The Wilderness Expedition: An effective life course intervention to improve young peoples well-being and connectedness to nature

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Title: The Wilderness Expedition: An Effective Life Course Intervention to Improve Young People's Wellbeing and Connectedness to Nature

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Abstract

It is generally well-understood that wilderness expeditions improve wellbeing; however there is little supporting quantitative data. The aim of this study was to measure the impact of wilderness expeditions on adolescent self-esteem (SE) and connectedness to nature (CN) and assess whether benefits varied according to participant and expedition characteristics. SE and CN were assessed pre- and post- wilderness expeditions in 130 adolescents using Rosenberg's SE scale and the state CN scale. Two-way ANOVA revealed a significant increase in both SE and CN ($P<0.001$) as a result of single expeditions. There was also an interaction effect of the expedition and gender on SE ($P<0.05$). Males had a higher SE than females at the start but female SE increased most. Linear regression revealed that living environment, gender and the length and location of the expedition did not contribute to changes in SE and CN. We conclude that regular contact with natural environments will improve adolescent wellbeing, with the largest improvements in females.

Keywords: Wilderness expedition; self-esteem; connectedness to nature; youth; school

Introduction

The prevalence of mental ill-health in the UK has remained relatively stable in the last 15 years at 17% of the population (Chief Medical Officer, 2013; Pretty et al, 2015). However, one in ten young people under the age of 16 years have a diagnosed mental disorder; with young people in lone parent families and families with lower levels of academic achievement being more likely to suffer from mental ill-health (Chief Medical Officer, 2013; Pretty et al, 2015). Adolescence represents a decisive development period in the life course, during which positive supportive schooling experiences can promote self-esteem and encourage the adoption of positive health behaviours (Currie et al, 2012; Due, Lynch, Holstein and Modvig, 2003; Freeman et al, 2009; Vineo, Santinello, Pastore and Perkins, 2007). Low self-esteem is a mental health risk factor (Griffiths, Parsons and Hill, 2010; Xavier and Mandal, 2005) and a principal aspect of psychological functioning during adolescence (Moksnes, Moljord, Espnes and Bryne, 2010). It is defined as *'a person's positive or negative attitude towards the self in totality'* (Bagley, 2001) and exhibits an inverse relationship with depression (Orth, Robins and Meier, 2009) and anxiety (Boden, Fergusson and Horwood, 2008).

Research suggests that self-esteem and ill-health tracks across the life course (Orth, Robins and Widaman, 2012; Pretty et al, 2009; Swann, Chang-schneider and McClarty, 2007; Trzesniewski et al., 2006) and that individuals with low self-esteem exhibit poorer coping strategies and are less resilient to stressful life events (Ort et al., 2009). Having high self-esteem at 15 years of age significantly predicts life satisfaction and peer attachment at 3, 6 and 10 years later (Boden et al., 2008). Girls are at greater risk of ill-health and emotional problems, including depression and anxiety and low life satisfaction (Currie et al, 2012). These gender differences continue to become more prominent with age (Ranta et al., 2007).

In addition to poor mental health, children and adolescents are increasingly spending less time outdoors and are experiencing a 'disconnection from nature' as a result (Louv, 2005). In a survey by Natural England (Hunt, Burt and Stewart, 2015) approximately 12% of young people today report never having visited a natural space in the previous twelve months; with only 21% reporting that they did so once a week. In addition, young people from Black, Asian and Minority Ethnic groups are less likely to visit natural spaces, as are children from families where adults have little contact with nature

(Hunt et al, 2015). Exposure to nature can improve children's cognitive functioning, concentration and wellbeing; reduce psychological and physiological stress, and result in better self-reported health (Mitchell and Popham, 2007; Maas, Verheij, Spreeuwenberg and Groenewegen, 2008; Van den Berg et al, 2010; Lee et al, 2011; Bratman et al, 2012). Furthermore, low levels of contact with nature during childhood can track across the life course and have a detrimental effect on future health and wellbeing (Ward Thompson, Aspinall and Montarzino, 2008; Pretty et al, 2009).

