Pre- and Post-Activity Anxiety for Sustainable Rafting

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Abstract: This study aimed to (i) analyze the levels of state-anxiety of rafting customers, before and after the activity; and (ii) characterize the levels of trait-anxiety and the amount of physical activity performed weekly by clients of a rafting activity. The sample had 100 subjects of a nature sports company, in the rafting activity, with a mean age of 33.27 ± 10.10 years, with 44% female and 56% male participants. They were evaluated in two moments M1 (pre-activity) and M2 (post-activity). In M1, the STAI—State-Anxiety questionnaire and the IPAQ—International Physical Activity Questionnaire (short version) were applied. In M2, the STAI Form 1 State-Anxiety questionnaire was applied again, followed by the STAI trait-anxiety. The results showed no correlation between the amount of weekly physical activity and levels of trait-anxiety ($rho(100) = -0.144$; p-value = 0.152), thus not corroborating with the existing literature. Regarding state-anxiety, we found that in 55% of cases, it decreased with the practice of rafting, which suggests that the practice may have an anxiolytic effect and promote the well-being and relaxation of participants promoting, in this way, the sustainability of the rafting activity.

Keywords: state-anxiety; trait-anxiety; outdoor; nature sport

1. Introduction

Rafting is characterized as the descent of rivers in inflatable boats where participants row under the coordination and responsibility of a guide who knows the sport and the environment where the activity takes place. The participants do not need any previous experience to perform this Nature Sport (NS) activity [1]. The activity is sold as a tourist product, where the necessary equipment is provided for the practice, such as the helmet, waistcoat, and neoprene suits, as well as the hiring of the river guide [2] among others. In competitive terms, rafting can be practiced by teams of 4 or 6 athletes of both sexes and with age groups starting at 16 years old; the competitions can be either technical, speed, or endurance [3].

This modality is included in the dimension of NSs, which has been of increasing interest in contemporary society [4]. The practice of NS activities has been motivated by the attempt to escape from daily urban life and the daily stress caused by increasingly sedentary professional activities [5]. The NS practitioner seeks new environments with risks and adventures, where they seek the pleasure of overcoming and self-affirmation [6]. Considering these risks, the practice of the modality may entail strong emotions, such as anxiety.

Anxiety is an emotional state that can be defined as a vague and diffuse "feeling" that can be expressed as distress and with prominent physical symptomatology (e.g., tightness in the chest, tachycardia, butterflies in the stomach) or as fear, when we react to something specific that feels like a threat, and one hopes to be able to avoid [7]. The incipience of how an experience will be triggered may cause momentary anxiety in the practitioner, which tends to decrease with the familiarization of the practice [8].

Anxiety can be studied in two dimensions: state-anxiety and trait-anxiety [9]. State-anxiety is a transient emotional condition that temporally oscillates according to the perception of a threat [10], whereas trait-anxiety refers to stable individual characteristics that help perceive and respond to potentially dangerous or threatening situations [11].

In NS, the fear and anxiety experienced before and during the practice of the activity act as a positive stimulus toward the practice, being intrinsically and directly linked to the pleasure that it provides [12]. Thus, the emotional state of NS practitioners changes long before the performance of activities, and states such as fear, anxiety, and pleasure are aggregated in such a way that it is often difficult to position them separately [12]. Moreover, activities that take place in an unknown environment, with a potentially high risk, increase the participants' state-anxiety, being more anxiogenic in women [13].

However, NSs are considered effective in reducing state-anxiety, and may have a lower influence on trait-anxiety and symptoms of depression or other psychological disorders [14]. In turn, Berman et al. [15] presented NS anxiety as a preponderant factor in the assessment of the perceived risk in adventure programs involving risk, being extremely important for the emotional safety of the activity and, consequently, for physical safety.

Rafting is an activity framed in the stereotype of NS, where, due to the place of practice and its leisure aspect, it is expected that it influences the state-anxiety of its practitioners [14]. This way, the practice of outdoor sports may have an anxiolytic effect. Tretyakova (2016) in a study with tourists who practiced rafting on the Ay River showed that there is a small change in the hemodynamics and heart rate of tourists. The blood pressure and heart rate of both males and females remained in the normal range and reached a normal state throughout the tour. The self-esteem of the emotional state of the group and the level of anxiety and depression entered the established limit and were at a high level, indicating the favorable and positive impact of travel on the human body [15].

