theoretically redundant groups at the lower end of the spectrum ($n = 17$ and $n = 19$) that would compromise the statistical power of subsequent nonparametric comparisons. Consequently, cluster analysis produced a three-profile solution that maximized between-group differences, minimized within-group variability, and provided the most parsimonious and theoretically interpretable taxonomy. Participants were classified into clusters based on comparisons of standardized values (z-scores) and raw mean scores for harmonious passion and obsessive passion (see Table 2 and Fig. 1). Cluster 1 ($n = 27$; 20.5%), labelled Moderate Passion, exhibited low levels of harmonious Passion ($Z = -1.57$) and reduced levels of obsessive passion ($Z = -0.64$). Cluster 2 ($n = 49$; 37.1%), classified as Optimized Passion, was characterized by elevated levels of harmonious passion ($M = 6.16$; $Z = 0.35$) combined with reduced levels of obsessive passion ($M = 2.80$; $Z = -0.70$). Cluster 3 ($n = 56$; 42.4%) emerged as the predominant profile in the sample and was designated Mixed Passion. This group exhibited elevated levels of harmonious passion ($M = 6.26$; $Z = 0.46$) and high levels of obsessive passion ($M = 5.25$; $Z = 0.92$), indicating a surfing

Table 1 Sociodemographic and surfing practice characteristics of the sample ($N = 132$)

Variable	Category	*n* (%)
Geographical location	North	69 (52,3%)
	Lisbon Metropolitan Area	32 (24,2%)
	Internacional	13 (9,8%)
	Centre	6 (4,5%)
	Autonomous Region of Madeira	4 (3,0%)
	Undefined	8 (6,1%)
Nationality	Portuguese	116 (87,9%)
	Brazilian	5 (3,8%)
	American	2 (1,5%)
	British	2 (1,5%)
	Other*	7 (5,3%)
Primary discipline	Shortboard	70 (53,0%)
	Bodyboard	29 (22,0%)
	Longboard	20 (15,2%)
	Kitesurfing	10 (7,6%)
	Stand Up Paddle	3 (2,3%)

Other nationalities included Italian, French, South African, German, Australian, Thai, and Bissau-Guinean (all with $n = 1$; 0.8% each)

experience characterized by the coexistence of autonomous integration and controlled internal pressure. Analysis of variance confirmed significant differences among the three profiles on the clustering variables ($p < 0.001$), supporting the statistical robustness of the solution.

For the second objective, the Kruskal–Wallis test identified statistically significant differences among the three passion profiles regarding intention to continue practicing ($H[2] = 32.38$; $p < 0.001$), with a large effect size ($\varepsilon^2 = 0.25$). Post hoc Dunn–Bonferroni comparisons showed that Cluster 1 (Moderate Passion) reported significantly lower intention levels than both Cluster 2 (Optimized Passion) ($p < 0.001$) and Cluster 3 (Mixed Passion) ($p < 0.001$). No significant differences were found between the Optimized Passion and Mixed Passion profiles ($p = 0.567$), indicating similarly high behavioral intention to persist in the sport (see Table 3).

For the third objective, comparative analysis of Life Satisfaction revealed statistically significant differences

Table 2 Characterization of passion profiles

Variable	Cluster 1 Moderate Passion $n = 27$	Cluster 2 Optimized Passion $n = 49$	Cluster 3 Mixed Passion $n = 56$	*F*	*p*
Harmonious passion					
M (SD)	4,44 (0,65)	6,16 (0,44)	6,26 (0,56)	116,08	<,001
Z-Score	−1,57	0,35	0,46		
Obsessive passion					
M (SD)	2,89 (1,30)	2,80 (0,85)	5,25 (0,77)	109,30	<,001
Z-Score	−0,64	−0,70	0,92		