Connection to nature is the degree to which '*an individual includes nature as part of their identity'* (Schultz, 2002). A lack of connection to nature has been associated with a diminished use of the senses, attention difficulties and higher rates of emotional and physical illnesses (Louv, 2005). Connection to nature has also been found to be associated with a number of different elements of psychological health and wellbeing (Clayton, 2003; Mayer and Frantz, 2004; Mayer et al., 2009; Nisbet et al., 2009; Howell et al., 2011; Davis et al., 2011; Cervinka et al., 2012; Markowitz et al., 2012; Wolsko and Lindberg, 2013), is an important predictor of subjective wellbeing in adults (Mayer and Frantz 2004; Nisbet et al., 2011; Wolsko and Lindberg, 2013) and is associated with higher general wellbeing and increased happiness (Baumeister and Leary, 1995; Mayer et al 2009, Howell et al., 2011; Cervinka et al., 2012; Capaldi, Dopko and Zelenski, 2014). Increases in connection to nature as a result of spending time in natural environments are positively and significantly associated with improvements in self-esteem (Bragg, 2014). Furthermore, the relationship between connection to nature and wellbeing is mediated by natural beauty. Individuals who are most attuned to natural beauty or who engage with more beautiful natural environments, reap the most positive benefits from being connected to nature (Zhang et al, 2014; Zhang, Howell and Iyer, 2014). Thus, effective interventions are needed both to engage and to connect young people with natural environments; which will in turn promote improvements in self-esteem and wellbeing.

Immersion in natural, wild and wilderness settings is increasingly used to provide a context for a range of health and development interventions. The restorative properties of the wilderness foster personal, social and emotional growth (Davis-Berman and Berman 1994a, 1994b, 2008; Russell 2001, 2006; Norton & Watt, 2014), including significant changes in self-esteem, self-efficacy, self-image, self-control, self-confidence, self-empowerment and decision making (Cason and Gillis, 1993;

Hans, 2000; Hattie, Marsh, Neill and Richards, 1997; Russell, 2006b; Hoag et al, 2013; Asfeldt and Hvenegaard, 2014; Paquette et al, 2014). Wilderness settings are also used as part of formal therapy in adolescents, improving psychological functioning and reducing distress related to interpersonal and mental health challenges (Berman and Davis-Berman, 2013; Norton et al, 2013; Hoag et al, 2014).

Wilderness expeditions are a form of wilderness experience that offer opportunities for educational experiences and promote leadership and character development (Goldenberg, McAvoy & Klenosky, 2005; Asfeldt and Hvenegaard, 2014). They can vary in their format (e.g. educational field trip, stewardship course, outdoor education or wilderness management programme), duration (days to weeks or months) and personal growth focus (e.g. leadership, personal or organisational development) (Dawson & Russell, 2012), but the outcome is often enhanced self-esteem (Moore and Russell 2002; Ewert and McAvoy 2000; Asfeldt and Hvenegaard, 2014; Paquette et al, 2014). Thus, wilderness expeditions might provide an important opportunity to promote self-esteem and nature connectedness in adolescents, both of which are important for wellbeing.

The evidence base for the benefits of wilderness expeditions is growing, implying there is a strong link between wilderness exposure and improved health and wellbeing for a variety of cohorts (Dawson and Russell, 2012). However, despite the long experience of wilderness expeditions, the majority of studies examining their impact are purely qualitative (around 30%) or descriptive (around 50%) (Hine, Pretty and Barton, 2009). The primary aim of this study is to determine whether a wilderness expedition can improve self-esteem and connectedness to nature in adolescents. The secondary aim is to determine whether benefits vary according to participants' gender, living environment and the location or length of the wilderness expedition.

Method

Participants

A total of 130 adolescents aged 11-18 years took part in the wilderness expeditions, comprising of 57 males (43%) and 75 females (57%). The majority of participants lived in a city (36%) or large town (26%), with 18% living in a village, 11% in a small town and only 9% in a remote rural area. Written parental consent and individual assent was obtained for all young people

both to take part in the wilderness expedition and in the research element. Institutional ethical approval was also granted for the study.

The Wilderness Expedition

The wilderness expeditions were run by the Wilderness Foundation UK between 2006 and 2012 (May-October). Sixteen different wilderness interventions took place during this period, located either in the Imfolozi game reserve of South Africa (63%) or in Scotland (37%) at Corrour, Loch Shiel and Glenfeshie Valley. The duration of the expeditions ranged from 5-11 days; with 50% of expeditions lasting for five days, 14.6% lasting for both six and eight days, 12.5% lasting for seven days and 8.3% lasting for 11 days.