As such, we believe that it is relevant to study the state-anxiety of participants before and after the rafting activity to better understand their levels anxiety and if anxiety may decrease with the activity. We intend to develop knowledge that will allow a better framing and acceptance, by companies and guides, of their clients during the rafting activity. Knowing the clients' state-anxiety when they arrive at the activity and how they finish it will enable the guides to shape their framework in the different phases and make the rafting activity sustainable.

Therefore, this study first aimed to analyze the state-anxiety of rafting clients, before and after the activity; secondly, we also aimed to characterize the levels of trait-anxiety of the practitioners and the amount of physical activity performed weekly by clients of a rafting activity.

2. Materials and Methods

2.1. Study Design

This was a quantitative cross-sectional study, with the assessment of the pre- and post-rafting activity of state-anxiety.

2.2. Participants

Data collection took place between April and September 2021 during a commercial rafting activity, on two different occasions. Upon the first contact with the clients, they were explained the context of the study, as well as given full data protection guarantee, assuring its exclusive use for this study. Age and willingness to participate in the study were taken as inclusion factors. The sample was chosen by convenience, using only customers from a company that had allowed us to collect their data. This only occurred in one company, as it was the only one to allow the researchers to collect data from their clients. All the others claimed that the collection of pre- and post-activity data would alter the dynamics of the activity and of the company. Data collection was only carried out by a trained researcher in order to ensure greater reliability, and the inquirers were placed in a separate room where they filled in the surveys manually (paper and pen). All Portuguese customers over 18 years old were considered, regardless of gender.

This study counted on the participation of 100 subjects of a Nature Sports company, in the rafting activity, aged between 18 and 61 years, with a mean ± SD of 33.27 ± 10.10. Regarding gender, 44% of the participants were female and 56% were male.

2.3. Measures

The variables analyzed in this study were the amount of weekly physical activity, age, and gender, as well as the levels of trait-anxiety and the pre- and post-activity levels of state-anxiety.

The self-assessment of anxiety questionnaire (STAI) by Spielberg, Gorsuch, and Lushene was designed to obtain accurate measures of anxiety [9]. The STAI consists of two scales of twenty questions, which were validated for the Portuguese population [16]. These questions are presented on a four-point Likert scale where 1 represents "Not at all" and 4 "Very much" [17]. These questions assess the state-anxiety, and the individual is instructed to choose the option that best describes the intensity of their feelings at the exact moment, and the trait-anxiety, where the individual is instructed to indicate how they feel generally [18].

The International Physical Activity Questionnaire (IPAQ) is a questionnaire used to assess the level of physical activity of the subject and has already been validated for the Portuguese population [19]. This questionnaire is divided into four parts featuring the weekly frequency (number of times) and the time (minutes/day) spent on: (1) vigorous-intensity activity, (2) moderate-intensity activity, (3) walking at least 10 min at a time, and (4) hours sitting and/or lying down (except for sleeping) per day.

2.4. Procedures

Participants were assessed at two moments (pre- and post-performance of a rafting activity). The first moment (M1) occurred at the reception of the clients during the completion of the information form where both the STAI—State-Anxiety Questionnaire and the IPAQ—International Physical Activity Questionnaire (short version) were applied.

The second moment (M2) took place at the end of the activity after the clients had a shower. Here, the STAI Form 1 State-Anxiety questionnaire was applied again, followed by the STAI Trait-Anxiety questionnaire (the order is due to what is recommended by the authors of the original version) [9].

The activity would take place in the morning (09:00) or the afternoon (14:00) regardless of the weather conditions. The river flow that the participants experienced was approximately the same, summer season, thus exposing the clients to the same dynamics.

2.5. Statistical Analysis

Data collected in the survey were introduced into a database in SPSS (Statistical Package for the Social Sciences version 27; Armonk, NY, USA: IBM Corporation) to assist the quantification of each variable according to the guidelines of each instrument.

The Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ)—Short and Long Forms [20] were used to interpret the results obtained from the International Physical Activity Questionnaire (IPAQ). To decode the data provided by IPAQ and calculate the metabolic number of equivalents spent per week on physical activity, the following formulas were used: Total physical activity MET-minutes/week = Walking MET-minutes/week (3.3 × walking minutes × walking days) + Moderate MET-minutes/week (4.0 × moderate-intensity activity minutes × moderate days) + Vigorous MET-minutes/week (8.0 × vigorous-intensity activity minutes × vigorous-intensity days.

To interpret the data provided by STAI, we added up the values of each scale, ranging from a minimum value of 20 to a maximum value of 80.

To statistically explore the variables, we used SPSS for the application of statistical tests.

To check the normality of the variables trait-anxiety, state-anxiety (post- and pre-activity), and the amount of weekly physical activity, we applied the Kolmogorov–Smirnov test.