M Mean; *SD* Standard deviation; *F* ANOVA test value

The response scale ranges from 1 to 7

$p < .05$

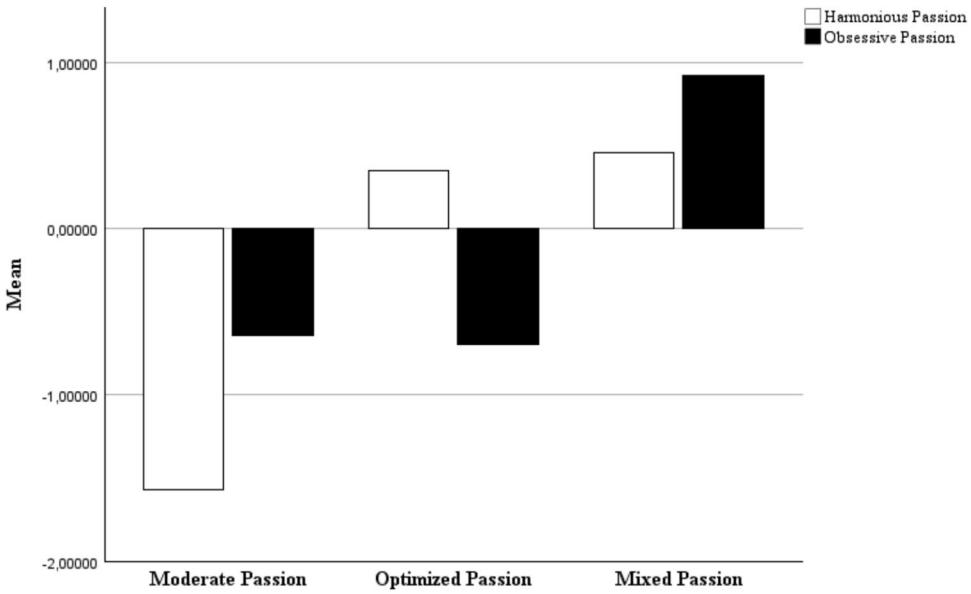

Fig. 1 Standardized mean scores of harmonious passion and obsessive passion across the three identified profiles

Table 3 Comparison of intention to continue practicing across passion profiles

Variable	Cluster 1 M ± SD	Cluster 2 M ± SD	Cluster 3 M ± SD	*H*	*p*	ϵ^2	Bonferroni
Intention	3,11 ± 0,99	4,22 ± 0,99	4,48 ± 0,74	32,38	<,001	0,25	1 < 2, 3
Life Satisfaction	4,57 ± 1,06	5,26 ± 0,89	5,32 ± 1,00	10,64	,005	0,08	1 < 2, 3

M Mean; *SD* Standard Deviation; *H* = Kruskal–Wallis test statistic; ε^2 effect size

1 < 2, 3 indicates that Cluster 1 is significantly lower than Clusters 2 and 3 ($p < .05$)

among motivational profiles (H[2] = 10.64; $p = 0.005$), with a medium effect size ($\varepsilon^2 = 0.08$). Post hoc analyses indicated that Cluster 1 (Moderate Passion) reported significantly lower life satisfaction levels than both Cluster 2 (Optimized Passion) ($p = 0.024$) and Cluster 3 (Mixed Passion) ($p = 0.004$). Notably, no significant differences were observed between Cluster 2 and Cluster 3 ($p = 1.00$), indicating that surfers with a Mixed Passion profile experienced life satisfaction levels statistically equivalent to those with an Optimized Passion profile (see Table 3).

Discussion

The present study sought to move beyond the traditional dichotomy of harmonious and obsessive passion by adopting a person-centered approach to map motivational profiles among recreational surfers. By stepping away from variable-centered approaches, which typically focus on examining passion dimensions separately and often highlight distinct outcomes such as the association of harmonious passion with well-being and obsessive passion with negative effects, we provide a more nuanced view. The findings revealed the coexistence of different types of internalization within the same individual, pointing to a more complex motivational configuration than that originally described by the Dualistic Model of Passion [53]. This nuanced perspective highlights the practical significance of our person-centered approach. The emergence of three distinct profiles, Moderate Passion, Optimized Passion, and Mixed Passion, and their differentiated associations with intention to practice and life satisfaction suggest that the surfing experience is shaped not only by the quality of passion but also by the dynamic intensity with which it is experienced.

