

“... the thought that I could flip and die today made me feel anxious”: A study of the experienced emotions of novice white-water kayakers

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Abstract

Learning to white-water kayak often takes place in a stressful environment. This challenges participants' experiences of the activity, causes emotional responses, and can affect their learning. The purpose of this study is to explore participants' experienced emotions during an educational white-water kayaking programme. Fifty-eight outdoor students from New Zealand participated. The participants responded to a bespoke questionnaire exploring fleeting somatic arousal and emotion on five different occasions during a kayaking day. Participants' emotions changed during the activity. Excitement was significantly higher than anxiety across the day. Anxiety was highest before starting the activity. No significant difference was found between the male and female participants' emotions. A thematic analysis resulted in five themes describing the participants' emotional experiences. Findings are discussed and related to theory and previous research. These findings present new insights regarding in-the-moment emotional perspectives during a white-water kayaking course for novices.

Keywords: *white-water kayaking; anxiety; learning; adventure activities; gender perspective*

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Introduction

White-water kayaking has a long history in the Anglosphere (MacGregor, 1866), starting as an outdoor adventure or recreational activity and developing into competitive sport, an Olympic sport, a tourist attraction, and an educational tool. These activities occur globally where climate and topography align to spawn white-water rivers and, in the case of artificial white-water parks, even where they do not. New Zealand and North-Western Europe are places where high rainfall and steep

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terrain provide the raw materials for this activity. New Zealand has a relatively long history of using white-water activities in both college programmes (<18yo) e.g. Howick College, St Paul's Collegiate, and tertiary programmes (>18yo) e.g. AUT University, Tai Poutini Polytechnic, Ara Polytechnic. Scandinavia has a shorter history of white-water kayaking but is adopting the pursuit rapidly. Increasingly, visitors arrive in Norway for nature and adventure activities with towns such as Voss capitalising as adventure destinations (Gyimóthy, 2010). White-water activities are seen as valuable to Scandinavian locals (Aas & Onstad, 2013), where tourists and Norwegian locals are increasingly seeking the thrill of white-water kayaking. Good kayaking rivers are found across the country, and very active white-water recreation communities are found in Sjøa, Voss, Kongsberg-Dagali, Oslo, Arendal, Trondheim, Oppdal, Lillehammer, Sogndal, Valdalen, Evje, and Hattfjeldal (Zinke et al., 2018, p. 3). White-water kayaking is now also taught at several educational institutions in Norway, including folk high schools ('*folkehøgskoler*') and colleges, e.g. Stavern Folk High School, Lyngdal Folk High School, and Voss High School.

Participant and client experiences of emotions in white-water have yet to be fully studied, but this gap needs to be filled to ensure a good experience for both instructors and beginners. This is perhaps more important in Scandinavian countries where the traditional outdoor activities under the '*friluftsliv*' model of outdoor education and recreation are more in harmony with nature and less adrenaline-inducing. The Norwegian Canoe Federation recognises that white-water kayaking takes place in a stressful environment, which can evoke negative emotions that prevent learning and a good experience. In the curriculum to become a white-water instructor in Norway, principles of psychological factors are emphasised when instructing beginners and more advanced white-water kayakers (Norwegian Canoe Federation, 2021). A key principle of the federation is that for participants to learn, part of the instructor's role is to prevent high anxiety levels in participants when instructing white-water kayaking (Føllesdal, 1996). The way participants experience emotions related to stress, fear and anxiety when learning white-water kayaking is thus of great importance in the Scandinavian context.

Many outdoor adventure activities emphasise challenges, especially physical challenges, as a central driver of learning (Priest & Gass, 2018). Experiential learning theory postulates that challenging experiences can be transformed into learning through a person's conscious cycle of experiencing, thinking, acting and reflecting (Kolb, 1984). In the past it has been argued that anxiety plays an important role; that it is the presence of anxiety that impels a learner to tackle the tasks presented (Walsh & Golins, 1976). However, more recent research shows that anxiety can be so overwhelming that it creates a negative spiral that disrupts motivation and depresses learning (McKenzie, 2003). It has been argued that placing people in stressful situations to help them overcome their fear and therefore grow as individuals (as postulated in the comfort zone model) should not be used to underpin programmes and teaching methodology in outdoor education (Brown, 2008). Indeed, Reed and

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Smith (2021) suggest that participants’ debilitating experience of fear can be at odds with the facilitator’s expectation of the growth potential of that fearful experience. The best scenario for learning, growth and change is the one where participants feel safe, secure, cared about, experience an optimum level of challenge and are working within their comfort zone (Csikszentmihalyi, 2000; Davis-Berman & Berman, 2002; Dingle et al., 2006; Hanin, 2000).

Further, positive mood and positive affect, it is suggested, lead to better activation of human memory (Bauml & Kuhbandner, 2009). This could influence both short- and long-term memories and learning (Moore & Oaksford, 2002), while anxiety and negative affect have been found to reduce learning and lessen cognitive processing ability (Khan & Zafar, 2010). Many models explain this relationship, including the information processing model (Humphreys & Revelle, 1984), selective attention (Braunstein-Bercovitz, 2003), the processing efficiency theory (Eysenck & Calvo, 1992), and the conscious processing hypothesis (Masters, 1992).

The construct of self-efficacy (Bandura, 1977) has seen continued application to psychology and more recently to outdoor learning domains (Deane et al., 2017). These more recent studies of self-efficacy have seen the original (Bandura, 1977) term ‘performance accomplishment’ replaced with the term ‘mastery experience’ (Deane et al., 2017) as the principal mediator of participants’ judgements of the strength of their self-efficacy beliefs (Bates & Khasawnek, 2007; Usher & Pajares, 2008). Allied to this are the findings of Rose et al. (2010) which conclude that the actual outdoor experiences (mastery experience) account for the most learning on a National Outdoor Leadership Schools course.

Teaching methods that have encouraged ‘personal mastery’ (Berry & West, 1993), i.e. a fixed skillset and variable time, have seen renewed interest from outdoor educators (Beames & Brown, 2016; Gray & Piggott, 2018), largely due to the wide-reaching benefits of these methodologies (Muntz & Müller, 2016; Zaichkowsky & Baltzell, 2001).

