

# A mixed-methods research synthesis to impact the wellbeing of adolescents: The Wellbeing in Outdoor Adventure Education Model (WOAEM)

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**Abstract:** Promoting adolescent wellbeing continues to challenge families, community groups, and schools, so ways to complement existing health programs should be sought. This paper aimed to synthesise four sequential, mixed-methods studies, resulting in a novel framework to impact adolescent wellbeing. Studies were conducted in Perth, Western Australia between 2020 and 2023, involving a quantitative systematic review and meta-analysis, qualitative analysis of focus groups with adolescent outdoor adventure education participants and key informant interviews with outdoor adventure education teachers, and mixed-method analysis of an electronic Delphi study with a panel of international experts in adolescence, wellbeing, and outdoor adventure education. The studies comprising this synthesis were conducted to provide an evidence base for adventure education practitioners to impact the wellbeing of their adolescent participants. The findings of these studies have resulted in the development of the Wellbeing in Outdoor Adventure Education Model (WOAEM), a new model that aims to provide outdoor adventure education practitioners with a practical application of the PERMA (positive emotions, engagement, relationships, meaning, and accomplishment) multidimensional framework of wellbeing. This practical application is specifically designed to guide program structure in a way that can positively impact the wellbeing of adolescents. Implications and recommendations for future research are discussed.

**Keywords:** conceptual model; student; PERMA; synthesis; wellbeing; adventure education; social structure

## 1. Introduction

Outdoor adventure education (OAE) involves a series of compelling tasks or activities with tangible outcomes (e.g., setting up a camping shelter or cooking a meal on a camping stove or open fire). These activities may be perceived as risky to participants (e.g., sailing or canyoning) and characteristically involve small groups of people in an environment of social support and contact with nature and natural places (Gilbertson et al., 2023; Thomas, 2018; Williams et al., 2018). Programs can be implemented with all age groups, but are often facilitated with adolescents as part of school-based experiences designed to encourage social cohesion and provide leadership opportunities with tangible outcomes or technical skill competencies (Rose et al., 2018). A growing body of literature suggests that OAE participants experience varying psychological and mental states throughout a typical program, such as perceptions, emotions,

motivations, and cognitions (Houge Mackenzie & Hodge, 2020; Houge Mackenzie & Kerr, 2017). With skilful facilitation of OAE experiences from staff, combined with a participant group open to the benefits that these states can offer, a combination of extrinsic (e.g., learning and using an efficient forward kayaking paddle stroke) and intrinsic (e.g., the satisfaction and internal reward of assisting a peer with a task) benefits may occur (Down et al., 2024a; Garst et al., 2019).

The literature has shown that positive wellbeing is manifested in vital, thriving, fully functioning individuals and is a state in which humans have the potential to satisfy their basic needs (Down et al., 2021; Esteban-Gonzalo et al., 2019; Pomfret et al., 2023). The pursuit of positive wellbeing, defined as the experience of prosperity, happiness, and health, is a universal human goal and is exemplified as being able to develop and maintain mutually benefiting relationships, having a sense of purpose, high satisfaction with life, stable psychological functioning, and the ability to manage stress (Joshano & Jovanović, 2018; Patton et al., 2016; White et al., 2017). Further, the literature widely supports the notion that wellbeing is comprised of both eudemonic components (i.e., the fulfilment of self-concordant goals and a quality of life based on the achievement of one's best potential) and hedonic components (the state of 'feeling good' derived from the possession of positive affect) (Konu & Rimpelä, 2002; Lee et al., 2017; Soutter et al., 2014). As such, the pursuit of these two components can act as protective factors for mental health and wellbeing. With a reported link between positive mental health and positive wellbeing (Riepenhausen et al., 2022), promoting protective factors for wellbeing should be explored from various fields, including novel, holistic approaches such as OAE.

Outdoor adventure education is a holistic educational medium that can involve the development of a range of outcomes for participants, such as increased self-esteem and resilience (Sheard & Golby, 2006), individual empowerment (Down et al., 2024a), conflict resolution (Passarelli et al., 2010), and groupwork skills (Cooley et al., 2014). OAE has also been linked with the field of positive psychology (Berman & Davis-Berman, 2005). The fundamental tenet of positive psychology is placing a high value on subjective experiences comprising contentment, satisfaction, and wellbeing (in the past); present-moment awareness, flow and happiness; and optimism and hope (in the future) (Snyder & Lopez, 2001). These subjective experiences can be divided into the individual level (e.g., interpersonal skills, perseverance, or courage) and the group level (altruism, tolerance, responsibility, work ethic, and civility) (Linley & Joseph, 2004; Seligman & Csikszentmihalyi, 2000). Engaging in these subjective experiences in holistic education programs such as OAE can lead to an increase in the sense of flourishing and wellbeing for the participant (Barrable & Arvanitis, 2019; Down et al., 2024b; Keyes, 2007).

A multidimensional framework for flourishing was proposed by Seligman (2011), in which psychological wellbeing is spread across five domains. These comprise Positive emotions (e.g., pride, amusement, joy, love, or hope), Engagement (that is, being completely immersed in an experience), Relationships (such as in close interpersonal relationships), Meaning (having a purpose in life), and Accomplishment (setting and achieving goals), otherwise known as the PERMA framework. While there is a range of subjective wellbeing aspects, such as psychological or emotional wellbeing, the PERMA framework is intended to encompass overall wellbeing (Seligman, 2011).