Regarding the first objective, the identification of three distinct profiles challenges the traditional dichotomous view and offers a richer taxonomy of motivation in surfing. The Mixed Passion profile, which emerged as the predominant group in the sample (42.4%), represents one of the most relevant findings of this study, corroborating recent evidence from other domains that rejects the mutual exclusivity of the two passion dimensions [45, 58, 61]. Within the specific context of surfing, this hybrid configuration may be interpreted as an adaptive response to the demands of the sport. Surfing has long been described as an immersive and identity-defining subculture [59], in which the pursuit of flow and immersion in nature often coexist with behaviors of extreme dedication and dependency [37]. It is plausible that the stochastic and unpredictable nature of the ocean requires psychological flexibility, characteristic of harmonious passion, to cope with changing conditions, while simultaneously demanding the rigid persistence associated with obsessive passion to withstand adverse physical and environmental demands [16, 25].

In turn, the emergence of the Optimized Passion (37.1%) and Moderate Passion (20.5%) profiles reinforces the heterogeneity of the surfing population. The Optimized group, characterized by the predominance of harmonious passion, appears to reflect the theoretical ideal of a healthy and integrated practice, in which surfing enriches identity without generating conflict [53]. Conversely, the Moderate profile, despite exhibiting the lowest passion levels, should not be interpreted as disinterest, but rather as a group for whom the activity occupies a less central role in identity or for whom the internalization process is less intense. This distinction is crucial, as it suggests that not all recreational surfers develop the excessive dedication often associated with surfing culture, and that a segment of practitioners maintains a more distanced, yet regular, relationship with the sport. These findings underscore the importance of adopting a person-centered approach to avoid overgeneralization regarding surfers' psychological experiences.

With respect to intention to continue practicing, the results showed that both the Optimized Passion and Mixed Passion profiles reported significantly higher levels compared with the Moderate Passion profile, with no statistically significant differences between the former two. These findings align with the Theory of Planned Behaviour, suggesting that intense motivation acts as a robust precursor of behavioral intention [2, 43]. The fact that the Mixed Passion group displayed intention levels comparable to those of the Optimized group suggests that the presence of obsessive elements does not diminish the desire to persist and may, in fact, reinforce it. In a sport characterized by substantial barriers, such as physical fatigue, thermal discomfort, and injury risk [10, 20, 34], the internal pressure typical of obsessive passion may function as a mechanism of rigid persistence, ensuring continuity of practice where purely autonomous motivation might falter [11].

Regarding life satisfaction, contrary to the classical literature that frequently associates obsessive passion with reduced well-being and interpersonal conflict [53, 55], surfers with a Mixed Passion profile reported life satisfaction levels statistically equivalent to those of the Optimized profile, and higher than those of the Moderate profile. This phenomenon may be interpreted in light of the buffering effect proposed by Schellenberg et al. [45], whereby high levels of harmonious passion appear to protect individuals from the deleterious consequences of obsession. In addition, the ecological context of the activity must be considered. A substantial body of literature documents the restorative benefits of blue spaces and surf therapy for mental health, particularly in reducing anxiety and promoting positive affect [1, 7, 17, 19, 32]. It is therefore plausible that the intrinsic benefits of ocean contact and the autotelic experience of surfing [8,

14] are sufficiently potent to offset the psychological costs of obsession, allowing surfers with a mixed passion profile to maintain a globally positive evaluation of their lives [4, 33].