Providing positive experiences that develop self-efficacy and perceptions of personal mastery are key to successful outdoor programmes. It therefore seems vital that the facilitator can monitor the students’ emotional state and therefore the learning potential of the given experience.

Self-efficacy has an influence on affect, with Laczczynska et al. (2005) finding that general self-efficacy has a positive relationship with positive affect and a negative correlation with negative affect. Factors that both improve performance and self-efficacy are arousal and emotion. These two factors are both antecedents of self-efficacy beliefs (Bandura, 1977; Schunk, 1995) and are related to peak performance in models such as Hardy and Parfitt’s (1991) catastrophe model and Hanin and Syrja’s (1995) individual zone of optimum function. The extent to which people believe they can exert a controlling influence over a stressful situation has also been shown to vary directly with arousal and performance (Folkman, 1984; Folkman & Lazarus, 1988), while perceptions of a lack of control have been associated with

increased anxiety (Endler et al., 2001). Both perceived control in stressful situations and strength of self-efficacy beliefs are strong predictors of academic achievement (Linnenbrink & Pintrich, 2003; Perry et al., 2007). Lang (1985) posits that emotions are stored in memory as a series of propositions accessed by information processing mechanisms. When information is received that matches the stored propositions, particular emotions are evoked. Full emotional response is more likely with complete matches, but limited emotional response can be accessed with partial matches. This suggests that if modification of some of the propositions can be made, then the emotional response might be attenuated. Lang (1985) also suggests that emotional expression lies along three dimensions: arousal; from low arousal to high, valence; from unpleasant to pleasant, and the degree of control.

The environment in which Western style outdoor pursuits are undertaken has been found to be highly stress-inducing (Bunting et al., 2000; Ewert, 2014). This is particularly so for white-water kayaking where there are perceived and actual risks involving capsizing and a high incidence of physical injury (Bunting et al., 2000; Fiore & Houston, 2001), thus the activity must be carefully managed. Stress can be viewed as a relationship ('transaction') between individuals and their environment, where the demands exceed the available coping resources (Lazarus & Folkman, 1986). This points to two processes within a person in its environment: cognitive appraisal and coping. Lazarus and Folkman's (1984) model of stress appraisal and response shows that short-term outcome of stressors can result in positive or negative feelings. Stress leads to physiological activation (arousal); the individual can perceive this arousal in either of two directions, positive affect (excitement) or negative affect (anxiety) (Burton & Naylor, 1997). A relationship between anxiety and arousal has been found, showing that high physiological arousal with high cognitive anxiety will lower performance (Hardy & Parfitt, 1991; Krane, 1992). Some authors would suggest that participants can flip from one emotional state to another with no change in physiological arousal but only in somatic perception (Apter, 1982). Summarizing, how a student or participant experiences or interprets their arousal (as arousal, anxiety, fear, or excitement) can influence the person's experience and the learning potential in any given stressor-filled environment.

Some aspects of the white-water kayaking participant experience have been researched, such as kayakers' experience of flow (Jones et al., 2000) and female white-water kayakers' experiences related to fear, confidence and competence (Dingle et al., 2006). Other research in this field has focused on injuries/medical perspectives (Fiore & Houston, 2001; Kizer, 1987; Murdoch & Kelly, 2018), place attachment for white-water recreationists (Bricker & Kerstetter, 2000; Kainzinger et al., 2018), and participation and involvement in white-water kayaking (Ewert et al., 2013; Schuett, 1993; Whiting et al., 2011). Research on how novice white-water kayakers experience emotions while learning, as well as the tools developed to measure this, needs to be undertaken and would make a valuable contribution to the outdoor education field in Scandinavia and other Western countries. This would provide instructors and leaders

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with a better understanding of the participant experience and their role in counter-acting its negative effects.

In a gender perspective, the outdoor adventure environment is stereotypically seen as male dominated (Godtman Kling et al., 2020; Kennedy & Russell, 2020), although we see women’s participation increasing (Outdoor Foundation, 2020). Literature and research into gender has also developed, looking into gender role socialization, participant rating and programme planning, together with gender differences in outdoor experience and risk taking (Neill, 1997; Warren, 2002, 2016). Gender differences were found throughout an outdoor education programme with females consistently reporting higher levels of anxiety, where social fear was higher than physically based fear (Young & Ewert, 1992). However, Chang et al. (2019) found no gender differences in stress levels of college age students, in short-term outdoor programmes. However, in general, little research literature exists on white-water kayaking, especially when related to gender.

The aim of this study was to explore outdoor education students’ emotions ‘in the moment’ during an educational white-water kayaking day with a focus on how and why emotions change, their relationship to gender and the pedagogical implications.

The research questions were:

- 1) How do novice paddlers experience excitement during an educational white-water (if possible) kayaking trip?
- 2) How do novice paddlers experience anxiety during an educational white-water kayaking trip?
- 3) How do novice paddlers experience arousal during an educational white-water kayaking trip?
- 4) Can causal factors be established for the changes in emotional state?
- 5) Can sex differences be detected in novice paddlers’ experience of emotion (feeling excited, anxious, and aroused) during an educational white-water kayaking experience?

Of the available and validated measures of anxiety, the CSAI-2 (Martens et al., 1990) is reported to take up to ten minutes to complete when the parameter it measures is in a constant state of flux, and is arguably not measuring anxiety at all. At the other end of the scale, the Anxiety Thermometer (Pijpers et al., 2003) is very quick to complete, but is simplistic and lacks any detail of the nature of the anxiety state reported. The challenge of accurately measuring participants’ experience of their emotions in the natural environment of a kayaking programme using a timely non-invasive tool is discussed in this study.

Method

We applied several methods to explore the participants’ experiences, closed questions analysed with statistics and open-ended questions analysed qualitatively. By blending

the approaches, the quantitative data are explained by the qualitative data and vice versa, providing richer data as a basis for informed conclusions.