Recent studies have utilised PERMA in several fields, some of which are complementary to OAE. PERMA has been used extensively in adventure tourism studies (e.g., Filep et al., 2013; Kaimakamis, 2022; Lötter et al., 2013), nature connection and wellbeing dimensions as they relate to having a 'solo' experience (being intentionally solitary in a natural environment) (Petersen et al., 2021), and from an ecopsychological perspective by investigating human flourishing through human interactions with wild dolphins (Yerbury & Boyd, 2019). The PERMA framework has also

been applied to the work context (Slavin et al., 2012) and the educational context (Norrish et al., 2013). In outdoor education, Brown (2016) describes the Invictus Wellbeing Program, which is facilitated in a small number of Australian schools that choose to participate and applies a variety of research models, including Rites of Passage (Rubinstein, 2013), Active Constructive Responding theory (Gable et al., 2004), grit (Duckworth et al., 2007), and PERMA (Seligman, 2011), into program design.

As OAE programming can have many applications depending on the desired outcome (e.g., a vehicle to deliver an adventure therapy intervention for patients with a mental health condition, as part of a college or university orientation program designed to form bonds between new students, or to develop leadership and intrapersonal capacity), program design can vary (Gass et al., 2020; Picknoll et al., 2023; Richmond & Sibthorp, 2019; Rude et al., 2017; Shellman & Hill, 2017). The importance of goal setting (Sibthorp & Jostad, 2014), student autonomy (Sibthorp et al., 2008), and achieving program outcomes (McKenzie, 2000) are also highlighted as key aspects of OAE in the literature. As a result, various perspectives can enhance the understanding of OAE intervention or activity design.

Outdoor adventure education typically takes place in a social setting where group members rely on each to achieve the outcomes of the program (Jostad et al., 2015). Within this social setting lie macro contextual factors, different components unique to each group that have an influence on how it functions (Sibthorp & Jostad, 2014). Macro contextual factors are exemplified through cultural and social beliefs, group norms, the structural elements of the program, the physical environment the program is held in and its remoteness, and the culture of the organisation facilitating the program (Capurso & Borsci, 2013; Ewert et al., 2013; Shooter et al., 2010). These macro contextual factors are dynamic, interconnected, and play a large role in achieving the outcomes and goals of an OAE group.

Due to the wide variety of potential applications, a corresponding range of methodologies is used in OAE research. As a result, the literature has noted some recurring research issues examining personal and social development in OAE, namely the management of variables (confounders), the composition and size of the sample, the lack of quantitative, longitudinal, randomised controlled studies, and appropriate data collection tools (e.g., validated surveys or established framework models such as PERMA) (Scrutton & Beames, 2015). Brown (2010) argues that there is a general lack of attention to the social, regional, cultural, and historical aspects of OAE, as well as the influence of these macro-contextual factors on participants. Furthermore, several motivations for participating in OAE, unrelated to its 'adventurous' aspects, have been identified in the literature, including attention restoration, self-actualisation, achievement, and personal control (Kerr & Houge Mackenzie, 2023; Mann et al., 2022). As such, addressing these gaps and controversies in the literature could increase the rigour of OAE research.

In this synthesis, we present four studies investigating the impacts of OAE on wellbeing and identify the elements that could form meaningful components of an OAE intervention program for adolescents. Specifically, a series of sequential studies were completed using qualitative and quantitative data, thereby obtaining a holistic picture of what makes for an impactful OAE program for adolescent wellbeing. In Study 1, we examined the literature and drew conclusions from other OAE research with similar foci to the current study (Down et al., 2024b). Study 2 then examined OAE program design as it relates to wellbeing (Down et al., 2023a). Study 3 gathered the opinions of an expert panel of OAE practitioners and academics regarding the most impactful program elements and flow for wellbeing (Down et al., 2023b), and Study 4 explored OAE programming in relation to psychosocial outcomes among adolescent participants (Down, 2024a). We aimed to answer the following research questions:

- Study 1: What are the within- and between-group effects of OAE on adolescent social and emotional wellbeing and their contributors?
- Study 2: What are the preferred program components to improve adolescent wellbeing during secondary school OAE programs?
- Study 3: What do international OAE experts believe are the most impactful program elements for adolescent wellbeing in future interventions?
- Study 4: What is the impact of OAE on psychosocial outcomes for participants?

We conclude by applying the results of this synthesis to the PERMA multidimensional wellbeing framework of Seligman (2011) to allow the translation of our findings into practice and present a new model to guide OAE program design to impact adolescent wellbeing.

## 2. Materials and methods

### 2.1 Study design

We conducted a four-stage sequential mixed methods study design between 2020 and 2023, where one stage informed the next (Creswell & Creswell, 2018). Rather than taking a singularly quantitative or qualitative approach, we chose a mixed-methods approach for its ability to provide a comprehensive understanding of our research questions (Figure 1). We achieved this through the following stages.

