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2024-10-01
Routledge
http://hdl.handle.net/10138/358362
Puhakka, R 2024, 'Effects of outdoor adventures on emerging adults' well-being and connection with nature', Journal of Adventure Education and Outdoor Learning, vol. 24, no. 4, pp. 719-734. https://doi.org/10.1080/14729679.2023.2220836

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Journal of Adventure Education and Outdoor Learning

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/raol20

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To cite this article: Riikka Puhakka (2023): Effects of outdoor adventures on emerging adults' well-being and connection with nature, Journal of Adventure Education and Outdoor Learning, DOI: 10.1080/14729679.2023.2220836

To link to this article: https://doi.org/10.1080/14729679.2023.2220836

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Published online: 04 Jun 2023.

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JOURNAL OF ADVENTURE EDUCATION AND OUTDOOR LEARNING
https://doi.org/10.1080/14729679.2023.2220836

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Effects of outdoor adventures on emerging adults' well-being and connection with nature

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ABSTRACT

While well-being and health benefits of nature are increasingly recognized, young people's decreasing contact with nature has raised concerns. The emerging adulthood period is seen as critical for ongoing participation in outdoor recreation. This mixed methods study examines how participation in an outdoor education course, including canoeing and hiking trips, affects participants' perceived well-being and connection with nature. The study is based on survey and interview data collected from Finnish vocational students ($N = 16$) in 2020. The results showed that the outdoor adventures had positive impacts on participants' mood, restoration, and life satisfaction. Participants highlighted the benefits on social relationships and group cohesion. The trips increased participants' nature-related curiosity and motivation to engage with nature. Providing opportunities for contact with nature as part of the school curriculum in vocational training as well as in other studies might provide an effective means of promoting well-being and connection with nature in emerging adults.

ARTICLE HISTORY
Received 19 April 2022
Accepted 5 April 2023

KEYWORDS
outdoor adventure; outdoor recreation; well-being; connection with nature; emerging adulthood

Introduction

Interest in human-nature interactions has grown along with urbanization, biodiversity loss, and climate crisis. Nature not only provides critical ecosystem services that support basic human needs but also non-material benefits, such as improved health and well-being (Sandifer et al., 2015). While the potential of nature in enhancing health and well-being is increasingly recognized, young people are leading more sedentary and technologically oriented lives (Inchley et al., 2020) and their outdoor experiences have decreased (Soga & Gaston, 2016).

Kaplan and Kaplan (2002) have described the adolescent years (roughly ages from 10 to 18 or 19) as a 'time out' in people's preference for the natural world and suggested that an interest in nature normally returns when adolescents become young adults. The shift from adolescence to young adulthood is a major normative life transition when individuals' roles, relationships, and ecological contexts alter and changes in leisure behaviour are most likely to take place (Arnett, 2015; Raymore et al., 2001). During this emerging adulthood period (Arnett, 2007)—roughly ages from 18 to 25 or 29 – individuals become more independent, begin to take more responsibility for their lives, and are faced with various stress factors and new demands on time and money. The negotiation of constraints during this period is critical for ongoing participation in outdoor recreation (Lovelock et al., 2016).

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Although in Finland, cities are still largely embedded in natural environments and outdoor activities are common (Neuvonen et al., 2022), there are signs of polarization in relation to nature: a small share of adolescents is not interested in nature (Hakokõngäs & Puhakka, 2021). Participation in outdoor recreation is associated with socio-economic factors and perceived health: adolescents from well-off and educated families and those feeling healthy and satisfied with life spend time in nature more often than others (Kaipainen, 2021). In Finland, especially girls' anxiety, symptoms of depression, and loneliness have increased, and their mental health and well-being decreased during the COVID-19 pandemic (Aalto-Setälä et al., 2021). Finnish women in vocational education and training were shown to experience a higher risk of depression compared to their academically oriented counterparts (Korhonen et al., 2017).

Therefore, pathways to support well-being and connection with nature are increasingly needed in the everyday lives of adolescents and emerging adults from all backgrounds. Structured outdoor and adventure programs and other nature-based interventions are seen as proactive means of enhancing participants' personal and social development and connection with nature (Ewert & Sibthorp, 2014). Outdoor adventures with a novel natural physical environment, challenging activities that aim to urge participants out of their comfort zones, a supportive social environment, and skilled instructors can be effective in producing positive outcomes (Deane & Harré, 2013; Mutz & Müller, 2016). However, there is still limited research on the role of outdoor adventures during the period of emerging adulthood (Ewert & Yoshino, 2011; Asfeldt & Hvenegaard, 2014; Chang et al., 2019; Mutz & Müller, 2016; Paquette et al., 2014; Stott & Hall, 2003). There is also a lack of studies on the mental health and subjective well-being benefits of outdoor adventure programs (Mutz & Müller, 2016). Furthermore, Birch et al. (2020) have identified a lack of research on diverse subjective and qualitative descriptions of well-being effects of nature; work with older youth has primarily focused on university students and quantitative measures.

The aim of this study is to explore how participation in outdoor adventures affects emerging adults' perceived well-being and connection with nature. The study is based on survey and interview data collected from Finnish vocational students ($N = 16$) who participated in an outdoor education course in 2020. Barton et al. (2016) have suggested that particularly at the period from adolescence to adulthood, nature-based interventions are likely important to future health and well-being.