Participants and setting

Participants in this study were students from two outdoor programmes in higher education, one group at university and one at college level, both based in Auckland, New Zealand. Fifty-eight students agreed to participate. The university group consisted of 14 female and 18 male participants, aged 18–30 years old. The college group consisted of 13 female and 13 male participants, all aged 17. The overall gender distribution was 27 females and 31 males. Table 1 shows participant characteristics.

Table 1. Characteristics of participants

Group	M age (SD)	Male	Female	Total
University	21 (3.1)	18	14	32
College	17 (0)	13	13	26
Total	19 (3)	31	27	58

Abbreviations: *M* = mean, *SD* = standard deviation

Students taking a kayaking programme as part of their university diploma or outdoor education course at college were invited to participate in this study as they follow identical programmes at the same venues with mostly the same instructors and organiser. Within the two groups, the students were familiar with each other as they had worked together across several other outdoor activities in other parts of their outdoor education programme. The programme aimed to provide the students with kayaking skills and knowledge of themselves and the environment. It was implemented by qualified male and female instructors from the New Zealand Outdoor Instructors Association. The white-water programme is described in Table 2.

Table 2. Description of the kayaking programme

White-water kayaking programme		
Day 1	Day 2	Day 3
<ul style="list-style-type: none"> • Training on basics in heated pool • Training on wet exit • Introduction and training on rolling • Introduction and training on different rescue techniques 	<ul style="list-style-type: none"> • Drive to river • Boat fit and safety instructions • Kayaking on grade 1 river • Set-up camp/dinner • Discussions and debrief 	<ul style="list-style-type: none"> • <u>Day of data collection</u> • Breakfast and camp time (site 1, Rest lodge) • Boat fit and getting ready (site 2, Rest riverbank) • Kayaking on river grade I–II (site 3 and 4, On water) • Lunch (site 5, Recovery)

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Ethical considerations

This research was approved by the Auckland University of Technology Ethics Committee on 30 September 2013, Reference number 13/235 AUTEK. The researchers provided oral and written information about the study to the students. Written consent was obtained from all participants in this study. Participants were informed that they could withdraw from the study at any time without consequences and were assured of confidentiality.

Data collection

Data were collected on the third day of the kayaking programme that involved paddling 10 km on a grade I–II river in small groups. Participants were given a number code written on their hand with waterproof ink. The participants wrote this code on the questionnaires to ensure anonymity and enable tracking of answers across the day. They were again informed orally about the purpose of the study and the concepts of excitement, arousal and anxiety were explained. The questionnaire was given on five different occasions. Site 1, Rest lodge: In the morning, shortly after the participants woke up, Site 2, Rest riverbank: The participants were in their gear and ready to go on the river, Site 3, On water 1: Short break on the river, Site 4, On water 2: Just after the largest rapid at the end of the river trip and Site 5, Recovery: After a one-hour lunch break.

Data collection took place in a natural environment and in an educational context, and therefore involved certain constraints. The research aim was to disrupt the normal kayaking programme as little as possible and keep the natural environment of both the kayaking and the educational context authentic. To minimise impact, data collection was carried out in their normal breaks and questionnaires were not given to the participants until they needed to be filled out. The kayaking instructors were trained to help in the data collection, handing out questionnaires and collecting them at designated places. Prior to the trip, the instructors were given a written explanation about the study and how data should be collected, with descriptors of how excitement, anxiety, and arousal should be understood if participants asked during data collection. Further, researchers provided instructors with an oral briefing on the morning of data collection. A short questionnaire was developed, ensuring that participants were able to give answers easily and quickly, whilst requiring a minimum of material to accommodate the sometimes wet, cold and windy environment. All data were carefully and accurately typed in Microsoft Excel format.

Measurements

Excitement, anxiety, and arousal can be measured by a variety of methods, but perhaps the most relevant to this study is the self-report. This method gives insight into how the physiological changes and emotions are being perceived by the participant (physically). As emotional response is dependent on the person’s interpretation via

the relevant hedonic tone and matching of stored propositions of those feelings, it can be argued that this method has greater relevance than any quantitative biological marker. Before the commencement of the study, excitement, anxiety, and arousal were described to the participants and examples were given to aid understanding of the terms. Excitement was described for the participants as a positive feeling, like buzzing, eagerness, enthusiasm, or exhilaration. An example is the way a child can feel on Christmas Eve. Anxiety was described as feelings of worry, fear, or uneasiness. When one is anxious, one is very concerned or worried about what may happen or has happened. It is a general negative feeling of concern about something real or imagined. Arousal was described as how busy and alert one's mind and body are. If a person is really ready to do something, that person is highly aroused. A feeling that one's heart is beating quickly, sweating and a focused mind are all signs of high arousal. Feeling sleepiness (but not tiredness) and relaxation are signs of low arousal.

Instrument

Participants' perceptions of how they experienced excitement, anxiety, and arousal were measured through a questionnaire we developed to specifically fit the natural environment of white-water kayaking: the Kayaking Emotion Thermometer (KET) (Appendix 1). This instrument was designed to give a simple to administer 'snapshot' of the emotional state of the participant 'in the moment', but also to provide a deeper understanding of the participants' lived experience. Due to ethical constraints, it had to minimise disruption to the participant's programme. Participants were asked to indicate on each of three Likert-type scales their perceived level of excitement, arousal and anxiety. A continuum was used to avoid participants matching perceived feelings with those of peers. In the printed version the scale is 10 cm so that the response can be converted to a numerical value for analysis.

A deeper understanding of the participants' emotional state and the direction of their state of affect was derived from the open-ended question, "Please state what makes you feel the way you do". This phrase was used to enable participants to comment on the widest possible range of perceived causation (internal, environmental, social and facilitation) without any leading bias.

Analysis

SPSS 26.0 was used for statistical analysis (Chicago, IL, USA), with a significance level of 0.05. All participants were included even though some did not have a complete data set. This could be a source of bias, although an analysis can be considered valid provided the data are missing at random, thus the data set will still be representative. A Little's MCAR test (Little, 1988) showed that the data were missing at random, hence we report on the original dataset with all participants included. Participants' stated excitement, anxiety, and arousal are reported as means with standard deviation. Independent sample t-tests were used to compare means and a

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one-way between-subjects ANOVA with Bonferroni corrections was used to analyse changes over the five time points.