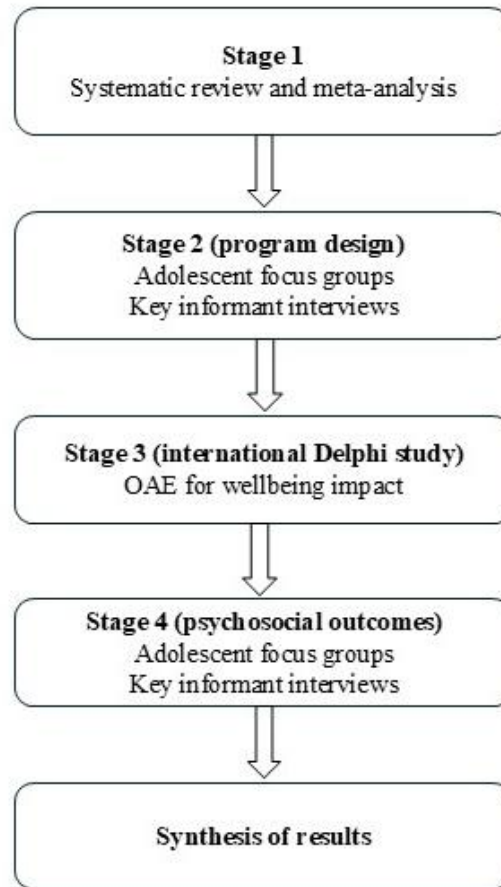
Stage 1: Our systematic review and meta-analysis were conducted per the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, the gold standard for conducting and reporting a systematic review (Page et al., 2021). The review aimed to examine the within- and between-group effects of OAE on adolescent wellbeing. Within-group change was assessed in four studies ( $n = 368$ ), and between-group change was assessed in six ( $n = 1,143$ ). The key findings from this study were the general lack of rigour, high risk of bias, and low certainty of presented evidence in included studies because of methodological design, resourcing, the influence of confounding variables, and the popularity of repeated measures testing without an associated qualitative component to add context and nuance to quantitative results. Therefore, the authors implemented two qualitative studies from OAE teachers and adolescent participants in Stages 2 and 4.

Stages 2 and 4: The above findings were then applied to a qualitative descriptive (QD) approach using deductive and inductive template analysis (Colorafi & Evans, 2016) to assess the responses of adolescent students in a series of five focus groups ( $n = 29$ ) and OAE teachers in key informant interviews ( $n = 4$ ). Topics of interest included OAE program design and flow for wellbeing (Stage 2) and OAE programming related to participant psychosocial outcomes (Stage 4). Results across student and teacher data revealed a range of focus areas for wellbeing impact, namely connections to others, tangible responsibilities, interpersonal and intrapersonal challenges, multifaceted success, opportunities for autonomy and independence, and relationship-building. These findings were then developed into a two-round Delphi study amongst an expert panel to verify or counter the key findings from the student and teacher groups.

Stage 3: This study intended to work towards gaining an expert consensus view of the elements and structure of an OAE intervention program that would most impact wellbeing. A mixed-methods electronic Delphi (e-Delphi) study comprising open-ended qualitative questions in Round 1 and a series of statements requiring Likert scale responses in Round 2 was conducted

with a panel of OAE experts ( $N = 18$ ) (Neylon et al., 2019; Niederberger et al., 2021; Sablatzky, 2022).

**Figure 1.** Study design flowchart



## 2.2 Participants

Stage 1, as a systematic review, did not involve participant recruitment. Stage 2 and 4 participants were recruited qualitatively via purposive sampling, a nonprobability approach whereby those with the most experience or knowledge about a topic of interest are selected (Campbell et al., 2020). The research team’s knowledge of the study purpose and target population guided the sampling process. The criteria for selecting adolescents were that they be aged 15-16 and have previous experience with OAE. Teachers were required to have been involved with adolescent OAE for at least 10 years.

Potential expert panellists were identified by the research team in Stage 3. To be invited to the panel, potential participants needed to be either an outdoors-focused mental health expert (e.g., an adventure therapist or psychologist), a published author of OAE peer-reviewed research, or a secondary school teacher with at least 10 years of experience in outdoor adventure education. This purposive sampling approach was used to recruit local (Western Australian), national (Australian) and international (Canada, Germany, New Zealand, United Kingdom, United States) panellists, including one mental health expert, 10 OAE researchers, and seven OAE teachers ( $N = 18$ ), which is a sample size consistent with the literature (Niederberger & Spranger, 2020).

### 2.3 Setting

Stage 1 was a systematic review conducted electronically by the first author, with in-person meetings regarding article screening, inclusion criteria, and risk of bias held at the University of Notre Dame Australia (Fremantle campus) as needed. Focus groups and key informant interviews for Stages 2 and 4 were held in the Perth, Western Australia metropolitan area at the respective schools the adolescent participants attended, and OAE teachers were interviewed at a mutually convenient location (e.g., a school classroom or local café). Stage 3 was conducted electronically, with panellists completing both survey rounds at a location and time of their choosing, provided they were returned by the set due date.

### 2.4 Data collection

#### *Stage 1: Inclusion criteria, article screening, and data extraction*

Studies that met our inclusion criteria, namely peer-reviewed, published, randomised or non-randomised interventions with no geographical or date limitations (due to the relatively small amount of published literature in the field), that examined adolescents from the general population in OAE programs (with one or more indicators of wellbeing as a focus) were included. After searching six electronic databases, articles were screened for suitability by title and abstract and subsequently through a full-text screen by two review authors independent of each other. Data were extracted independently by two authors and added to a template, with a third author ensuring consensus by reviewing data.

#### *Stages 2 and 4: Focus groups and key informant interviews*

Qualitative data for Stages 2 and 4 were collected from adolescent students in a series of focus groups and from OAE teacher key informant interviews. The same semi-structured interview schedule was employed to enable a synthesis between the two data points of each study. Audio recordings were made, interviews were transcribed verbatim, and template thematic analysis was used to analyse data.