The aim of the wilderness expeditions was to re-kindle the connections that exist between people and nature and to develop informed leadership in a climate of challenge and adventure. All wilderness expeditions involved total nature immersion whereby participants engaged in basic living with no facilities such as electricity or access to mobile phones; and running water available only from nearby rivers, streams or lochs. It was hoped that this immersion and the simplicity of the experience would help participants to build a connection with nature, gain perspective and return with fresh insights. The expeditions offered a range of life training skills such as leadership, planning and organising, decision making, reflection, learning to process experiences, communication and teamwork; and promoted personal development and social skills. Participants engaged in activities such as camping, hiking, wild swimming, wild nature watching, food foraging, solo experiences, journaling and canoeing. All participants were encouraged to lead 'Leave No Trace' principles engendering a respect for nature and the outdoors, alongside respect for each other.

Procedure

At the start and end of each wilderness expedition, participants completed questionnaires to assess self-esteem and connectedness to nature. Self-esteem was assessed using Rosenberg's self-esteem scale (Rosenberg, 1965). The scale provides a self-reported one-dimensional measure of global self-esteem and is widely used in research analysing the effects of exposure to nature (Pretty et al, 2005; Pretty et al, 2007; Barton and Pretty, 2010; Wood et al, 2012; 2014; Rogerson et al, 2014). The scale comprises 10 statements relating to overall feelings of self-worth or self-acceptance. Each

item is scored on a four point likert scale from strongly agree to strongly disagree. An overall self-esteem score is calculated ranging from 10 to 40; with a higher score representing a better level of self-esteem. The scale has a Cronbach alpha coefficient of between 0.77 and 0.88 indicating a good level of internal consistency (Blascovich and Tomaka, 1991; Robins et al, 2001).

Connectedness to nature was assessed using the State Connectedness to Nature scale (Mayer and Frantz, 2004; Mayer, Frantz, Bruehlman-Senecal and Doliver, 2009). This instrument has been widely used and is appropriate for use in both adults and adolescents (Mayer and Frantz, 2004). The scale is a single-factor measure which consists of 13-items scored on a five point likert scale from strongly agree to strongly disagree. Three items are reverse scored. Scores for each item are summed and divided by 13 to provide an overall connectedness to nature score (ranging from 1 to 5). A higher score represents a greater connection to nature. The Cronbach alpha coefficient for the scale is 0.84 indicating a good level of internal consistency (Mayer and Frantz, 2004).

Data Analysis

One-way ANOVA compared self-esteem and connectedness to nature scores across the different expeditions. Two-way mixed ANOVA was used to examine the impact of the wilderness expedition and gender on participants' self-esteem and connectedness to nature; whilst linear multiple regression examined the impact of gender, living environment and the length and location of the wilderness expedition on the change in self-esteem and connectedness to nature scores. Significance was accepted as $P<0.05$ throughout the analysis.

Results

Self-esteem

One-way ANOVA revealed no significant differences in the pre self-esteem scores between the different expedition locations ($P>0.05$); all data was therefore grouped together. Two-way mixed ANOVA revealed a significant interaction effect of gender with time ($F(1,116)= 4.89$; $P<0.05$). Post hoc independent t-tests revealed that there was a significant difference between boys and girls self-esteem pre- wilderness expedition ($t(122)= 2.96$; $P<0.01$); but not post- expedition. Boys' self-esteem was higher than that of girls pre-expedition, but this difference did not exist post- expedition (Table

1). There was also a significant main effect for time ($F(1,116)= 62.2$; $P<0.001$), with self-esteem improving pre-post expedition.

Multiple regression revealed that neither the participants' gender (Beta= .15; $p>0.05$), the location of the wilderness expedition (Beta=-.04; $P>0.05$), the expedition duration (Beta=-.10; $P>0.05$) or participants living environment (Beta= -.17; $P>0.05$) made significant contributions to the variance in the change in self-esteem scores.

Connectedness to Nature

One-way within ANOVA revealed no significant differences in the pre connectedness-to-nature scores between the different wilderness locations ($P>0.05$); all expedition data was therefore grouped together. There was no significant interaction effect due to gender with time ($P>0.05$), or main effect due to gender ($P>0.05$). However two-way mixed ANOVA revealed a significant main effect for time ($F(1,105)= 65.9$; $P<0.001$), with the connectedness to nature score increasing pre-post expedition.