Nature connection and well-being

The biophilia hypothesis suggests that humans possess an innate tendency to seek connections with nature and other life-forms (Wilson, 1984). Previous studies (Chawla, 2020; Rosa & Collado, 2019) have shown the links between nature experiences and high levels of nature connection, an empathetic relationship with nature, and proenvironmental attitudes and behavior. Connection with nature—understood as an individual's subjective sense of relationship with nature—is also associated with higher levels of well-being (Arola et al., 2023).

Previous research has indicated the benefits of nature on our psychological, physical, and social well-being and health (Keniger et al., 2013). In terms of psychological benefits, interacting with nature increases self-esteem, mood, and positive affect (e.g. happiness, vitality) and reduces anxiety and negative affect (Barton & Pretty, 2010; Bratman et al., 2015; McMahan & Estes, 2015). Benefits of nature on mental processes and cognitive ability or function have been explained by attention restoration theory which claims that directed attention becomes fatigued after prolonged mental effort (Kaplan & Kaplan, 1989). Restorative environments, such as natural settings, relieve the mental fatigue and stress in a person. Empirical studies have shown that nature contributes to attentional recovery and improves the ability to concentrate and perform mentally challenging tasks (Bratman et al., 2015; Tyrväinen et al., 2014).

Stress-reduction theory has also been used to explain how nature decreases arousal and perceived stress-levels and promotes psychophysiological stress recovery (Ulrich et al., 1991). Interacting with nature causes positive changes in human physiology, such as reduced blood

pressure or salivary cortisol levels (e.g. Tyrväinen et al., 2014). Contact with nature has been associated lower probabilities of many health problems (Twohig Bennett & Jones, 2018), including disorders of the immune system (Haahtela, 2019). Indirect benefits on both physical health and mental well-being are derived when natural settings encourage exercise (Shanahan et al., 2016).

In terms of social benefits, shared nature experiences have been shown to strengthen bonds within families or communities and promote social cohesion (e.g. Jennings & Bamkole, 2019). Weinstein et al (2015; see Wilson, 1984) have suggested that interacting with nature fosters a sense of connection with the outside world that may generalize to a feeling of caring and closeness with other people.

Benefits of outdoor adventures

While nature or outdoor experiences refer to time spent in nature in general and may also include passive or incidental contact with nature (Keniger et al., 2013; Rosa & Collado, 2019), outdoor adventures imply physically active, direct, and intentional contact with nature. The concept of outdoor adventure refers to a pursuit in an outdoor natural setting within an educational context, containing elements of risk, challenge, and uncertainty (Ewert & Sibthorp, 2014).

Previous studies on structured outdoor adventures in nature have shown the positive effects of such experiences for young people. There is a lot of research evidence about the benefits on personal and social development: for example, a more positive self-concept and improved self-esteem (Asfeldt & Hvenegaard, 2014; Barton et al., 2016; Paquette et al., 2014; Schell et al., 2012), higher outdoor and academic self-efficacy (Evans et al., 2020; Widmer et al., 2014), increased developmental assets (Norton & Watt, 2014) and personal skills (Stott & Hall, 2003), higher level of resilience (Ewert & Yoshino, 2011), more pro-social behavior and social skills (Bowers et al., 2019; Hignett et al., 2018; Stott & Hall, 2003), and increased group cohesion (Cooley et al., 2015).

Many of these benefits, such as self-esteem (Diener et al., 1999), resilience (Liu et al., 2013), and social cohesion (Delhey & Dragolov, 2016), have been shown to be linked to subjective well-being, which refers to people's cognitive and affective evaluations of their lives (Diener et al., 1999). However, subjective well-being frameworks have been largely absent from adventure studies (Houge Mackenzie & Hodge, 2020). The cognitive component of subjective well-being includes life satisfaction judgments, and the affective component reflects the presence of positive affect and the absence of negative affect (Diener et al., 1999; Schimmack, 2008). While the cognitive component is supposed to be based on evaluations of the long-term life achievements, the affective component is highly dependent on the present-moment emotions of a person in a specific situation (Mutz & Müller, 2016).

Although well-being effects of nature in general have been widely studied, the research on the mental health and subjective well-being benefits of outdoor adventures is still limited and scattered. Mutz and Müller (2016) discovered an increase in adolescents' and university students' life satisfaction, happiness, mindfulness, and self-efficacy and a decrease in perceived stress after long hikes. Warber et al. (2015) observed that well-being outcomes, such as positive and negative emotions, perceived stress, and relaxation significantly improved among young adults during a four-week wilderness camp. While quantitative analyses by Williams et al. (2018) did not find support for universal well-being benefits of an outdoor adventure experience, their qualitative data suggested that the outdoor program was impactful and positive for some adolescents. Chang et al. (2019) found that participation in short-term adventure-based outdoor programs significantly reduced college students' psychological stress levels. In their study on a 10-week wilderness adventure therapy, Bowen et al. (2016) observed improvements in at-risk adolescents' psychological resilience, depression, and social self-esteem (see Schell et al., 2012). In their framework, Houge Mackenzie and Hodge (2020) suggest that adventure recreation fosters eudaemonic aspects of subjective well-being (e.g. purpose and meaning, life satisfaction) by supporting the satisfaction of basic psychological needs for autonomy, competence, relatedness, and beneficence.