#### *Stage 3: Open-ended questions and Likert scale responses to statements*

The e-Delphi [Stage 3] involved two iterative survey rounds based on the key themes from the focus groups and interviews. In the first round, expert panellists were asked open-ended questions requiring qualitative responses via an online survey platform. Analysis of this data led to the formation of a series of statements clustered by theme requiring Likert scale responses (1 = strongly disagree, 5 = strongly agree) in the second round, with some items reverse-scored to break the tendency to agree with a statement regardless of its content (Hartley, 2014). Panellists were also asked to rank statements by their importance to wellbeing impact from each theme.

### 2.5 Data analysis

#### *Stage 1: Data syntheses, biases reporting, certainty of evidence assessment*

Single or multi-arm intervention studies that assessed the effects of OAE on wellbeing were included, and a meta-analysis was conducted on outcomes of interest. The Cochrane Risk of Bias (RoB) Tool 2.0 assessed RoB in multi-arm studies (Higgins et al., 2021b). The Grading of Recommendations Assessment, Development and Evaluation (GRADE) tool was used for certainty assessment (Higgins et al., 2021a).

#### *Stages 2 and 4: Deductive and inductive template analysis*

Initial *a priori* codes were developed from interview questions, allowing the creation of a deductive code frame per template analysis (TA) guidelines (Brooks et al., 2015). Following this, inductive content analysis was used on the code frame, with data clustered based on their characteristics (Arnold-Reed et al., 2023). The coding of illustrative quotes resulted in the development of key themes (Braun & Clarke, 2021). Some of the topic areas included in the analysis include staff traits, activity type preferences, and thoughts on novel activities.

#### *Stage 3: Template analysis and expert ratings of importance and agreement*

Qualitative data from the first survey round were analysed similarly to Stage 2 and 4 data (Brooks et al., 2015). Median scores for each statement were calculated as the measure of central tendency, and quartiles (Q1: 25%, Q3: 75%) were reported as a means to rank the importance of each statement (very important:  $Q1 \geq 4.3$  and  $Q3 = 5$ ; important:  $Q1 \geq 4.0$  and  $Q3 \geq 4.5$ ) (Chen et al., 2017). Consensus on a statement was recorded by its quartile deviation ( $QD = (Q3 - Q1)/2$ ), indicating low consensus ( $QD > 1$ ), medium consensus ( $QD \geq 0.6 < 1$ ) and high consensus  $\leq 0.6$  (Niederberger & Spranger, 2020).

#### *2.6 PERMA framework*

We looked for resultant items, domains, and activities based on the synthesis that could be applied to the PERMA framework (Seligman, 2011) and that would guide future wellbeing-focused OAE intervention studies. This could include methodological design based on findings from the systematic review, themes developed from focus groups, or the expert opinions of our Delphi panel. The PERMA framework was chosen as a theoretical framework in this synthesis due to its prevalence in the literature and its acceptance as a reputable approach to measuring wellbeing in participants. PERMA has been applied as a theoretical framework in several studies, exemplified through an exploration of wellbeing outcomes in an LGBT (Lesbian, Gay, Bisexual, Transgender) event in China (Zhou et al., 2021), food festivals, tourism, and wellbeing (Rossetti et al., 2024), wellbeing and cooking behaviour (Farmer & Cotter, 2021), and in Norwegian ninth-grade boys at risk of school dropout participating in a two-week learning camp (Ramsdal & Wynn, 2024).

### **3. Results**

Ten papers were included in the systematic review in Stage 1. Stages 2 and 4 included 29 adolescents from five schools and four key informants (100% conversion rate), and Stage 3 invited 57 experts to join an e-Delphi panel, of which 18 participated (32% conversion rate).

#### *Stage 1: Evidence quality and overall effect sizes*

After analysis, we found that the included studies had very low certainty evidence to support OAE for the intervention domains of interpersonal connectedness and psychological strengths. A summary of Stage 1 results is presented in Appendix 1.

#### *Stages 2 and 4: Key theme and sub-theme development*

The key themes developed from Stage 2 data were *perceptions of the outdoors, motivators for participation, barriers to participation, perceptions of novel activities, staff traits, and ideal program components for wellbeing*. Stage 4 themes included *connection to others, tangible responsibility, interpersonal and intrapersonal challenges, and multifaceted successes*. These themes, a selection of sub-themes and an exemplar of illustrative quotes are provided in Appendix 2.

### *Stage 3: Importance and level of consensus of program elements*

There was no disagreement among panellists about any statement, with three statements receiving medium consensus and 11 statements (across all concepts) having high consensus (Appendix 3). One statement, “*Equity for all participants requires flexible delivery and facilitation*”, was considered very important for adolescent wellbeing, and five statements (across each of the three concepts) were considered important.

## **4. Discussion**

This synthesis aimed to investigate whether the PERMA model proposed by Seligman (2011) could be utilised in an OAE setting and, by extension, provide an operational application of PERMA for this particular educational medium. Based on our literature review, we believe the current study is one of the first to examine OAE for adolescent wellbeing utilising the PERMA framework. Synthesising the four studies detailed in this paper led to a series of conclusions about program design and resulted in a model that we propose may lead to increased wellbeing in adolescent participants.