To verify the relationship between trait-anxiety and the amount of physical activity, Spearman's correlation coefficient test was applied to understand the strength of the association between the two variables.

To verify the existence or not of a statistically significant difference between pre-activity and post-activity state-anxiety, at the time of analysis, we used the Wilcoxon test, for paired samples, which allows us to test the equality of two population distributions for a level of significance $p < 0.05$.

3. Results

The sample had 100 participants of a rafting activity with ages between 18 and 61 years old where 44% were female and 56% were male.

After applying the Kolmogorov–Smirnov test, we found that the variables trait-anxiety, state-anxiety (post- and pre-activities), and the amount of weekly physical activity did not follow the standard distribution $p < 0.05$ (Figure 1).
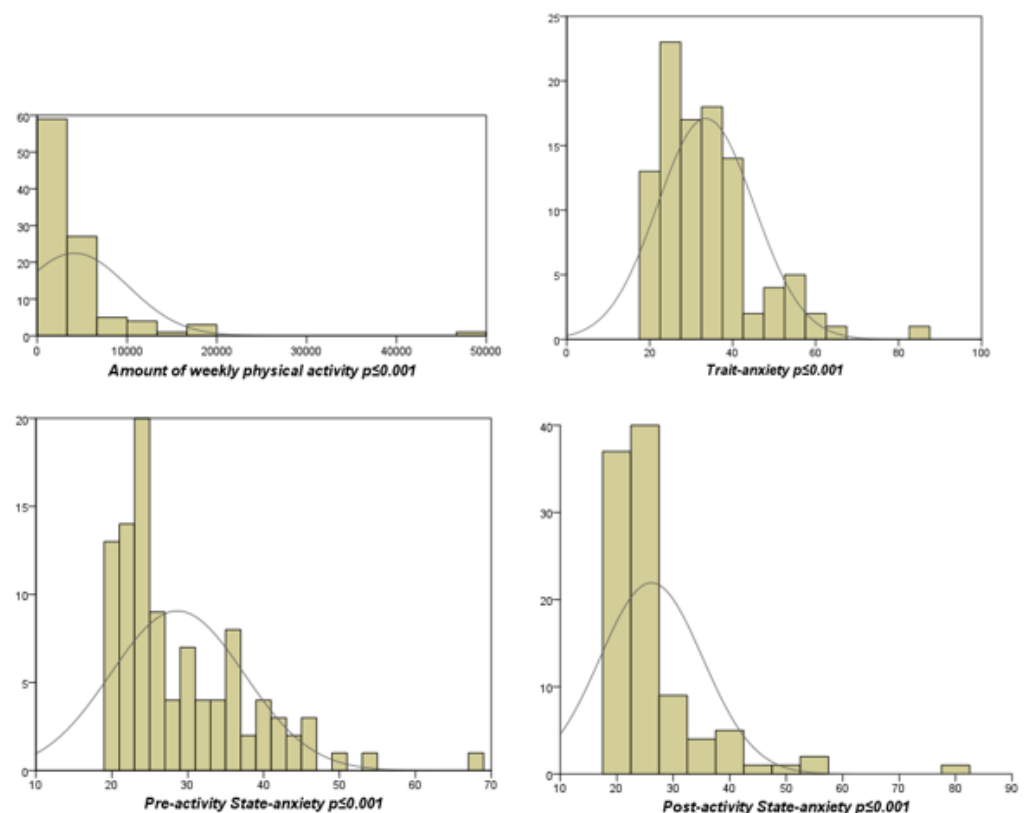
Figure 1. Graphic representation of distribution of the variables: pre-and post-activity state-anxiety, amount of weekly physical activity, and trait-anxiety.

When analyzing the data found, we verified that the amount of weekly physical activity had a median value of 2580 (Mets/Week) and a maximum value of 48,000 (METS/Week). Regarding trait-anxiety, there was median of 31.5 and a maximum value of 66.

Using Spearman's statistical test, which tests correlation coefficients, no statistical significance was found (rho(100) = −0.144; p-value = 0.152) between the amount of weekly physical activity and the trait-anxiety (Table 1).

Table 1. Correlation between anxiety-trait and amount of physical activity.

		Anxiety-Trait	**Mets/P/without**
anxiety-trait *rho*(100)	Correlation Coefficient	1	−0.144
	Sig. (2 ends)		0.152
Mets/P/without *rho*(100)	Correlation Coefficient	−0.144	1
	Sig. (2 ends)	0.152	

By exposing the pre- and post-activity rafting state-anxiety data, we found that pre-activity state-anxiety had a median of 25 and a maximum of 67, while post-activity state-anxiety had a median of 23 and a maximum of 79.