Furthermore, several quantitative and qualitative studies have shown that participants' connection with nature, appreciation for nature, and environmental awareness increased during outdoor interventions (Barton et al., 2016; Braun & Dierkes, 2017; Hignett et al., 2018; Lekies et al., 2015). However, some studies did not show an effect on connectedness with nature (Bruni et al., 2017; Williams et al., 2018). In their study on young adults, Warber et al. (2015) found that participants' connection with nature and all other nature-related measures, such as knowledge, skills, and perceived safety, significantly increased during a wilderness camp. Asfeldt and Hvenegaard (2014) observed that a three-week wilderness expedition had long-lasting impacts on university students' nature appreciation.

Most research has focused on outdoor adventure programs spanning several weeks (Asfeldt & Hvenegaard, 2014; Hignett et al., 2018; Stott & Hall, 2003; Warber et al., 2015) or even years (Lekies et al., 2015). Based on the studies that compared nature-based interventions of differing lengths, the longer interventions had greater and longer-term impacts (Braun & Dierkes, 2017; Sellmann & Bogner, 2013; Sibthorp et al., 2007). However, shorter trips may also push participants out of their 'comfort zones' and be turning points for personal growth, connection with nature, and longer periods of nature engagement (Barton et al., 2016; Bowers et al., 2019).

Impacts of outdoor adventures seem to be dependent on participants' socio-demographic and other characteristics, although socio-economic or educational background have not been a focus of research. Limited research has pointed, for example, to larger developmental gains and gains in nature connection in younger age groups (Braun & Dierkes, 2017; Sibthorp et al., 2007) and among individuals without previous outdoor adventure experience (Sibthorp et al., 2007) or with lower nature connection during pre-testing (Braun & Dierkes, 2017; Bruni et al., 2017. Mutz et al. (2019) found that an outdoor adventure program yielded stronger mental health and subjective well-being benefits, measured with perceived stress, long-term life satisfaction, and a short-term hedonic balance, for adolescents with a high level of daily screen time compared to youth with low-to-moderate levels. Some studies have also demonstrated that wilderness experiences have a greater influence on females' self-esteem compared to males (Barton et al., 2016; see Evans et al., 2020).

Methods

This study addresses existing gaps in research by employing mixed methods to explore how participation in outdoor adventures affects emerging adults' perceived well-being and connection with nature. Participants' subjective sense of well-being and relationship with nature were studied with mixed methods. For example, Onwuegbuzie and Leech (2005) have emphasized the benefits of using a mixed methods approach to understand phenomenon more fully. Based on the triangulation design (Cresswell & Plano Clark, 2007), this study involved the concurrent collection of quantitative survey data and qualitative interview data and bringing the results together in the interpretation. The qualitative data collection enabled capturing emerging adults' voices articulating if and how outdoor adventures supported their well-being or nature connection. The inclusion of qualitative data in the study also helps explain relationships discovered by quantitative data (Onwuegbuzie & Leech, 2005).

Course description and participants

The study is based on an outdoor education course that was organized for students in vocational education and training in the city of Lahti, Finland, in autumn 2020. Lahti is a typical mid-sized Finnish city of 120,000 citizens and is surrounded by water and green areas. The outdoor education course was voluntary for second-year students studying basic vocational qualification in education and instruction. The aim of the course was to not only provide students nature experiences and improve their outdoor skills but also to increase their understanding of the possibilities to use nature-based approaches in education and instruction.

The course included a three-day canoeing trip to Päijänne National Park, a three-day hiking trip to Repovesi National Park, and several meetings to prepare for the trips. A teacher at the school and another qualified instructor who were experts in adventure education led the course and involved participants in planning and organizing the trips (e.g. selecting routes, planning meals). During the trips, participants stayed in tents or in a traditional Finnish forest hut with a stove and benches and prepared their meals with portable stoves. Accordingly, participants engaged in basic living with no facilities such as electricity or tap water. They participated in nature-based activities, such as camping, hiking, canoeing, wild swimming, observing nature, and doing small-scale adventurous activities, which challenged them to test their skills and face their fears (e.g. building a canoe raft and walking across it). In addition, students practiced instruction by planning and organizing nature-based guidance activities for other students in small groups.

In total, 16 students completed the course (13 women, 3 men, all native Finns). Eleven participants were 17–18 years old, three were 19–30 years old, and two were older than 30. Before the course, all students responded to participate in overnight hiking rarely or never. Participants were informed about the aims of the research, and they gave their informed consent to voluntarily take part in the research.

Procedure

The quantitative part of the study was based on a pre-post-test research design where individuals were questioned at two different points in time. At the start (*t1*) and end (*t2*) of the course, participants completed paper questionnaires to assess well-being effects and connection with nature. Questionnaires included quantitative measures and a series of open-ended questions.