### *4.1 The Wellbeing in Outdoor Adventure Education Model*

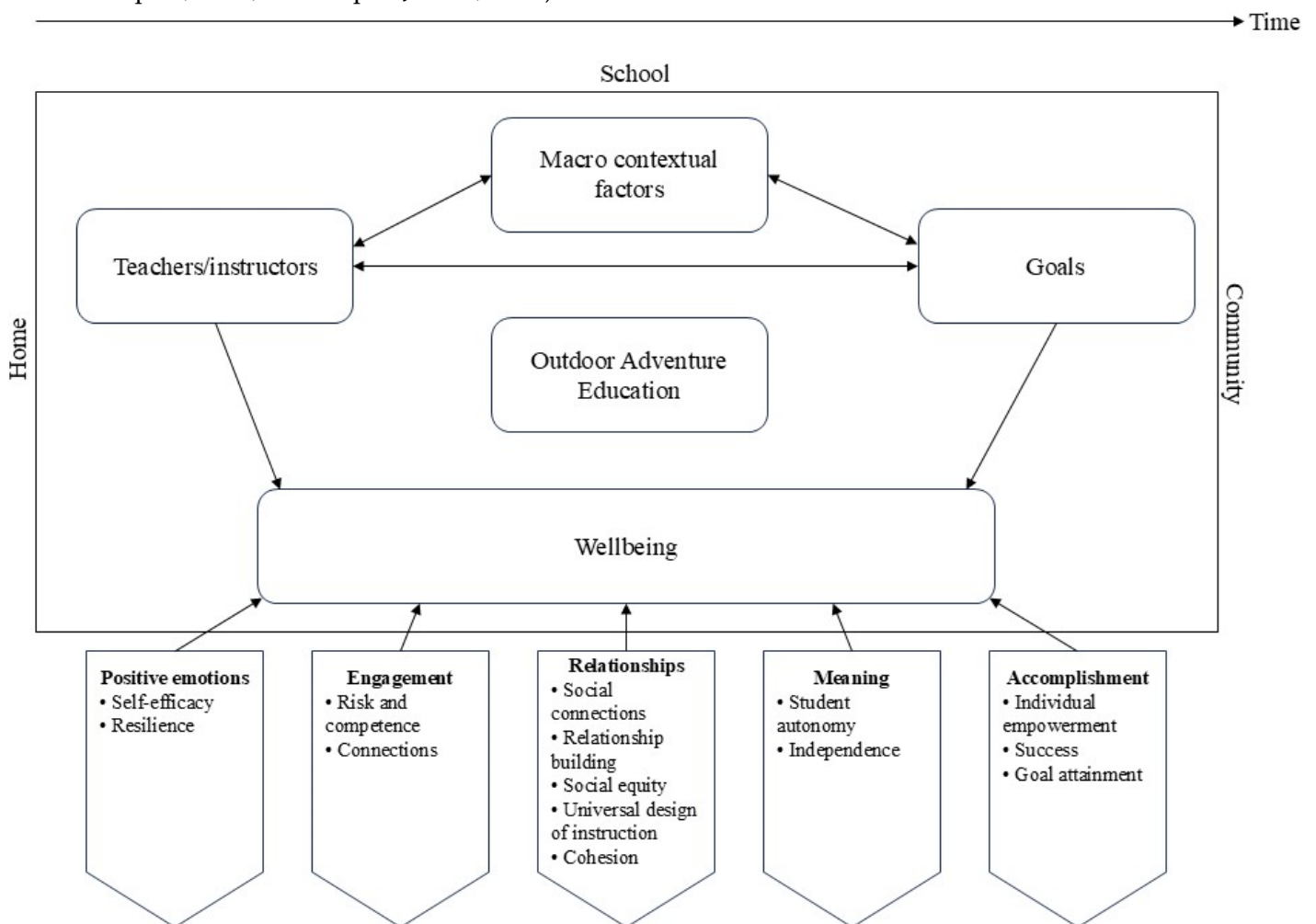
The Wellbeing in Outdoor Adventure Education Model (WOAEM) is a conceptual model of wellbeing in OAE (Figure 2; below). The WOAEM is an application of the PERMA Framework (Seligman, 2011) and is adapted from other works in the literature (Konu & Rimpelä, 2002; Sibthorp & Jostad, 2014). The intent behind the model is to guide OAE program design through activity, structure, and flow decisions relating to adolescent wellbeing and should be viewed from an adolescent’s perspective. The components of the model are discussed below.

The WOAEM acknowledges the importance of the home, school, and community environments and their influence on perceptions of OAE for adolescents. Receiving positive frontloading messages from members of these groups prior to the OAE experience may lead to excitement, positive expectation, and a positive view of the OAE program before departure, thus influencing subjective wellbeing (Priest & Gass, 1994). In the complementary field of environmental education, the positive influence of parents and community member for learning experiences have been noted, with parental and community involvement in programming resulting in a constructive contribution to student perceptions (Tali Tal, 2004). The influence of the school environment has also been noted as impactful, with pre-OAE-experience factors such as sense of self, attitudes and beliefs, expectations, existing relationships, and experience and skills shaping students before they begin a program (Richmond et al., 2017).

The model also assumes that wellbeing, teachers or instructors, goals, and macro contextual factors (such as group culture, structural elements, and social and cultural beliefs) are complementary, interconnected, and exemplify a bidirectional flow in the model (Shooter et al., 2009, 2010, 2012; Sibthorp et al., 2011; Sibthorp & Jostad, 2014). The way that OAE participants are taught or instructed plays a large role in their wellbeing due to individual perceptions of personal experiences associated with their teacher or instructor (Schumann et al., 2009; Sibthorp, 2003; Sibthorp & Schumann, 2013; Walsh & Golins, 1976; Witman, 1993). The goals that OAE participants strive for (and staff facilitate) also influence wellbeing, either through the attainment of an explicit goal such as summitting a mountain or paddling to the end of a river, or an implicit goal such as developing leadership or individual empowerment, which is often the result of achieving an explicit goal (McKenzie, 2000; Paisley et al., 2014; Varley & Semple, 2015; Wattchow & Brown, 2011). While striving to achieve an explicit goal is often an integral factor in OAE, the processing and meaningful reflection of this experience often results in an increase in wellbeing