The Wilcoxon statistical test was applied to test the variation in the pre- and post-activity state-anxiety. We found that in 55% of cases, the post-activity state-anxiety was lower than the pre-activity state-anxiety, with 26% verifying more post-activity state-anxiety than pre-activity and 19% presenting the same level of state-anxiety (Table 2).

Table 2. State-anxiety pre- and post-rafting activity.

		General (*n* = 100)	**Male (*n* = 56)**	**Female (*n* = 44)**
State-anxiety Post-Pre Activity	Post < Pre	55	26	29
	Post > Pre	26	19	7
	Post = Pre	19	11	8
Wilcoxon Z =		−3.434 (p < 0.001)	−1.323 (p = 0.186)	−3.459 (p < 0.001)

The results suggest in an overview of our sample, N(100), that 55% demonstrated that the values of state-anxiety post-activity were lower than the values of state-anxiety pre-activity (Wilcoxon Z = −3.434; p-value < 0.001) (Table 2). When analyzing the variable pre- and post-activity state-anxiety according to the variable gender, we found that in females, 65.9% had a higher pre- than post-activity state-anxiety, while 15.9% had a higher post- than pre-activity state-anxiety, and 18.2% maintained the same level of state-anxiety. The results in females suggest that the median post-activity state-anxiety scores were significantly lower than the median pre-activity state-anxiety scores in females (Wilcoxon Z = −3.59; p-value < 0.001) (Table 2).

In males, 46.4% had a higher pre-activity state-anxiety than post-activity, while 33.4% had a higher post-activity state-anxiety than pre-activity, and 19.64% maintained the same level of state-anxiety. However, Wilconxon's test showed a nonsignificant difference between state-anxiety post-activity and pre-activity (Wilcoxon Z = −1.32; p-value = 0.186).

Regarding anxiety, its measurement resulting from the use of the STAY-Y form may vary between 20 and 80 points and may be stratified into low degree of anxiety (0–30), medium degree of anxiety (31–49), and a high degree of anxiety (greater than or equal to 50). Consequently, the lower the score, the lower the degree of anxiety (Table 3). In Females pre-activity state-anxiety, we found 63.6% with a low degree of anxiety, 38.8% with a medium degree of anxiety, and only 4.54% with a high degree of anxiety, corresponding to a median value of 27.50.

Table 3. Stratification of anxiety degrees.

	Low Degree of Anxiety (0 a 30)	Average Anxiety Degree (31 a 49)	High Anxiety Degree (>50)	Median
State-anxiety Pre-Activity Female *n* (44)	63.6%	38.8%	4.54%	27.50
State-anxiety Post-Activity Female *n* (44)	88.6%	9.09%	2.2%	23
Trait-Anxiety *n* (100)	47%	42%	11%	31

In female post-activity state-anxiety, we found 88.6% with low anxiety, 9.09% with a medium degree of anxiety, and only 2.2% with a high degree of anxiety, corresponding to a median value of 23.

The levels of trait-anxiety presented were 47% with low anxiety, 42% with a medium degree of anxiety, and only 11% with a high degree of anxiety, corresponding to a mean value of 31.

4. Discussion

This study aimed to analyze the pre- and post-activity state-anxiety, as well as to characterize the levels of trait-anxiety and the amount of physical activity performed weekly by clients of a rafting activity.

The World Health Organization [20] recommends that adults between the ages of 18 and 64 years should perform at least 150 to 300 min of aerobic physical activity, moderate-intensity, or at least 75 to 150 min of aerobic physical activity, vigorous-intensity, throughout the week for substantial health benefits.

Using the formulas of calculation of Forde [21] for metabolic equivalents, it would give between 600 and 1200 METS/Week, and by stratifying the objective results, we verified that 14% of our sample were below 600 METS/Week, 10% were between 601 and 1200 METS/Week, and 76% had values above 1200 METS/Week.

Therefore, we can affirm that our participants practice physical activity beyond what is recommended, being extremely active, as the average amount of physical activity was found to have a median value of 2580 (Mets/week). This high level of physical activity may be related to the age range of the participants, which was between 18 and 61 years old, with an average of 33.27 ± 10.10 ($n = 100$) and may also be related to the predisposition of the participants for the practice of sports and the consequent search for new sensations in a natural environment [22].