On the questionnaires at *t1* and *t2*, the cognitive component of subjective well-being, life satisfaction, was measured with the well-established question 'Are you satisfied with your life at the moment?' on a scale from 1 ('very unsatisfied') to 5 ('very satisfied'). To measure perceptions of vitality—having energy and feelings of being alive—four items from the Subjective Vitality Scale (SVS; see Bostic et al., 2000) were used (e.g. 'I feel alive and vital,' 'I look forward to each new day'). Participants responded with a seven-point Likert scale ranging from 1 ('not at all') to 7 ('completely'). The SVS scale has shown high reliability and covariation with somatic and psychological factors (Bostic et al., 2000; Ryan & Frederick, 1997). Nature connection was measured with the established Inclusion of Nature in Self (INS) scale (Schulz, 2001). The INS contains seven different circle pairs labelled 'nature' and 'self,' which differ in their degree of overlapping. Participants were asked to select one of the seven graphics determining their individual feeling of interconnection with nature. Scoring ranged from 1 (circles do not overlap) to 7 (circles overlap completely).

To measure (short-term) emotional well-being, participants were asked on the questionnaire at *t2* how often they had experienced various positive (e.g. calmness, happiness) and negative (e.g. nervousness, loneliness) emotions during the trips (scale from 1 = 'rarely or never' to 5 = 'very often or constantly'). To examine feelings towards different components of the outdoor adventures, participants were asked to select the three most pleasant, influential, and difficult components in their trips (e.g. canoeing, cooking, discussing with instructors). Furthermore, five open-ended questions were included on the questionnaire at *t2* so that participants could describe their feelings evoked by the outdoor adventures (e.g. 'What caused you to have positive/negative feelings on the trips?,' 'Did you experience something frightening during the trips?').

The questionnaire at *t2* also included statements of different well-being effects of the outdoor adventures assessed with a five-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). The items covered psychological well-being aspects, namely restorative outcomes (e.g. 'I felt restored and relaxe,d' 'I could forget everyday worries', 'I felt more self-confiden;t' see Korpela et al., 2016). The Restorative Outcome Scale was shown to be a reliable and valid scale to evaluate the restorative emotional and cognitive outcomes of nature (Korpela et al., 2008, 2010). The items also covered different aspects of social well-being (e.g. 'The trips fostered my relationship with

Table 1. Interview themes.

Main themes	Subthemes
Experiences from the canoeing and hiking trips	Positive
	Negative
Effects on psychological well-being	Mood, positive and negative feelings
	Restoration, relaxation, retreating from daily life
	Learning new knowledge and skills
	Self-confidence, self-efficacy, self-awareness
Effects of social well-being	Enjoying social interaction (cf., retreating)
	Social relationships
	Collaboration, support, group spirit
Effects on physical well-being	Physical activity
	Physical sensations and feelings
	Exceeding one's limits
Effects on connection with nature	Spending time in a natural environment
	Natural elements enhancing well-being
	Future interest in hiking, canoeing, engaging with nature

classmates', 'I found it easier to talk about personal matters in nature') and physical well-being and sensations (e.g. 'I was able to test my physical strengt,h' I enjoyed silence') (see Puhakka et al., 2017). Finally, participants were asked whether the trips inspired them to engage in nature-based and physical activities (e.g. 'To increase nature-based hobbies', 'To maintain hiking skills').

Survey data were complemented with interview data to allow a deeper insight into participants' subjective voices articulating how they experience nature during the outdoor adventures and if and how nature supports their well-being. Nine voluntary students (6 women, 3 men, different age groups) participated in three small-group interviews conducted by the researcher at the end of the hiking trip before filling in the questionnaire. Group interviews were chosen as they often yield rich information as participants respond to each other's comments (see Gibbs, 2012). To enable participants to feel comfortable, interviews were conducted in small groups that interacted closely during the trips, e.g. participants stayed in the same tent or cooked their meals together. Each interview involved three participants and lasted for 30–45 minutes; interviews were conducted in a peaceful place outside or in a hut without other students listening. The thematic interviews covered participants' experiences during the trips and the perceived effects on well-being and connection with nature (Table 1). All general themes included more specific questions, depending on the course of the interview. The interviews were recorded and then transcribed for analysis.

Data analysis

Data gathered through the questionnaires were combined, stored, and analysed using SPSS software (Version 28). The results are reported in the following section via the descriptive statistics of different variables. Differences between the pre- and post-intervention responses were compared using the nonparametric Wilcoxon signed-rank test that can be used for ordinal and not normally distributed data.

When analysing qualitative data, the researcher first familiarized herself with the material by reading all 30 pages of transcribed interviews and marking text related to various themes with different colours. Then transcribed interview data were coded into different categories and subcategories; one or more codes were assigned to each related interview statement. The researcher identified aspects of the interviews that indicated the effects of outdoor adventures on various aspects of well-being and nature connection. The coding scheme was refined after the initial coding and synonymous codes combined to form broader themes. By coding the data, it was possible to form an overall picture of all responses.

In the following sections, quantitative and qualitative findings are integrated to provide a more comprehensive understanding of experiences and outcomes of the adventures. Quotations from the

group interviews are given to illustrate the ways in which participants elaborated on their experiences of engaging with nature and gaining well-being benefits.