Analysis of qualitative data

This was guided by thematic analysis (Braun et al., 2016) and conducted with a reflective inductive approach. Thematic analysis was appropriate as it can show patterns of shared meaning. It uses reflexivity as an essential aspect and the subjectivity of the researcher is a resource rather than a potential threat (Braun & Clarke, 2019). The analysis consisted of the following five steps (Braun & Clarke, 2019; Braun et al., 2016):

- 1) Familiarising oneself with the data: The written responses from all sites were initially read to gain an overall impression and become familiar with their content.
- 2) Generating initial codes: The text passages were then organised into the five sites, and each site then became a source of a thematic analysis. At each site text was organised into codes representing shared meaning, e.g. ‘fun’ and ‘competence’ were codes developed when analysing site 4.
- 3) Searching for themes: The codes were organised into potential themes and sub-themes.
- 4) Reviewing themes: The themes were checked to ensure that they represented the content of the codes.
- 5) Defining and naming themes: The themes and subthemes were revisited, analysed, and redefined. The themes aimed to describe the essence of the participants’ experience at each site.

We have provided readers with several passages to inform them of their nature and depth, while allowing them to share the participants’ experiences. Data from each data site consisted of 42–50 written responses, giving 229 short answers in all.

Results

Excitement, anxiety, and arousal during the kayaking day

Participants’ reported feelings of excitement, anxiety, and arousal during the kayaking day are presented in Figure 1.

A one-way between-subjects ANOVA showed significant changes in excitement during the kayaking day, $F(4, 188) = 18.53, p < .001$. The post-hoc test revealed that the participants’ scores of excitement significantly increased from Rest lodge to Rest riverbank ($p = .009$). Further, they increased significantly between On-water 1 and On-water 2 ($p < .001$), followed by a significant fall in excitement between On-water 2 and Recovery ($p < .001$). This shows that excitement steadily increased during the kayaking day and only dropped when the trip ended, but was still relatively high.

The one-way between-subjects ANOVA showed significant changes in anxiety during the kayaking day, $F(4, 188) = 14.25, p < .001$. The post-hoc test showed no

significant change in feeling anxious between Rest lodge, Rest riverbank, On-water 1 and On-water 2. Anxiety was significantly lower at Recovery than all other sites ($p < .001$).

A one-way between-subjects ANOVA showed significant changes in arousal during the kayaking day, $F(4, 184) = 25.8, p < .001$. The post-hoc test revealed that the participants' scores of arousal significantly increased between Rest lodge and Rest riverbank ($p < .001$). Further, arousal increased significantly between On-water 1 and On-water 2 ($p < .001$), followed by a significant decrease between On-water 2 and Recovery ($p = .012$). The means and standard deviation are presented in Figure 1.

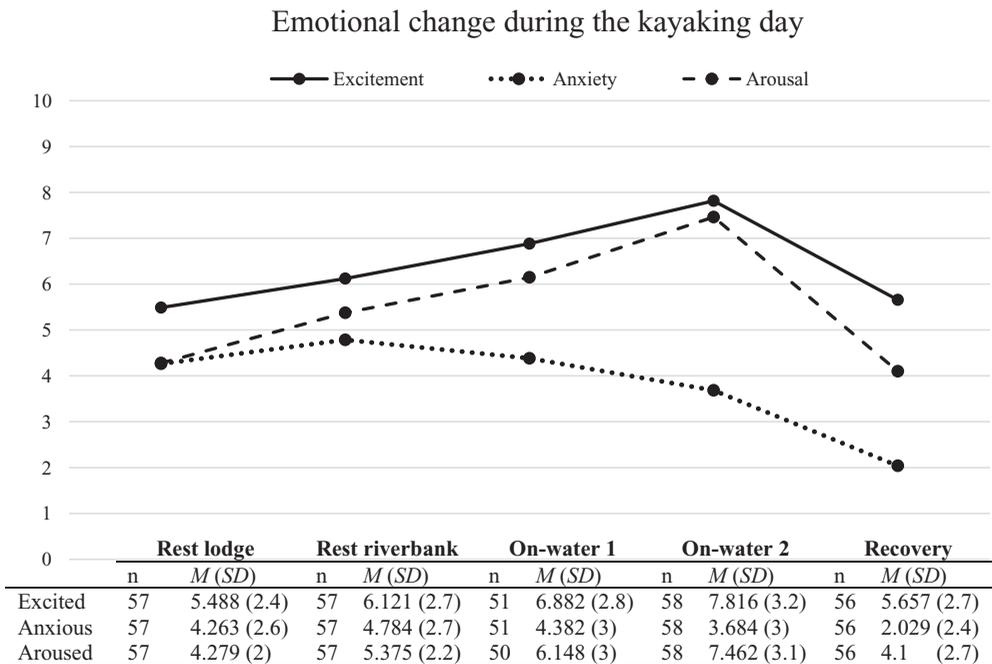


Figure 1. Excitement, anxiety, and arousal changes over time, table showing means and standard deviation

Abbreviations: *M* = mean, *SD* = standard deviation

Participant scores of excitement were significantly higher than arousal at Rest lodge (confirmed by a paired sample t-test, $p < .001$) with no differences found at the other sampling sites. Excitement is significantly higher than anxiety at all sites (confirmed by a paired sample t-test, at Rest lodge $p = .011$, at Rest riverbank $p = .014$, On-water 1 $p < .001$, On-water 2 $p < .001$ and Recovery $p < .001$). Anxiety is significantly lower than arousal (and excitement) at On-water 1 ($p = .002$), and On-water 2 ($p < .001$) and Recovery ($p < .001$).

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Perceived emotions over time by gender

Figure 2 presents male and female participants' reported feelings during the kayaking day. Although female participants reported consistently higher levels of anxiety than their male counterparts did, this difference did not reach statistical significance ($p = .062$ at site 3, On-water 1). Perhaps a larger study showing similar trends would meet the statistical threshold. Other emotions showed even closer correlation between males and females.