Limitations and future research directions (English version)

Although this study offers theoretical contributions, its findings must be interpreted considering several methodological limitations. First, the cross-sectional research design prevents establishing causal relationships between passion profiles and outcome variables. Although the data indicate that Optimized and Mixed Passion profiles are associated with higher intention and life satisfaction, the possibility of bidirectional relationships over time remains unresolved. To address this gap, future studies should explore a specific longitudinal question: *Do surfers shift from Mixed to Optimized profiles over a competitive season*? Such a longitudinal examination would provide insights into the causal dynamics and temporal evolution of passion profiles, enhancing our understanding of their underlying processes. Second, the reliance on nonprobabilistic convenience sampling and primarily digital recruitment methods may have introduced selection bias, potentially favoring participants with stronger affiliations to online surfing communities. Furthermore, the final sample ($n = 132$) was asymmetrically distributed, with a predominance of male participants and individuals of Portuguese nationality. This limits the generalizability of the findings to the broader global surfing population, especially female surfers and culturally diverse groups. However, this limitation can be reframed as an opportunity to enhance inclusivity and enrich research through diversity. Future research could explore collaboration with women's surfing clubs and non-Western federations to test and understand cultural nuances in passion profiles. One potential strategy is to establish partnerships with international surfing associations and local female surf clubs to engage a broader and more diverse sample. This approach not only addresses the sampling bias but also demonstrates proactive stewardship towards a more inclusive understanding of surfing communities. From a statistical standpoint, a post hoc sensitivity analysis indicated that the current sample design had sufficient power to detect only large effects ($f = 0.44$). Consequently, the absence of statistically significant differences between the Optimized and Mixed clusters should be interpreted with caution, as effects of small to medium magnitude may not have been detected. A third limitation concerns the exclusively self-reported nature of the data. Variables such as technical competence, although measured with validated taxonomies, are still subject to participants' subjective perceptions and potential social desirability bias. In addition, life satisfaction reflects a global cognitive judgment and does not account for immediate affective fluctuations that may occur following practice, such as acute emotional responses. To address these limitations, future research could benefit from integrating multimodal experience sampling methods. For instance, using brief in-session flow checklists or collecting heart-rate variability snapshots could complement global life satisfaction assessments. This approach would better capture the "here-and-now" of surfing passion by pairing subjective scales with micro-level data, potentially unveiling patterns that might be invisible in retrospective reports.

Future research should implement longitudinal designs to assess the temporal stability of passion profiles. Specifically, it is important to determine whether the Mixed Passion profile constitutes a transitional developmental state in surfing participation or a stable long-term configuration. For instance, researchers could outline potential markers such as duration thresholds or shifts in obsessive scores to guide future investigations. Such criteria can transform a speculative question into a research blueprint, offering clearer directions for understanding developmental versus stable passion pathways. Further studies should incorporate objective behavioral measures, such as GPS-based tracking to quantify training volume, and physiological indicators of stress or recovery. This approach would help determine whether elevated obsession levels within the Mixed profile result in biological costs not captured by psychological well-being scales. Additionally, replicating this cluster-based analysis in samples of big-wave surfers or highly skilled practitioners (i.e., scores of 9 or higher on the [21] competence scale), where life-threatening risk is inherent, would provide valuable insights into whether motivational profile configurations differ under extreme risk conditions.

Conclusion

The present study contributes to a deeper understanding of motivational dynamics in surfing by demonstrating that surfing passion does not operate within a rigid, dualistic vacuum. The findings indicate that the most prevalent motivational configuration among recreational surfers is neither purely harmonious nor purely obsessive, but rather an intense fusion of both dimensions. This Mixed Passion profile appears functional and adaptive, sustaining high levels of intention to continue practicing and life satisfaction, comparable to those observed in the theoretically ideal Optimized Passion profile.

These findings indicate that, in the context of surfing, a high-intensity emotional bond, even when characterized by obsessive elements, may facilitate both well-being and behavioral persistence. It is plausible that the therapeutic and restorative qualities of the marine environment serve a regulatory function, reducing the potential negative

consequences of motivational rigidity commonly linked to obsession. Overall, for recreational surfers, engaging in the sport with a strong and hybrid intensity does not appear to be inherently pathological. Rather, it may constitute an essential factor for meeting the challenges of the ocean and achieving substantial life satisfaction through the activity.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Conflict of interest The authors declare no competing interests.

Informed consent Informed Consent Statement Informed consent was obtained from all subjects involved in the study

Ethical approval Institutional Review Board Statement The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Trás-os-Montes and Alto Douro.

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