Results

Effects on well-being

The study results indicated the perceived benefits of outdoor adventures on various aspects of psychological well-being. Based on the questionnaire at *t2*, participants often felt positive feelings—safety, happiness, calmness, and vitality—during the hiking and canoeing trips (MD = 4). Meanwhile, they rarely or very rarely felt negative feelings: nervousness (MD = 2), depression (MD = 2), and loneliness (MD = 1). Ratings of the restorative outcomes showed that participants experienced the trips as rather restorative (Table 2). Based on the comparison of pre- and post-questionnaires, participants did not demonstrate significant changes in their subjective vitality (SVS) scores (*p*-values > .05). However, participants significantly increased their satisfaction with life scores between *t1* ($M = 3.54$, SD = .88) and *t2* ($M = 4.00$, SD = .37, $p = .034$).

In the open-ended questions and interviews, many participants described how the hiking and canoeing trips calmed them down, relieved their stress and anxiety, or increased their energy and positive feelings. Meanwhile, a few felt that these physically and mentally demanding trips had some negative impacts on their mood or stress levels. Participants' feelings varied during the trips, depending on the current situation, and they were able to identify their positive and negative

Table 2. Perceived well-being effects of the trips (on a scale of 1–5).

	Mean	SD
Restoration		
I felt more vital and energetic.	3.75	0.58
I could forget everyday worries.	4.13	0.81
I had new hope for tomorrow.	3.75	0.58
I felt restored and relaxed.	4.00	0.52
I felt more focused.	3.56	0.73
I felt more self-confident.	4.00	0.82
I felt calm.	3.88	0.72
My thoughts were clearer.	3.25	0.78
Social well-being		
I had a chance to get away from school.	4.44	0.63
My school motivation improved.	3.50	0.97
I had a chance to get away from everyday life.	4.25	0.86
My motivation for everyday life improved.	3.75	0.78
I enjoyed getting to know new people.	4.37	0.72
I enjoyed spending time with my classmates.	4.63	0.62
I found it easier to talk about personal matters in nature.	4.00	1.10
Having company increased my feeling of security.	4.44	0.63
I enjoyed being alone.	4.00	1.10
The trips fostered my relationships with classmates.	4.31	0.60
Physical sensations and well-being		
I enjoyed silence.	4.81	0.40
I enjoyed sounds of nature.	4.69	0.48
I enjoyed the fragrance of nature.	4.44	0.63
It felt good to breathe fresh air.	4.81	0.40
I enjoyed beautiful nature.	4.88	0.34
The feel of nature was pleasant (wind on my face, soft moss, shapes of different surfaces, etc.).	4.50	0.73
I felt the bugs were disturbing (mosquitos, deer flies, wasps, ticks, etc.).	2.00	1.10
Weather conditions felt unpleasant.	3.19	1.05
I exercised more than in everyday life.	4.00	1.27
I was able to test my physical strength.	4.25	0.86
I felt that nature exercise improved my physical condition.	4.13	0.89
I felt my physical well-being improved.	4.13	0.72

emotions. Some interviewees had noticed that both positive and negative emotions feel stronger in a novel natural environment under simple conditions.

> *We discussed also in a bad sense that some emotions activate stronger here. I think it's good in some cases. Because a feeling like joy, for example, feels so much stronger when you do not have anything unnecessary around it. So you know that it's for a reason, and it's a good feeling*. (Participant 7)

In the open-ended survey question, individual respondents mentioned not only muscle pain, tiredness, and hunger but also weather conditions (coldness, wetness) and mosquitos as causes of negative feelings on the trips. A few participants named frightening elements: thunderstorm, darkness, walking in rocky terrain, and being in a novel environment. The interviews illustrated that participants are not used to being in natural settings around the clock, which caused some of them fear or insecurity in specific situations.

> *I was walking in the evening, and I'm not used to darkness or total quietness. . . When I was walking there alone for the first time, there was some small mouse in the bushes, it was rustling there, and I almost ran back to our camp. Then I went another time with [name], and I almost jumped behind [name]'s back when a mouse was running past my legs. — No, it's not [frightening], but I'm not used to them. (Participant 3)*

The questionnaire at *t2* also showed that participants agreed that their self-confidence increased during the outdoor adventures (Table 2). Some interviewees described how handling various situations during the trips encouraged them to try different things also in their everyday lives. By providing novel challenging opportunities, the trips allowed participants to develop new knowledge and skills and to achieve the feeling of mastery.

> *- Just like jumping into the unknown, this doing has been quite unknown, and you haven't known beforehand . . . You don't learn if you don't try, so maybe this will encourage in that.*
>
> *- Yeah, so that you can really manage when you're facing new situations.*
>
> *- Just that you challenge yourself.* (Participants 5 and 6)

Furthermore, many interviewed participants were surprised by their own characteristics, such as mental tolerance, during the trips. They could thus learn something new about themselves and improve their self-awareness.

Based on the questionnaire at *t2*, participants felt that they had a chance to get away from school and everyday life during the outdoor adventures (Table 2). In the interviews, many participants emphasised the possibility to retreat from the hustle and stress of everyday life. Physical separation from the busy and noisy urban environment and the routines and requirements of daily life was perceived to promote psychological well-being. Interviewees described how everything seems to slow down in the natural environment, and it is possible to calm down, focus on direct sensory experiences, and clear thoughts. Some participants described these effects on well-being as long-term, compared to excitement and action that stimulate senses in a different way.