and is another example of bidirectional flow through the model, thus reinforcing the experience for the individual (Down et al., 2024b; King et al., 2020). Due to the social nature of an OAE program there are a range of macro contextual factors that may affect participant experience (Matz & Wood, 2005; Sibthorp & Jostad, 2014). These factors can range from the physical environment that the program is conducted in (such as in a forest or on the ocean), the remoteness of the program environment, the weather, or the activity type (and the corresponding level of teamwork required) (Ewert et al., 2013). We note the potential importance of macro contextual factors for wellbeing but also acknowledge that careful research design and the implementation of fidelity measures should be employed to control these confounding variables (Ewert & Sibthorp, 2009; Scrutton & Beames, 2015) and to shine a light in the educational “black box” of OAE program outcomes in future studies (Mainieri & Anderson, 2015; Shellman & Ewert, 2010).

**Figure 2.** The Wellbeing in Outdoor Adventure Education Model (adapted from Konu & Rimpelä, 2002; Sibthorp & Jostad, 2014)



The lower part of the model displays the unidirectional resultant outcomes from OAE, which act as contributors to wellbeing. These outcomes are an amalgam of the conclusions from the four studies by the lead author that contributed to the WOAEM and represent aspirational consequences of OAE participation. This approach of applying study outcomes to PERMA as a theoretical framework has been utilised in various fields in the literature (e.g., Kovich et al., 2022; Leontopoulou, 2020; Tansey et al., 2018). By following the WOAEM, we posit that participants

will experience the five elements of the PERMA model, namely *positive emotions* (self-efficacy or resilience as a result of completing a challenging task), *engagement* (responding to a situation perceived as risky by the individual such as sleeping in a tent or going rock climbing), *relationships* (social connections, relationship building, social equity, universal design of instruction [UDI]), or cohesion from participating in meaningful work in an OAE group), *meaning* (student autonomy, independence, or altruism, e.g., via the opportunity to help and serve others), and *accomplishment* (individual empowerment, success, or goal attainment through the completion of a novel task).

## 5. Conclusion

This four-stage sequential study aimed to create a model that OAE practitioners could utilise to impact adolescent wellbeing. A strength of this study is the comprehensive formative work conducted to arrive at our conclusions and the use of an established multidimensional framework for wellbeing with which to frame our findings.

### 5.1 Limitations

The evidence gathered in the four studies comprising this synthesis generally found positive impacts for participants due to OAE. However, we acknowledge this as a limitation of this synthesis, the WOAEM, and OAE in general; for some participants, feelings of apprehension, fear, and anxiety may occur for various reasons (e.g., being away from home or participating in adventurous activities). Future studies should approach this issue as a confounding variable and take steps to limit its influence.

### 5.2 Future directions and applications for practice

Future OAE research could adopt our findings if adolescent wellbeing impact is a desired outcome. We recommend conducting a series of pilot studies to assess the interconnected, bidirectional factors of teachers/instructors, goals, and macro contextual factors to gain baseline data before upscaling (e.g., measuring the relationship between the influence of staff and the goals set for an OAE program, and how this relationship impacts wellbeing in a small sample of adolescent OAE participants). Examining different examples of each PERMA element and their applicability to wellbeing in an OAE context may also yield meaningful results. We recommend a mixed-methods approach combining both validated psychometric scales to measure wellbeing and its contributors (e.g., the Warwick-Edinburgh Mental Well-Being Scale (Taggart et al., 2015) and Social Connectedness Scale (Lee & Robbins, 1995)) and using qualitative approaches to add context and nuance to findings. We also recommend the use of implementation fidelity measures to ensure program adherence and minimise the influence of confounders.

To conclude, the present study provides a novel framework for OAE researchers and practitioners to potentially impact the wellbeing of adolescents through deliberate decisions regarding activity choice, program structure, and flow.

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### **Author contribution statement**

MD: Conceptualisation, Methodology, Formal analysis, Investigation, Original Draft, Writing –Review & Editing. DP: Conceptualisation, Methodology, Investigation, Writing –Review & Editing, Supervision. BP: Conceptualisation, Methodology, Formal analysis, Investigation, Original Draft, Writing –Review & Editing, Supervision. GH: Formal analysis, Investigation, Original Draft, Writing –Review & Editing, Supervision. CB: Conceptualisation, Methodology, Formal analysis, Investigation, Original Draft, Writing –Review & Editing, Supervision.

### **Funding**

This research received no specific grant from public, commercial, or not-for-profit funding agencies.

### **Conflict of interest statement**

MD, BP, GH, and CB are directly employed by The University of Notre Dame Australia but declare no other conflicts of interest. DP declares no conflict of interest.

### **Ethical approval**

Where relevant, individual studies were conducted per the Declaration of Helsinki (1964). All participants were invited by email, provided with a written participant information sheet, and provided written consent before their involvement. Institutional ethical approval was provided by The University of Notre Dame Australia Human Research Ethics Committee, approval numbers 2020-197F and 2022-073F.

### **AI statement**

During the preparation of this work, the authors utilised the AI tool Grammarly to refine the manuscript's language. After using this tool, the authors reviewed and edited the content as necessary and take full responsibility for the publication's content.

### **Data availability statement**

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

## Acknowledgements

The corresponding author wishes to acknowledge support from the Australian Government Research Training Program Scholarship and affirm that all those who have contributed significantly to the project have been acknowledged. The authors wish to thank all study participants for their time and expertise.