However, we cannot fail to mention that 24% of our sample had low physical activity, with this significant value of our sample of about a quarter deserving attention by the guides as this lack of physical activity can negatively influence the execution of the activity, putting the group at risk [23].

Miranda et al. [24] support the interconnection between anxiety and physical activity, stating that it has an anxiolytic effect on anxiety levels, thus reducing the degree of anxiety. The benefits of physical activity in anxiety symptoms are unquestionable [25].

Cheik et al. [26], in a study aiming to verify the influence of physical exercise and physical activity on psychological aspects, found that the regular practice of physical exercise contributed to reducing the levels of depression and anxiety in individuals.

Marques et al. [27] reinforced the idea of the importance of sports practice, which brings about beneficial effects in terms of healthy habits, social integration, in addition to all physiological aspects that benefit from sports practice, and concluded that sports in a leisure context significantly decrease anxiety levels in practitioners, as classified by the rafting activity.

When we correlated the amount of weekly physical activity in our sample with the trait-anxiety, we did not find a correlation (*p*-value > 0.05), which is not in agreement with the literature found [14].

Another parameter analyzed was state-anxiety, which is a transitory state that varies over time and responds to the perception of some threat [18]. In the state-anxiety pre- and post-activity, we only found significant differences in females (Wilcoxon $Z = -3.59$; *p*-value < 0.001).

Moderate levels of anxiety (nonpathological) can be considered ideal for better performance, directing the focus to a specific activity, which does not occur with low levels of anxiety, which cause a decline in alertness and attention, or with high levels that cause physiological changes that affect the performance of the activity [28].

Although we only found significant differences in females, it suggests that the rafting activity reduced anxiety levels, meeting their charisma of leisure activity and contact with nature [29]. We should also emphasize the importance of the guides' supervision, which, by providing good supervision, may provide a pleasurable and leisurely moment, thus lowering anxiety levels.

In this study, the sample involved answering to a state-anxiety assessment instrument before and after the activity. In the pre-activity female assessment, only 38.8% were at a medium level of anxiety, which Paulini et al. [30] advocated as ideal for physical performance, and 63.6% at a low level of anxiety.

According to Mckay [2], rafting does not require special skills from the clients, nor a specific physical form, so the physical performance of excellence does not become a preponderant factor in its performance; however, the existence of regular physical activity helps to reduce the risk.

The search for NS activities is a consequence of the search for new emotions and a break with everyday life [31], thus justifying that 63.6% of female participants were in a low state-anxiety. From the point of view of the guide, who is responsible for framing the activity, this low level of anxiety and consequent relaxation on the part of the clients may culminate in a misinterpretation of the risks involved and reduced attention to the guide's instructions, which is a preponderant factor for a safe framing of the activity.

When comparing the values of state-anxiety before and after the activity, we found statistically significant values in females (Wilcoxon $Z = -3.59$; *p*-value < 0.001). The higher level of pre-activity anxiety state can be explained by the fact that it is a NS activity with associated risk, transmitting the lack of knowledge about its outcome, being interpreted as a threatening situation that triggers feelings of fear, uncertainty, lack of security, and excessive nervousness [32–34], which fades after the activity.

We therefore infer that rafting is a pleasant and sustainable activity, reducing state-anxiety, mostly in female practitioners, which is in line with the idea that this activity helps to distract and move away from everyday life, presenting itself as self-assured and with heterogeneous abilities, making it possible to welcome anxious clients, with less or greater physical capacity.

This study had some limitations, namely the sample size and its origin; all participants were customers of the same company. Moreover, the fact that the sample was of convenience and cross-sectional does not allow the generalization of the results. However, it is the first step toward a line of research that is still little explored, especially in Portugal but not only there. We suggest that further research should be carried out encompassing participants from other companies and attending higher-degree rivers to provide a more detailed analysis on this theme.

The data obtained will be an important aid in the education of rafting guides, becoming an indisputable reference in their basic training. The knowledge of the different state-anxiety and their variation pre- and post-activity will allow the guides to develop tools to better receive, motivate, and frame the participants, allowing the realization of a safer, enjoyable, and more sustainable activity.

5. Conclusions

The sample of this study proved to be physically active, and 76% of them had a physical activity above the parameters recommended by the World Health Organization [20]. We did not find a correlation between the amount of weekly physical activity and the trait-anxiety. When state-anxiety was analyzed, we found that, in 55% of the cases ($n = 100$), it decreased with the practice of rafting, with the female sex being the one that found statistically significant values ($n = 44$), which suggests that it may have an anxiolytic effect and promote the well-being and relaxation of the participants, thus promoting the sustainability of the rafting activity.

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