> *- If the choice would have been Linnanmäki [an amusement park], no thank you.*
>
> *- Yeah, it wouldn't at all increase well-being in a similar way, two totally different worlds.*
>
> *- This is longer-term, that's short-term.*
>
> *- Yeah, and if we compare to Linnanmäki, it stimulates your senses, raises adrenalin and excitement and everything, but here you can calm down. It's the totally opposite effect. Everything slows down and stops, the senses have more space to work, and it's not like cacophony, but everything is more in balance and in harmony*. (Participants 1 and 2)

Getting away also meant retreating from mobile phones and other digital devices, which was partly explained by the poor internet connection and limited possibilities to charge a phone battery. Separation from modern technologies was seen to affect social interaction in a positive way: two

interviewees had noted that participants talked more with each other during the trips compared to school because they used their mobile phones less.

In terms of social well-being, the questionnaire at *t2* showed that, although respondents enjoyed moments of being alone on the trips, they enjoyed even more spending time with others and found it easier to talk about personal matters in nature. Accordingly, participants perceived that the trips fostered their social relationships (Table 2). Furthermore, participants identified gatherings of the whole group (e.g. by the bonfire) (87%) and spending time in their small group (40%) as the most pleasant parts of the trips. In the open-ended question concerning the causes of positive feelings, almost all respondents mentioned social aspects. For example, one participant described how becoming accepted in the group during the trips had helped to heal past wounds caused by school bullying. Interviewees felt that the group spirit and trust towards others increased in a novel environment under simple conditions: 'If you can't do something, they [the group] will share the load' (Participant 9). Participants helped, spurred, and supported each other for example when setting up a tent, cooking with a portable stove, or carrying equipment.

> *It [spending time together around the clock] makes us closer in my opinion. At school we would not necessarily . . . If we had to do schoolwork, we might not get along in a similar way, but here we must collaborate and everyone has a good feeling, so everyone wants to collaborate, or at least I feel so. So it's very different here than it would be at school.* (Participant 4)

During the outdoor adventures, participants highly enjoyed different physical sensations, such as seeing beautiful nature, listening to silence, and breathing fresh air (Table 2). In the open-ended questions and interviews, participants described various natural elements and multisensory nature experiences that they perceived to calm them down, improve their mood, or enhance their well-being in another way. Retreating from everyday life and its routines and worries enabled participants to focus on direct sensory experiences and enjoy small wonders of nature.

> *- I think that one [that enhances well-being] is water, silence, and rocks.*
>
> *- Water, sun, sky, bonfire, lovely small wind, and then those smells, birdsong. So it's not only one element, but there are quite many of them.*
>
> *- Me neither, I can't separate only one because it's the entire forest.*
>
> *- Beautiful variation in shapes, lichen, shapes of rocks or some stick of wood, or it has grown like this or . . .*
>
> *- And here everything is quite old. If you think about all these trees, they are several tens of years old.* (Participants 1, 2, and 3)

Based on the questionnaire at *t2*, participants were able to test their physical strength during the outdoor adventures and felt that nature exercise improved their physical condition and well-being (Table 2). Respondents also agreed that they exercised more than in everyday life, which illustrates that canoeing and hiking with a backpack were physically demanding for many participants. Interviewees perceived muscle pain and tiredness as positive signs of being physically active and improving physical condition. Exceeding one's physical and mental limits was seen to increase positive feelings, such as joy, and satisfaction of success. Challenging opportunities allowed participants not only to push their physical limits of endurance but also to overcome their fears. For example, one participant who had a fear of water walked across a canoe raft in deep water.

> *I was totally exhausted but very happy that I went there [canoeing], but when you get to sleep in your own bed, it feels very good. However, I had a very good feeling. I told all my friends that oh damn, I did this and that and I exceeded myself, but I was physically very tired.* (Participant 4)

Physically and mentally demanding activities—sleeping outdoors (53%) and canoeing (47%)—were identified as the most influential parts of the trips after the gatherings of the whole group (67%). Meanwhile, participants identified hiking (60%), sleeping outdoors (53%), canoeing (53%), and cooking (53%) as the most difficult components.

Table 3. Perceived inspiration to do various things in the future (on a scale of 1–5).

	Mean	SD
To visit these areas again.	4.31	0.87
To visit other natural settings.	4.25	0.68
To maintain daily exercise.	4.13	0.96
To increase daily exercise.	4.13	0.96
To increase nature-based activities.	4.00	1.03
To maintain hiking skills.	4.00	1.10
To learn new skills.	4.19	0.98

Effects on connection with nature

Based on the questionnaires, respondents did not show significant changes in their degree of nature connectedness (INS scores) between *t1* ($M = 4.23$, SD = 1.24) and *t2* ($M = 4.38$, SD = 1.03, $p = .564$). Participants, however, agreed that they learnt more from nature ($M = 4.50$, SD = .63) and new skills ($M = 4.69$, SD = .60) and their interest towards nature increased ($M = 4.19$, SD = .91) during the trips. They also responded that participating in the outdoor adventures inspired them to visit these areas and other natural settings again, to participate in nature-based and physical activities as well as to maintain and learn new skills (Table 3).