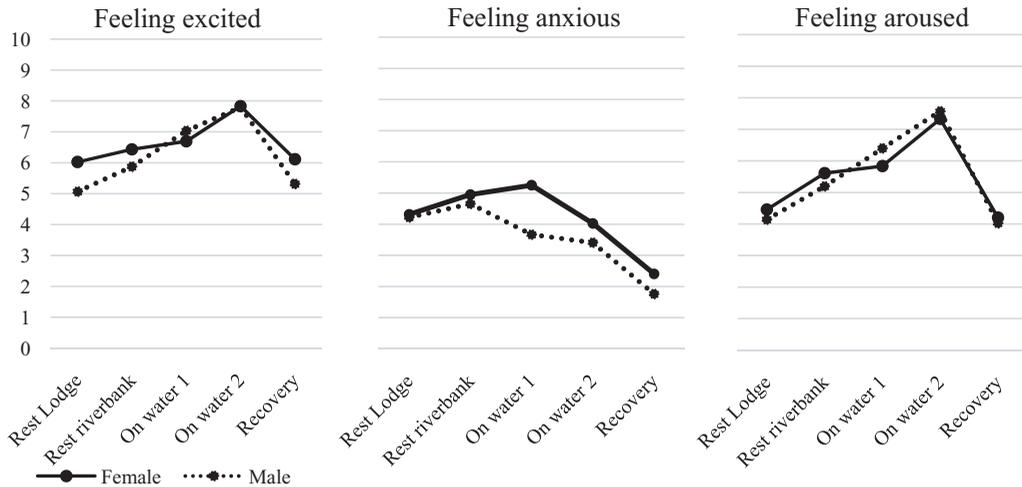


Figure 2. Male and female mean scores of excitement, anxiety, and arousal

Results from thematic analysis of participants' answers to the open question “Please state what makes you feel the way you do”

Identified themes and subthemes for the five sites are presented and described below in Table 3. Each theme describes the essence of the participants' shared experiences at each site. Participants' quotes exemplify the findings, and we added their scale-reported emotions to enhance our understanding of the level of reported experience of emotions. At each theme, we look across the data, letting the different data complement each other to deepen our understanding of the participants' emotional experience.

Figure 3 (below Table 3) presents data for one male participant. This exemplifies the findings, namely that participants across the day report high levels of excitement, anxiety, and arousal, indicating that this is a stressful experience and environment. It shows that negative emotions and expectations are present before starting the activity, however once taking part in the activity, the high arousal is in a positive direction and anxiety is lowering. Overcoming fear and anxiety, personal learning and development occur while perceived competence increases. Of note are the lasting effects of excitement (afterglow) and the steady decline in anxiety throughout the day.

Table 3. Results of thematic analysis presented through themes, subthemes and quotes from the data

Themes	Quotes
Rest lodge: Theme 1: Over(thinking) about the coming event	
Subtheme: Appreciation of a new challenging learning experience	
At rest lodge in the mornings, several participants reported being excited about the upcoming kayaking activity. They reported feeling confident, trusting the instructors, and feeling positive about meeting and dealing with challenges. A small group of participants only commented about their morning that it was cold, they felt sleepy and did not comment on or think about the day ahead.	“I’m excited about a bigger challenge, I’m not too worried because I trust the instructors.” (Female, excited: 8, anxious: 2, aroused: 7)
Subtheme: Anticipation and mixed feelings. A large group of participants reported mixed feelings. On the one hand, they described being excited about the activity, and about developing and trying out skills and having fun. On the other hand, they reported feeling scared, anxious, and worried, for several reasons they thought of: they were anxious about the activity itself and elements of the river that they found intimidating (hazards, rapids). They further related the negative feelings to lack of confidence in skills, and feeling uncertain about the river.	“I’m excited because it’s a new day, new experience, new opportunities to learn.” (Female, excited: 9, anxious: 1, aroused 2)
	“After the first session I struggled to get most things right, so I’m worried about today though I did have fun so I do want to do it today.” (Male, excited: 6, anxious: 9, aroused: 4)
	“I’m afraid of water a little bit. My mind likes to overthink everything.” (Female, excited: 3, anxious: 9, aroused: 3)
Interpretation across data: We found no differences between the three reported emotions at Rest lodge. In Figure 1, we see that all emotions are between 4 and 6 just after waking up. From the analysis of their responses at this site, we see that participants at an early stage were highly influenced by the fact that a challenging learning activity is to take place. The coming event is present in their minds, leading to feelings of being excited, anxious and aroused.	
Rest riverbank: Theme 2: Need to prepare mentally and physically for the challenge	
Subtheme: Getting ready increases joy of expectation	
As the event came closer and the participants were getting ready and geared up, they reported increased individual and peer excitement as being and getting mentally and physically ready. Some also reported thinking and getting more nervous while peer support lowered anxiety.	“After getting my heart rate up I’m more pumped so now I’m ready to kayak. Still very anxious about flipping my kayak though!” (Female, excited: 8, anxious: 5, aroused: 8)
	“Having fun with everyone has built my excitement and I’m feeling less anxious.” (Male, excited: 8, anxious: 2, aroused: 7)