Multiple regression revealed that neither the participants gender (Beta= .05; $p>0.05$), the location of the wilderness expedition (Beta=-.09; $P>0.05$), the expedition duration (Beta=-.07; $P>0.05$) or participants living environment (Beta= -.20; $P>0.05$) made significant contributions to the variance in the change in connectedness to nature scores.

Discussion

The primary aim of this study was to examine the impact of a wilderness expedition on adolescents' self-esteem and connectedness to nature. Whilst wilderness expeditions have increasingly been used to provide health and development opportunities in young people (Davis-Berman and Berman 1994a, 1994b, 2008; Russell 2001, 2006a, 2006b; Hoag et al, 2013; Asfeldt and Havengaard, 2014; Norton & Watt, 2014; Paquette et al, 2014), there is a lack of quantitative data to support the increasing body of descriptive and qualitative evidence on the impact of the wilderness (Hine, Pretty and Barton, 2009; Dawson and Russell, 2012).

The findings of this study indicated that participation in a wilderness expedition improves adolescent self-esteem; a finding which is consistent with existing literature (Moore and Russell,

2002; Ewert and McAvoy, 2000; Asfeldt and Hvengaard, 2014; Paquette et al, 2014). Existing literature also suggests that the effects of wilderness expedition's increase, and are maintained over time (Hattie et al, 1997; Asfeldt and Hvenegaard, 2014); indicating that improvements in self-esteem experienced as a result of a wilderness expedition could have long lasting effects. In light of the fact that one in ten young people have a diagnosed mental illness (Chief Medical Officer, 2013; Pretty et al, 2015) and that poor mental health tracks across the life course (Orth, Robins and Widaman, 2012; Pretty et al, 2009; Swann, Chang-schneider and McClarty, 2007; Trzesniewski et al., 2006), improvements in self-esteem are of great importance. Low self-esteem is a mental health risk factor (Griffiths et al., 2010; Xavier and Mandal, 2005), and is related to life satisfaction (Boden et al., 2008), ability to cope with stress (Orth et al., 2009); depression and anxiety (Boden et al., 2008; Orth et al., 2009). Thus, improvements in adolescent self-esteem might help to improve mental health and could also reduce the costs to society of treating mental ill-health, which are approximately £11-59,000 per child per year in the UK (Chief Medical Officer, 2013; Pretty et al, 2015). Given that the majority of adolescence is spent in school and that wilderness expeditions offer educational and personal growth experiences; opportunities for contact with wilderness as part of the school curriculum might provide an effective means of promoting mental wellbeing in adolescents.

In addition to improving participants' self-esteem; the wilderness expedition also closed the gap between the differences in the self-esteem of boys and girls. Whilst there were significant differences between their self-esteem at the start of the wilderness expedition, with boys having better self-esteem; this difference did not exist at the end of the expedition. Girls are at greater risk of low self-esteem and poor mental health, including depression and anxiety (Currie et al., 2012; Marcotte et al., 2002). Thus for girls, contact with wilderness environments might be a particularly successful and important tool for promoting self-esteem and improving mental health. Previous studies have also demonstrated that wilderness experiences can have a greater influence on female self-esteem (Ewert and McAvoy, 2000; Whittington, 2006; Leupp, 2007). The potential reasons for this are likely to include the opportunity for females to challenge conventional notions of femininity; the ability to demonstrate perseverance, strength and determination; and the feelings of accomplishment and pride

generated from the experience (Whittington, 2006; Leupp, 2007). However, more research is required to explore these differences further.

Alongside the improvements in self-esteem, participants also experienced an increase in their connection to nature. Connection to nature is an important predictor of subjective wellbeing and ecological behaviour (Mayer and Frantz, 2004; Zelenski and Nisbet, 2012; Wolsko and Lindberg, 2013); has been associated with improved psychological, self-esteem and general wellbeing; and increased happiness (Clayton, 2003; Mayer and Frantz, 2004; Mayer et al., 2009; Nisbet et al., 2009; Howell et al., 2011; Davis et al., 2011; Cervinka et al., 2012; Markowitz et al., 2012; Wolsko and Lindberg, 2013; Bragg, 2014; Capaldi, Dopko and Zelenski, 2014). Furthermore, individuals who are connected to nature are less likely to experience emotional and physical illnesses (Louv, 2005). Thus, connection to nature can play an important role in mental wellbeing and the promotion of self-esteem. Adolescents should therefore have regular opportunity to develop this connection through contact with nature. However, a large number of young people do not have regular weekly contact with natural environments, particularly those from minority ethnic groups or of low socio-economic status (Hunt et al, 2015). Given that all young people are required to attend school, the school day might therefore provide a key opportunity to allow children and young people from all backgrounds to have contact with nature. This contact with nature will help young people to develop a connection with the natural world, which will in turn improve their health and wellbeing (Bratman, Hamilton and Daily, 2012).