In the interviews, participants described that they have had a chance to learn hiking skills in a safe way under guidance, and they were willing to continue participating in overnight hiking with their classmates or other close people. Some participants also felt that after realizing the well-being benefits, they were more motivated to spend time in natural environments in their everyday lives. Meanwhile, a few mentioned that engaging with nature enhances appreciation for nature.

> *I have considered that I could relocate the moments of calming down away from my own bed, where I spend time otherwise, to our nearby forest because it's only around 20 meters away.* (Participant 6)

Discussion

This study explored how participation in an outdoor education course affects Finnish emerging adults' perceived well-being and connection with nature. The results are in line with previous studies indicating the perceived benefits of outdoor adventures on various aspects of psychological well-being, such as relaxation, stress reduction, mood, and life satisfaction (e.g. Chang et al., 2019; Mutz & Müller, 2016; Warber et al., 2015). Based on prevalence of positive feelings compared to negative feelings during the canoeing and hiking trips, the trips had positive impacts on participants' (short-term) emotional well-being. Meanwhile, increased ratings of satisfaction with life reflect improvement in longer-term subjective well-being (see Diener et al., 1999; Mutz & Müller, 2016). Although participants experienced the trips as restorative in general, challenging overnight adventures also caused them some stress, tiredness, and muscle pain, which may affect their ratings of well-being immediately after the trips. This explains why participants did not demonstrate any significant changes in their subjective vitality (SVS) scores (cf. Tyrväinen et al., 2014).

Based on the results, physical separation from the various stressors that the students encounter in their everyday lives enhanced perceived psychological benefits. The outdoor adventures enabled a temporary escape from urban disturbances, daily routines, duties, and worries—and even from digital technologies (see Birch et al., 2020; Chang et al., 2019). The physical distance also creates a psychological distance and reduces feelings of being under pressure of time and social demands, for example (Mutz & Müller, 2016). Floros et al. (2021) have further highlighted the importance of 'a digital detox' – reduced technology use on holiday—in enhancing well-being. Escaping everyday life and the resulting well-being benefits may be particularly important for emerging adults who face

various challenges and pressures during this phase of life of becoming more independent (Puhakka, 2021).

During the outdoor adventures, participants highly enjoyed various physical sensations of nature that engaged their attention and helped to focus on the moment. Based on the attention restoration theory (Kaplan & Kaplan, 1989; Kaplan, 1995), natural environments are restorative not only because they provide an opportunity for 'being away' but also because they afford fascinations that effortlessly engage our involuntary attention, provide a sense of extent, and are highly compatible with human inclinations. The results illustrated that 'soft' fascinations that engage our involuntary attention are not only based on the visual sense, but well-being is often derived from multisensory and embodied experiences (see Hakoköngäs & Puhakka, 2021; Puhakka, 2021). As Mutz and Müller (2016) have stated, a key aspect in outdoor adventures is mindfulness, which refers to openness for the present-moment experience. It helps people to self-direct more attention to the beauty of nature as well as to their own feelings and thoughts.

Various activities on the trips were not only challenging but also highly influential for participants. While students could learn outdoor skills under guidance, they became more self-confident to continue participating in nature-based activities independently. Some participants also felt more encouraged to try various things in their everyday lives. Increases in self-efficacy in outdoor recreation can be generalized to other areas of life functioning (Widmer et al., 2014). The results support the previous studies indicating that meaningful challenges enable exceeding one's physical and mental limits and achieving the feeling of mastery (Barton et al., 2016; Bowers et al., 2019). Efficacy beliefs are promoted when the difficulty of tasks slightly exceeds the participant's ability (Widmer et al., 2014). Increases in ratings of satisfaction with life may also have been caused by successfully overcoming challenges (see Mutz & Müller, 2016). As Houge Mackenzie and Hodge (2020) have suggested in their framework, the satisfaction of psychological needs, such as competence, fosters eudaemonic aspects of subjective well-being. Mastery experiences achieved during outdoor adventures might also be effective in enhancing levels of resilience (Ewert & Yoshino, 2011). They are particularly relevant to adolescents and emerging adults who often experience fluctuations in their self-esteem (e.g. Paquette et al., 2014).

Participants highlighted the effects of the outdoor adventures on the social aspects of well-being. Being in a novel environment under simple conditions with limited connections to the outside world enabled close interaction among group members and helped to nurture positive connections with each other. Growth in social competencies was demonstrated by the willingness and ability to collaborate with and trust each other (see Bowers et al., 2019; Warber et al., 2015). Participants seemed to be able to liberate themselves from social expectations, roles, and judgements of everyday life (see Birch et al., 2020). The results thus support previous research indicating the benefits of outdoor adventures on social skills and group cohesion (Barton et al., 2016; Bowers et al., 2019; Cooley et al., 2015). The importance of socially shared experiences may be highlighted during emerging adulthood, which is characterized by maintaining connections with friends, creating new friendships, and giving and receiving peer support (see Arnett, 2007; Lovelock et al., 2016).