## Publishing Timeline

Received 25 November 2024

Revised version received 15 June 2025

Accepted 23 June 2025

Published 30 September 2025

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## Appendices

### Appendix 1. Summary results data from the systematic review and meta-analysis

Between-group studies	Group (n)		Activities	Domains of interest assessed							
	I/C <sup>a</sup>	% female		I/C	R <sup>b</sup>	S-ef <sup>c</sup>	S-es <sup>d</sup>	SB <sup>e</sup>	W <sup>f</sup>	RoB <sup>g</sup>	Certainty <sup>h</sup>
Baena-Extremera et al. (2012)	76/49	53%	OAE classes/school classes	-	-	-	-	-	-	High	Very low
Hayhurst et al. (2015)	63/63	57%	Sailing/undergrad. classes	Yes	-	-	-	-	-	High	Very low
Scarf et al. (2016)	60/120	54%	Sailing/school classes	Yes	-	-	-	-	-	High	Very low
Scarf et al. (2017)	90/90	57%	Sailing/school classes	Yes	-	-	Yes	-	-	High	Very low
Scarf et al. (2018)	80/91	58%	Sailing/school classes	-	-	Yes	-	-	-	High	Very low
Williams et al. (2018)	245/116	51%	Multi <sup>i</sup> /school classes	-	Yes	-	Yes	Yes	Yes	High	Very low
Within-group studies	Group		Activity/domain of interest	Change in domains of interest							
	n	% female		Cohen's <i>d</i> ( <i>p</i> -value)							
Grocott and Hunter (2009)	193	62%	Sailing/self-esteem	ES = not reported ( $p < 0.001$ ; $p < 0.002$ )							
Mutz and Muller (2016)	12	42%	Hiking/self-efficacy	ES = 0.26 ( $p = 0.188$ )							
Mutz et al. (2019)	76	37%	Multi <sup>m</sup> /wellbeing	ES = 1.11 ( $p < 0.001$ ) <sup>n</sup> ; ES = 0.83 ( $p < 0.001$ ) <sup>o</sup>							
Whittington et al. (2016)	87	100%	Mountain biking/resilience	ES = 0.20 ( $p < 0.01$ ) <sup>p</sup> ; ES = -0.16 ( $p < 0.05$ ) <sup>q</sup> ; ES = -.037 ( $p < 0.001$ ) <sup>r</sup>							

Note. Data reprinted with permission (Down et al., 2024b).

<sup>a</sup>I = intervention group; C = control group.

<sup>b</sup>R = resilience

<sup>c</sup>S-ef = Self-efficacy

<sup>d</sup>S-es = Self-esteem

<sup>e</sup>SB = Social Belonging

<sup>f</sup>W = Wellbeing

<sup>g</sup>Overall RoB = Risk of Bias Assessment for Cluster-Randomised Trials (RoB 2 CRT) (Higgins et al., 2021b).

<sup>h</sup>Certainty = Quality of evidence and strength of recommendations calculated according to the GRADE approach (GRADE Working Group, 2004).

<sup>i</sup>Multi = canoeing, raft building, mountain biking, high ropes, initiative activities, giant swing, hiking, navigation, leadership, camping.

<sup>j</sup>ES = effect sizes calculated using Cohen's *d*: small (.2), medium (.5), large (.8) (Cohen, 2013).

<sup>k</sup> = improvement from baseline to immediately after program.

<sup>l</sup> = improvement from baseline to short-term follow-up.

<sup>m</sup> = canoeing, rappelling, caving, fixed rope route, canyoneering, rock climbing, hiking.

<sup>n</sup> = improvement for participants who were high media consumers.

<sup>o</sup> = improvement for low-to-moderate media consumers.

<sup>p</sup> = decrease in emotional reactivity.

<sup>q</sup> = increase in sense of relatedness.

<sup>r</sup> = increase in sense of mastery.

**Appendix 2.** Key themes and select sub-themes from Stages 2 and 4, with an exemplar of illustrative quotes

Key themes <sup>a</sup>	Select sub themes <sup>b</sup>	Illustrative quotes
2.1 Perceptions of the outdoors	Stress relief	<i>"Takes away the stressors of everyday school life, I mean you don't have to hear just the talk of school and everything, <b>you're just outside with no worries</b>" (FG2).</i>
2.2 Motivators for participation	"The experience"	<i>"Variety is great... though <b>my preference is definitely with the longer programs, so they've got that longer time to really set themselves up into... their rhythm</b>" (KI4).</i>
2.3 Barriers to participation	Freedom and independence	<i>"...we had to walk with the teachers – there's no freedom at all... walk in a straight line on the path, and <b>I don't think many people enjoyed that just because how restricted we were</b>" (FG3).</i>
2.4 Perceptions of novel activities	Accomplishment	<i>"...when we were doing canoeing lessons and then putting it into action it was really nice to see, and when we were going down the river and seeing all the nature and all green it was just so peaceful... it was <b>nice to see how we worked for that and we worked to get there</b>" (FG4).</i>
2.5 Staff traits	Patience, calm	<i>"Someone who's calm. Someone who I think is a broad thinker in the sense that they're not just focused on the sole thinking, they're thinking widely. <b>I like people who can see the whole picture and who have an open mind to lots of things.</b> I think that way you can do the best for the kids" (KI2).</i>
2.6 Preferred program components for wellbeing	New relationships and social connections	<i>"... sometimes your best friends aren't actually the right people to go on these camps with... You see this nice girl that you have one class with and <b>then you realise that you have a lot more in common than you think</b>" (FG2).</i>
2.7 Additional thoughts	Aboriginal and cultural elements	<i>"If we're looking at outdoor education and we're talking about the natural world, particularly in Australia, it's difficult to go to these natural places and not talk about the natural world and <b>the Indigenous side of that is just embedded in it because it's all one and the same really</b>" (KI2).</i>
4.1 Connection to others	Fire deepens connections	<i>"More and more <b>just doing those slow things and giving kids time without technology and so many things around them to just sit by a fire, and kids having a chat...</b> [these] are things they don't really do these days" (KI2).</i>
4.2 Tangible responsibility	Making the hard, easy	<i>"I remember the big one was when we watched the boat over overnight... to make sure the boat doesn't float away... we had to take an hour and a half shifts... And we consistently looked at it the whole night. <b>And so I remember having some pretty big conversations with people while we were watching it</b>" (FG1).</i>
4.3 Interpersonal and intrapersonal challenge	Intrinsic rewards	<i>"There was just fireworks [conflict]... we just spoke openly about what it was, how people were feeling... There were kids in there who had been holding their tongue for years you know... Others who just didn't think that anyone in the class got them... [after the conflict was resolved] <b>the feeling in that tent was like warm dough, just about to be put in the oven</b>" (KI1).</i>