The second aim of this study was to determine whether the effect of the wilderness expedition on self-esteem and connectedness to nature varied according to participants' gender, living environment and the location and length of the wilderness expedition. The findings highlighted that that none of these variables significantly contributed to participants' changes in self-esteem or nature connection. Thus, participants who live in an urban environment and attend a local wilderness environment for a short duration will receive the same magnitude of benefits for self-esteem and connection to nature as participants who live in a rural location and are immersed in a remote wilderness environment for a number of weeks. In fact, the majority of participants in the current study engaged in the shortest duration of wilderness experience. This finding is encouraging as short

duration contact with a nearby wilderness area could be easily incorporated into everyday routines and the school curriculum, and has the potential to have significant impacts on the mental wellbeing of young people.

This study had some limitations. First the questionnaires are open to a ceiling and floor effect. Participants may rate themselves as having a high self-esteem or connection to nature at the start of the wilderness expedition, but still experience improvements as a result of the expedition. As a high score has already been recorded, it may be difficult for this improvement to be quantified. The mean scores for both self-esteem (29.8 out of a possible 40) and connection to nature (3.29 out of a possible 5.0) were relatively high at the start of the expedition, therefore limiting the possible magnitude of improvements. Future research should seek to examine the impact of a wilderness expedition on adolescents suffering from mental ill-health and poor self-esteem as the magnitude of improvements in these groups is likely to be large, as suggested in wilderness experiences for the adult mental health population (Hine, Wood, Barton and Pretty, 2011; Bragg, 2014).

Overall, the findings of this study indicate that wilderness expeditions are likely to be a successful tool for improving self-esteem and connectedness to nature in adolescents and particularly in girls. Adolescents should therefore be encouraged to have regular contact with natural environments in order to be connected to nature and to enhance their self-esteem and mental wellbeing. Given that behaviour, nature contact and ill-health often track throughout the life course and particularly from adolescence to adulthood, appropriate interventions at this stage are likely to be essential to future health and wellbeing. In fact, evidence suggests that unlike many educational programmes; wilderness expeditions have long lasting health benefits which increase over time (Hattie et al, 1997; Asfeldt and Havengaard, 2014). Therefore participants who take part in wilderness expeditions are likely to continue to accrue benefits throughout the life course, resulting in potential savings to the UK economy, particularly with regard to the prevention and treatment of mental ill-health.

This research has important implications for schools, children's care establishments, youth groups and youth offending teams. These organisations should seek to ensure that the young people in their care have regular opportunities to interact with nature and green space for their enhanced

wellbeing. Since the majority of adolescence is spent in school, opportunities for contact with wilderness through school may be particularly effective by enabling all adolescents to have contact with natural environments on a regular basis.

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Tables

Table 1: Self-esteem scores in males and females pre and post the wilderness trail.

	Pre Self-esteem	Post self-esteem
Male	31.1±4.0 (30.0-32.3)#	33.0±4.4 (31.8-34.2)
Female	29.1±4.1 (28.1-30.1)	32.4±4.3 (31.4-33.4)
Total	30.0±4.2 (29.4-30.9)	32.7±4.3 (31.9-33.5)*

*indicates a significant difference between pre- and post- self-esteem (P<0.001). # indicates a significant gender difference (P<0.001). Note: a high score= a better self-esteem.

Table 2: Connectedness to nature scores in males and females pre and post the wilderness trail.

	Pre Connectedness to nature	Post Connectedness to nature
Male	3.27±0.68 (3.08-3.47)	3.85±0.70 (3.65-4.05)
Female	3.31±0.61 (3.14-3.47)	3.96±0.64 (3.80-4.14)
Total	3.29±0.64 (3.17-3.42)	3.92±0.67 (3.78-4.04)*

*indicates a significant increase in connectedness to nature (P>0.001). Note: A higher score= greater connectedness to nature.