Based on the results, intensive engagement with nature while canoeing and hiking did not change participants' degree of nature connectedness. This result is in line with some previous studies (Bruni et al., 2017; Williams et al., 2018; cf., Barton et al., 2016; Braun & Dierkes, 2017; Hignett et al., 2018). In this study, a null finding may be caused by a so-called ceiling effect; participants' nature connectedness (INS) scores were already relatively high before the intervention (cf., Barton et al., 2016) and further improvements would thus be unlikely (see Williams et al., 2018). Relatively strong connection with nature may also have influenced participants' positive perceptions of the well-being effects of outdoor adventures (see Mayer et al., 2009). Although decreasing contact with nature has raised worries also in Finland, most adolescents and emerging adults still participate in outdoor activities and highlight the importance of nature (Hakoköngäs & Puhakka, 2021; Neuvonen et al., 2022). The results, however, indicate that the outdoor adventures increased participants' nature-related curiosity and motivation to engage with nature. The trips encouraged

students to participate in more frequent outdoor experiences which may increase their connectedness with and appreciation for nature in the long term (see Barton et al., 2016; Bowers et al., 2019).

As the results illustrate, emerging adults learn to spend time in nature and get used to different kinds of features of nature and seasonal and weather conditions through practice. Exceeding one's physical or mental limits may help in overcoming fears and insecurities. The relational approach highlights that the more one spends time in natural settings, the more skilled one becomes in engaging with nature and perceiving affordances that enhance well-being (Rantala & Puhakka, 2020; see Lekies et al., 2015). Outdoor adventures can be catalysts for lifestyle improvements as recognizing the well-being benefits of nature may encourage participants to change their daily habits of well-being (see Pomfret & Varley, 2019).

Conclusion

This study indicates that outdoor adventures have benefits on emerging adults' engagement with nature and subjective well-being, 'be it through mastery experiences, the beauty of the natural environment or the social support received from the group' (Mutz & Müller, 2016, pp. 107–108). Participation in canoeing and hiking trips had positive impacts on Finnish vocational students' perceived mood, restoration, and life satisfaction. After challenging oneself in a novel environment, participants felt more self-confident. They also highlighted increased social interaction and group cohesion. Although ratings of nature connectedness did not change, the trips enhanced participants' nature-related curiosity and motivation to engage with nature.

As a limitation of this study, no follow-up data were collected from participants afterwards, and it is thus not possible to evaluate the durability of the perceived benefits. Collecting follow-up data is recommended in future studies (e.g. Williams et al., 2018). In addition, the study was based on a small sample and lacked a control group; most participants were females, and their age range was wide. An older participant's dominant role in one interview might have limited the youngest participant's possibilities to express one's own opinions. Although study participants had only a little experience with overnight hiking, they had voluntarily participated in this outdoor education course, which may have caused self-selection bias. This may also explain their relatively high INS scores. This small-scale exploratory research would benefit from future research using equivalent control groups and conducting randomized controlled trials to evaluate the effects caused by outdoor adventures on emerging adults' well-being and connection with nature.

Despite the limitations, the study indicates that organizing outdoor adventures may provide an effective means of promoting well-being and connection with nature during the emerging adulthood period. Special efforts are needed to support getting over the 'time-out' in relation to nature after adolescence (see Kaplan & Kaplan, 2002; Lovelock et al., 2016). In other countries, there may be a greater decline in emerging adults' outdoor experiences and everyday connection with nature than there is among the Finnish participants of this study (see Soga & Gaston, 2016). Efforts to enhance emerging adults' well-being during a life stage loaded with stress factors are highly important in post-pandemic times with decreasing levels of well-being (e.g. Aalto-Setälä et al., 2021). Contributions of nature to human well-being might also be a good way to gain broader acceptance for protecting ecosystems and biodiversity (Sandifer et al., 2015). Incorporating outdoor adventures into the school curriculum in vocational training as well as in other studies would enable young people from all backgrounds to engage with nature and gain well-being benefits (see Barton et al., 2016).

Organized outdoor activities help participants to familiarize themselves with natural settings, to learn new skills and knowledge, and to socialize with peers in a safe way. Especially among first-year students, outdoor adventures could be used in enhancing social interaction and group cohesion. Many outdoor practices—such as setting up a tent—require collaboration, but social interaction could also be enhanced by giving specific group tasks to students. Meaningful challenges and activities during outdoor adventures enable increases in self-confidence and self-

efficacy. Meanwhile, possibilities to retreat from social interaction and calm down in nature are needed to enable restoration. Practices focused on observing nature with all senses might be useful not only in restoring attention but also in enhancing connection with nature. Gradual progress from shorter to longer and more challenging adventures allows developing outdoor skills, getting used to different conditions, and achieving the feeling of mastery. From participants, the successful outdoor adventures require openness to new experiences and people, and the ability to cope with elements of risk, challenge, and uncertainty. Adventures of several days under simple conditions enable memorable and influential experiences that may promote lifestyle changes and have thus long-lasting effects on emerging adults' well-being and connection with nature.

Acknowledgments

The author is very grateful to all participants of the study and Paavo Heinonen (Sport Institute of Finland, Vierumäki) and Anna Lappalainen (Salpaus Further Education) for leading the outdoor education course.

Disclosure statement

No potential conflict of interest was reported by the author.

Funding

This work was supported by the Academy of Finland under Grant [321250].

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