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Themes	Quotes
<p>Rest riverbank: Theme 2: Need to prepare mentally and physically for the challenge</p>	
<p>Subtheme: Feeling nervous and thinking of fearful elements Several participants reported feeling nervous, not confident in their skills and anxious for the unknown (the river). They reported thinking of things that might happen that they were afraid of, difficult tasks they might meet and scary elements, such as going through rapids.</p>	<p>“Fear of falling out, and not being able to get back in” (Male, excited: 1.1, anxious: 8.5, aroused: 1.8)</p> <p>“I have a fear of water itself. I’m very worried that something bad will happen” (Female, excited: 3, anxious: 9, aroused: 3)</p>
<p>Interpretation across data: In Figure 1, we see a significant increase in excitement and arousal from Rest lodge to Rest riverbank and a small non-significant increase in anxiety. In our analysis of their responses, we found that getting ready and putting gear on makes the participants focused and getting themselves mentally and physically ready, which could explain feeling more aroused. At Rest lodge, there seemed to be mixed feelings among participants, with several relating imagined frightening outcomes. However, as Figure 1 shows, participants in general felt more excited than anxious.</p>	
<p>On-water 1: Theme 3: Getting familiar with the situation</p>	
<p>Subtheme: Positive and optimistic. When expectations met reality, several participant were positively surprised, some reported feeling more confident in skills and others appreciated now what was coming. The balance between demands and skills helped participants to feel happy, have fun, and enjoy the shared experience with their peers.</p>	<p>“I feel more confident about my technique today and had a good flow in the rapids.” (Male, excited: 6.7, anxious: 2.8, aroused: 5.1)</p> <p>“I feel much better about being in the water. Still a little worried. It’s not as bad as my mind thought it would be.” (Female, excited: 7, anxious: 4, aroused: 7)</p>
<p>Subtheme: Dealing with fear. Experiencing the struggle of handling the challenges and lacking the requisite skills made a group of participants feel terrified, unhappy, sick, anxious, and nervous. They reported capsizing and going through rapids as intimidating and not feeling ‘steady’.</p>	<p>“Still absolutely terrified. A little bit sick. Still some fun parts though.” (Male, excited: 5, anxious: 9.8, aroused: 0.1)</p> <p>“Feeling scared and anxious because I can’t roll and I keep tipping over going through eddies.” (Female, excited: 7, anxious: 10, aroused: 5)</p>
<p>Interpretation across data: When the participants were on the water and had started the kayaking activity, excitement and arousal increased significantly and anxiety dropped slightly (non-significant). Feeling aroused and excited was significantly higher than feeling anxious, which can be explained by the participants now getting familiar with the situation and environment. Their expectation of the experience was more fear provoking than the reality they met. Anxiety was still present and high in several participants. However, the fear seemed less imaginative and more related to concrete events which they found challenging.</p>	

(Continued)

Table 3. (Continued)

Themes	Quotes
On-water 2: Theme 4: Coping while handling successes and failures	
Subtheme: Development and learning	
A pattern was revealed of dealing successfully with challenging tasks on the water increasing confidence and motivation. Several participants reported enjoyment, having fun, some even found enjoyment in 'failing' (capsizing and swimming). At this stage they expressed happiness due to feeling they had accomplished something either on their own or through others' success and learning.	<p>"Keen for more after doing rapids and surviving." (Male, excited: 10, anxious: 0, aroused: 10)</p> <p>"Our group did a really awesome job. I'm proud of our improvement." (Female, excited: 10, anxious: 2, aroused: 10)</p>
On-water 2: Theme 4: Coping while handling successes and failures	
Subtheme: Feelings of being overwhelmed	
Several of the participants' responses indicated that they were in general overwhelmed. They were high on their experiences, in the present and focused on the task at hand. Some participants were too overwhelmed. They reported swimming a lot, capsizing, hitting rocks and being scared and anxious.	<p>"Hated that, shaken up from being under water." (Male, excited: 0, anxious: 10, aroused: 10)</p> <p>"Pumped as hell to go through the rapids." (Male, excited: 9, anxious: 8, aroused: 9)</p>
Interpretation across data: Excitement and arousal have increased again significantly. At this site, we see reports of feeling highly excited and aroused, the pinnacle of the kayaking day. There was a sense of feeling high on the intense experience and feeling slightly overwhelmed. The high reported excitement can be explained by participants experiencing development and learning to deal successfully with challenges. Feeling anxious on the river was connected to experiencing too many challenges and we find examples of participants reporting extremely high anxiety and arousal and low excitement.	
Recovery: Theme 5: Ending an intense experience brings relief and reflection	
Subtheme: Contentment	
The participants responded positively to the end of the activity. Many reported feeling relaxed and just 'chilled out'. Several reflected on the day, reporting feeling proud of what they accomplished, appreciation of the experience and overcoming fear.	<p>"I lost my worries! Today was great, we improved a lot with [name of the two instructors]. One of the best experiences that I have ever had." (Female, excited: 9, anxious: 0, aroused: 9)</p>
Subtheme: Processing	
A group of participants seemed to reflect on and process their experience. One participant reported still feeling anxious after capsizing. Others reported feelings of exhaustion. However, they were still energised, describing motivation to continue the activity and improve skills further.	<p>"Excited to try again and try to improve. Still anxious, especially after tipping over a couple of times and not having control of the kayak." (Female, excited: 9, anxious: 4, aroused: 8)</p>
Interpretation across data: After finishing the kayaking trip, this time of the day was characterised by feelings of being relieved, content, and proud of accomplishments. This is connected to a significant drop in anxiety to the lowest point of the day, but it was still present as frightening events were being processed.	

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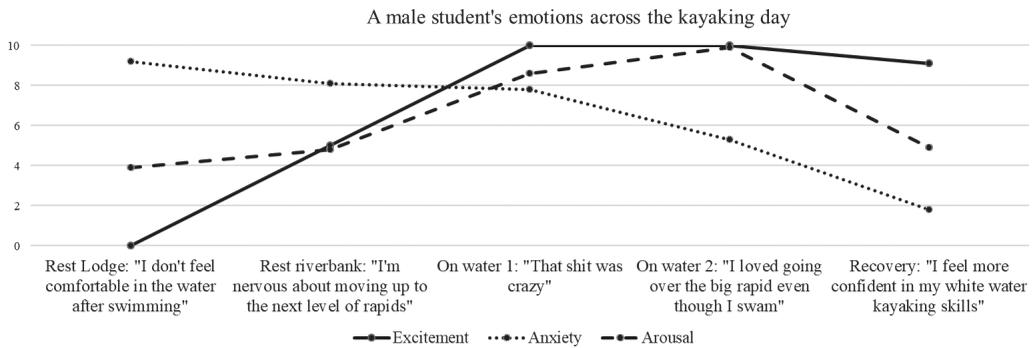


Figure 3. Example of one male participant's emotional experience of the kayaking day

Discussion

The participants' experience of emotions while learning white-water kayaking in a natural setting have been explored through a blend of approaches capturing the participants' self-reported experience 'in the moment' across an educational kayaking day. The results suggest that the participants in our study find learning white-water kayaking to be an intense process and experience, with strong emotions. This is related to the experience of white-water kayaking as an activity that sets certain requirements on the individual and the experience of the river and its features as sustained and unpredictable, yet a desirable challenge to take on.