Key themes <sup>a</sup>	Select sub themes <sup>b</sup>	Illustrative quotes
4.4 Multifaceted successes	Individual empowerment	<i>“When we make mistakes, that’s when we actually learn the most and next time we revisit that situation we hopefully have the information and the knowledge and experience to do better. And that’s all we can ask – all we ask of the boys is to do the best they can, and sometimes that means failing” (KI2).</i>

Note. Data reprinted with permission (Down et al., 2023a; Down et al., 2024a).

<sup>a</sup>Numbers denote study number and theme number (e.g., 4.1 = study 4, theme 1).

<sup>b</sup>Italicised text denotes the focus group or key informant interview question; parenthetical text denotes background and context for the question.

### Appendix 3. Importance and levels of consensus of program elements

Concept	Statement	Md (Q1, Q3)	QD
Connection and disconnection	1. Connection to self and others is an important outcome of an OAE program*	4.5 (4.0, 5.0) <sup>c</sup>	0.5 <sup>b</sup>
	2. Adventurous experiences should be in balance with reflective, quiet experiences	4.0 (3.0, 5.0)	1
	3. Connection to nature is not an important outcome in OAE	4.5 (4.0, 5.0)	0.5 <sup>b</sup>
	4. Disconnecting from media and electronics is important for people to connect with themselves, others, and the natural environment	4.0 (3.3, 5.0)	0.9 <sup>d</sup>
	5. Meal preparation, sharing/eating, and cleaning up leads to social connection	4.0 (3.3, 5.0)	0.9 <sup>d</sup>
	6. Meals made with food foraged or hunted is a powerful nature connection experience	3.0 (3.0, 4.0)	0.5 <sup>b</sup>
	7. Being fully immersed in an OAE program leads to transferable skills from the outdoors to home	4.0 (3.0, 5.0)	1
Authentic, meaningful experiences	1. A deliberate programming of group activities with real challenge (and tangible consequences) creates group cohesion	4.5 (3.3, 5.0)	0.9 <sup>d</sup>
	2. A journey should be long, arduous, and taxing for it to be an authentic experience	2.0 (1.0, 3.0)	1
	3. Participant ownership of parts of a program leads to buy-in and empowerment	5.0 (4.0, 5.0) <sup>c</sup>	0.5 <sup>b</sup>
	4. Authentic, meaningful experiences foster independence, self-reliance, and a sense of responsibility	4.5 (4.0, 5.0) <sup>c</sup>	0.5 <sup>b</sup>
	5. The scaffolding of skills throughout a program is not necessary to overcome obstacles and challenges through peak adventurous experiences*	3.0 (2.0, 3.0)	0.5 <sup>b</sup>
	6. An intellectual, cognitive task can be an equaliser for students	3.0 (3.0, 4.0)	0.5 <sup>b</sup>
Access, equity, inclusion, and respect	1. An activity or task that can be modified to cater for differing levels of participant competence is an integral part of equitable program design	5.0 (4.0, 5.0) <sup>c</sup>	0.5 <sup>b</sup>
	2. Equity for all participants requires flexible delivery and facilitation*	5.0 (4.3, 5.0) <sup>a</sup>	0.5 <sup>b</sup>
	3. The burden of caring for other people in an outdoor program provides benefits for all	4.5 (4.0, 5.0) <sup>c</sup>	0.5 <sup>b</sup>
	4. Frontloading the importance and relevance of an outdoor activity will empower student choice to engage with the activity	4.0 (3.0, 4.0)	0.5 <sup>b</sup>

Note. Permission to reproduce this table in its original form has been approved by the copyright holder (Down et al., 2023b).

Abbreviations: Md = median score, Q1 = lower quartile, Q3 = upper quartile, QD = quartile deviation.

<sup>a</sup>Level of importance: Q1 ≥ 4.3, Q3 = 5 indicates “very important”.

<sup>b</sup>Level of agreement: Q.D. ≤ 0.6 indicates “high agreement” (high consensus).

<sup>c</sup>Level of importance: Q1 ≥ 4.0, Q3 ≥ 4.5 indicates “important”.

<sup>d</sup>Level of agreement: Q.D. > 0.6 ≤ 1 indicates “moderate agreement” (medium consensus).

\*Denotes the highest-ranked statement for each thematic concept.