Mastery experience

The changes that we see over the duration of the kayaking day in Figures 1 and 2 can be explained by several branches of research. We see that self-reported arousal and excitement rise as anxiety falls over the time the participants were preparing for the trip, and on the water tackling the rapids. Bandura's (1977) theory of self-efficacy relies on four sources of information (antecedents) on which to base judgement. The participants will be highly aware of these during the kayaking experience: their level of 'physiological arousal', seeing their peers succeed or fail (vicarious experience), their own previous success or failure 'mastery experience', and their instructor's and peers' 'verbal persuasion'. To some extent, greater experience will strengthen judgements of self-efficacy but only if the experiences are positive, successful and nurturing, thus fulfilling the conditions for optimal learning environments of Davis-Berman and Berman (2002) and Dingle et al. (2006). The strength of the social environment, the skill of the instructors, and the design of the programme interact with the participants' skills development to enable feelings of control and personal mastery which account for anxiety waning and excitement increasing. We see increasing levels of self-reported arousal, which would be congruent with the increasing technical difficulty of the rapids, and would be explained by Apter's (1982) reversal theory

where high arousal can be perceived as anxiety (at the start of the day) or excitement, with greater judgements of efficacy for the skills required. This leads to pleasant feelings and exhilaration, with increasing perceptions of personal mastery for the skills required. The physical challenge set for participants by the rapids of a particular river on a given day are relatively fixed; however, the participants' skill in manoeuvring their kayak are more subject to change (due to ongoing practice and ever greater experience). In this context, the pleasant sensations of personal mastery (Zaichkowsky & Baltzell, 2001) occur when the skill level has caught up with the demands placed on the participant by the environment. However, the emotional response of the participant is in even greater flux, dependent on the participants' interpretation of the level of challenge, their perception of the required skill level as well as their physical, physiological and cognitive arousal response. Indeed the hedonic tone that they ascribe to their individual set of antecedents highly influences their emotional state (Apter, 1982). This would suggest that increased lived experience of the river and ongoing practice of skills increased their judgement of self-efficacy (Bandura, 1977) for those skills at a greater rate than the increased challenge set by the technical difficulties of negotiating the rapids. It is suggested that only under well managed, appropriate activities, does this lead to an increased hedonic tone and strengthened judgements of self-efficacy (mastery experience), and greater perceptions of control (Folkman & Lazarus, 1988), thus leading to reports of increasingly excited emotional responses even during increasing arousal responses through the day.

Gender differences

Participant self-reports of physiological arousal and excitement showed a very similar pattern over the kayaking day, generally rising to the point on the river where the most difficult rapids were (On-water 2). Differences in the reported levels of anxiety between the male and female participants on the river did not quite reach statistical significance. However, a larger study or splitting the participant group along a gender continuum may have revealed a significant difference. This data is in line with other gender-based anxiety studies (Puskar et al., 2009), where females reported higher levels of anxiety than males. It has been suggested that females may be more inclined to reveal a true record of their feelings, whereas males may suppress their reporting as befitting of their burgeoning masculinity. However, the value of the qualitative question, as used in this research, suggests that in this study, the males and females represented their own level of anxiety accurately. It is interesting to note that the effect of anxiety on enjoyment and learning is purely based on an individual's perception of that somatic anxiety and not on a particular biologically measured marker.

Although white-water kayaking is seen as a male-dominated activity, nearly half of the participants in our study were female. It has been argued that gender differences are less often seen because women who choose to participate in outdoor education programmes may be a self-selected group, who have higher ideals of self-conceptualisation and are more motivated towards personal development than

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their male counterparts. It suggests that females show greater change than males because they are physically and psychologically more challenged when they are forced into a different and unfamiliar role (Neill, 1997). One of the few studies exploring female perspectives in white-water kayaking found that women favoured learning to kayak on a trip down the river as a journey rather than skill acquisition and practice on a single river feature, as some women favour a task-oriented environment that sets non-competitive standards (Dingle et al., 2006). In addition, females seek skilled coaching from their instructor and “not just being a good paddler” (Dingle et al., 2006). This could indicate that the form of the investigated kayaking programme works well for females. The study by Dingle et al. (2006) concludes that instructors would do well to pay attention to and address the fears felt by female paddlers, as some female paddlers reported being uncomfortable performing in front of skilful peers. This study concludes that social fear can be a powerful inhibitor of risk taking and learning, affecting confidence and hence competence, most noticeably in female paddlers. Social factors could affect females’ higher scores of feeling anxious, but our data does not provide such evidence. We argue that paying attention and addressing fears is important to both male and female participants learning white-water kayaking.

Linking written responses to scores of emotion

An interesting finding is that the participants experienced most anxiety before going on the water. This seems to be driven by their expectations of what might happen, overthinking and imagining events, as a way of preparing themselves mentally for the forthcoming experiences (Themes 1 and 2). Participants in our study reported some level of anxiety throughout the day, highest at the beginning, when they were struggling with what is real and what is perceived risk with no experience to guide them. However, dealing successfully with challenging tasks as they go through the day strengthens confidence and motivation, while giving them a sense of accomplishment, personal mastery and reality (Themes 3 and 4). Overcoming challenges led the participants to a process of reflection about themselves and their capabilities, leading to feelings of contentment and pride as they absorbed the intense experience (Theme 5). The fact that the participants were facing actual white-water rapids for the first time, as their previous experience had been in a pool or flat water, could explain the high anxiety at the start and its decrease once the participants had time to settle into how rapids affect the movement of the kayak and use and gain confidence in techniques taught on still water in a new context. Other causes may be found in the participants settling into the social structure enforced upon them, as found by Witman (1995) and Orson et al. (2020). We see in Theme 4 that the participants were settling in with their new kayaking groups: “Our group did a really awesome job. I’m proud of our improvement.” They also felt that they trusted their instructors: Theme 1: “I’m not too worried because I trust the instructors.” Theme 5: “Today was great, we improved a lot with [name of the two

instructors]”, as Humberstone and Stan (2011) illustrate the importance of the instructor-participant relationship.

Similar results were found in a recent study, reporting that learning in an adventure education programme came from an active process of grappling with difficult challenges, including pain and emotional obstacles (Orson et al., 2020). Successfully overcoming these challenges led the participants to have reflective insights, discoveries and realisations about themselves and their capabilities (Orson et al., 2020). Interestingly, white-water kayakers may have positive experiences even when their abilities are exceeded by the difficulty of the river (Jones et al., 2000). We do find supporting examples in our data (in Figure 3), where participants’ fear turned into reality; however, even though capsizing and swimming, the participants report positive feelings and increased confidence. Perhaps even though things went wrong, the reality was not as bad as their prediction, further increasing confidence, lowering anxiety, and altering their hedonic tone towards excitement and wellbeing.

Scant research suggests that too high perceived risk and anxiety in adventure programmes are detrimental, thereby challenging the historically situated assumption of a ‘fear for all’ approach (Reed & Smith, 2021). Reed and Smith (2021) found that those outdoor adventure education participants who were not able to successfully interact with their fears perceived feelings of terror, often resulting in them attending as observers and/or dropping out of the programme. This indicates a large discrepancy between the fear that the facilitators suggested to the participants, and how participants actually experienced that fear. This supports Davis-Berman & Berman’s (2002) notion that participants should feel safe, secure and cared for, and therefore one should work within, or in close proximity to, participants’ comfort zones. Educators in white-water kayaking, or other intense or stressful environments, can benefit from a better understanding of when and why participants tend to feel anxious, and as Reed and Smith (2021) found, fear isolated and marginalised participants who were unable to successfully interact with that fear. Our KET tool offers facilitators a timely method of monitoring participant experiences to enable client emotions to be managed, and activities regulated to nurture positive learning outcomes. We believe our study provides a substantial contribution by showing that the time leading up to a demanding adventurous learning activity directly affects the participants’ emotional experience and learning outcomes. Thus (over)thinking of the coming event (Theme 1) and need to prepare mentally and physically for the challenge (Theme 2) represent a period that is perhaps underestimated, a time for instructors to recognise and address unnecessary anxiety and fear. This is, however, also evident towards the end of the activity, as several participants in our study reported concerns during the activity, dealing with fear (Theme 3), coping and handling successes and failures (Theme 4). Ending the intense experience brings relief and reflection (Theme 5), where both excitement and anxiety are still present, thus representing an opportunity where instructors could actively engage and help facilitate the participants to process

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their intense learning experiences. This would give merit to the educator’s full use of these times to pre-brief and de-brief the experience to fully anchor the activity within the educative process.

Methodological considerations

Using a mixed method technique strengthens the validity of the research by triangulation. Physiological arousal markers have been widely reported to show little direct correlation with each other (Haneishi et al., 2007; Jones & Hardy, 1990). It has been suggested that individuals differ in their response to stressful situations and that therefore their arousal is expressed in somewhat differing ways (Hanin, 2000). Bailey et al. (2017), in studying adventure activities, concluded that self-reported measures of arousal in general agreed with objective data, meaning that the somatic measure as used in this study is very likely to be ‘as accurate’ as more invasive and time-consuming evaluations of a spectrum of biological markers. This may be due to individuals assessing their state from a blend (their own individual mix) of physiological markers and social cues as predicted by Lang (1985). This would concur with Hanin’s (2000) notion of individual zone of optimum function, and that individuals can perceive their own individual state better than direct measurement of physiological arousal markers. The measurement, via a somatic arousal and emotion tool such as used here (KET), may give the best overall indication of arousal and emotion, and most importantly, as it affects the participant ‘in the moment’, more accurately than other more direct and less timely measurements could do. The questionnaire provides a method that works well in outdoor education research, as it requires few resources and allows data collection from a relatively large number of participants with minimum interference to the educational programme, capturing the phenomenon in its natural setting. Emotions can be fleeting, so capturing them ‘in the moment’ is imperative. There is always a gap between the participant’s experience and reporting. By using the KET at several time points we have minimised this gap. Future additions to the KET could be considered, such as overall feeling of happiness and confidence in skill level. However, it should continue to be short to maintain its purpose of giving a non-intrusive snapshot. The written responses from participants were short and informative, but could have limited the depth of the thematic analysis, perhaps providing a summary of the data rather than conceptualised themes.

Limitations and future research/recommendations

A larger study may reveal a significant difference between male and female perceptions of anxiety in learning white-water kayaking. The way white-water programmes are structured and facilitated may influence the participants’ experience as affected by the social setting. In addition, further research should explore how the participants processed and made sense of their intense experience, what meaning and reflections they made about their experience and themselves, as well as their perception of the

causal factors. Improvements in wearable digital recording devices could be explored to narrow the experience-reporting gap with more frequent data collection presenting a fuller picture of the lived experience.

Concluding remarks

In this study, we developed a tool to capture novice white-water kayakers' emotions 'in the moment' on an educational kayaking day. We found the river to be a stressful environment provoking intense emotions. Anxiety and fears were present during the whole day, highest before going on the river. Being on the river induced high excitement and arousal while grappling with the imposed challenges, successfully and non-successfully. Instructors should reduce and address unnecessary anxiety and fear and further question the approach of fear for all to learn and grow. This tool can be used to accurately provide a window into the participants' experience of an adventure activity and therefore inform programme design and instructors' teaching approach. The data can also be used as a rich source from which participants can reflect and learn both in the physical and mental self-regulation domains.

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Jennifer Byrne holds a masters in cognitive neuroscience from Aston University in United Kingdom. She undertook a year-long placement at Auckland University of Technology as part of her psychology bachelors degree where she co-developed the questionnaire and helped with data collection in for this presented study in novice white water kayaking.

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“... the thought that I could flip and die today made me feel anxious”

Appendix 1

CODE

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SITE

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Kayaking Emotion Thermometer (KET)

Please indicate with a cross where on each line you think best describes how you are currently feeling.

Not at all excited	-----	Extremely excited
Not at all anxious	-----	Extremely anxious
Not at all physiologically aroused	-----	Extremely physiologically aroused

Please state what makes you feel the way you do:

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