

Assessing Nature Connection and Well-Being during an Experiential Environmental Program

Joe Hinds

*Department of Psychology, Social Work and Counselling
University of Greenwich, United Kingdom*

Sarah O'Malley

Institute of Technology Tralee, Ireland

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Abstract

This paper presents the findings of an outdoor experiential residential program for a group of 96 children (aged 10-11) using self-report questionnaires to investigate the effects of the program for both well-being and nature connection. Three separate schools participated in the program for a week at a time during October 2015. Results from a one-month follow up (N = 50) indicated longitudinal positive effects on competence, hope, and nature connection. The results are discussed in relation to the extant literature on outdoor experiential education and the role that related programs may have in eliciting both psychological well-being and greater sense of connection to the environment among participants.

Keywords: experiential environmental education, nature connection, hope, competence

Introduction

There is some evidence that people have a preference for, and a predisposition to respond positively to, natural stimuli (Falk & Balling, 2010; White et al., 2010), and that that natural stimuli affords people the opportunity to recover from depleted cognitive capacities (Grahn & Stigsdotter, 2010; van den Berg, Hartig, & Staats, 2007), as well as preventing emotional states such as stress and anxiety (e.g., Maller, Townsend, Pryor, Brown, & St. Leger, 2005). In addition, theoretical perspectives, supported by empirical work, suggest that there may be a similar range of psychological benefits for participating in nature-based programs, activities and interventions (e.g., Fletcher & Hinkle, 2002). Moreover, the development of positive perceptions of natural environments through exposure to them has been shown to contribute to pro-environmental attitudes (Berto, 2005; Hartig, Kaiser, & Strumse, 2007).

However, the research cited above has in the main been oriented around adult populations, albeit with some exceptions. For instance, research using retrospective methods has suggested that engagement in play and exploration in nature during school environmental education and wilderness experience programs may be strongly associated with later adult pro-environmental behavior (see Chawla & Derr, 2012 for a review). Further, evidence is growing around the impact of green school playgrounds on children's cognitive restoration (Bagot, Allen, & Toukhsati, 2015; Kelz, Evans, & Röderer, 2015).

In recent decades, Western children's ability to informally experience and understand the natural environment through unstructured and experiential outdoor play have arguably been diminishing (Corcoran, Gray, & Peillon, 2009; Louv, 2010; Malone, 2007; O'Malley, 2015). While many children's environmental outdoor programs are designed to reconnect children with nature in its many forms to improve a range of environmental perceptions, behaviors and attitudes (Gerstenberger, Kelly, & Cross, 2004; Powers, 2004; Smith-Sebasto & Cavern, 2006), there are also other important social, emotional and psychological benefits of nature (Natural England, 2011).

There has also been a developing realization that cognitive (learning) aspects of programs need to be embedded within an affective framework to enable positive outcomes (Littledyke, 2007; Ojala, 2017; Pooley & O'Connor, 2000). Moreover, the affective and experiential qualities of these programs also seem to contribute towards psychological mental recovery (Bagot, 2004), personal development (Schreuder et al., 2014), and quality of life (Hassink, Elings, Zweekhorst, van den Nieuwenhuizen, & Smit, 2010). Specific evidence to support this thesis suggest, for instance, that exposure to green areas in childhood may help alleviate the symptoms of attention deficit disorder (Faber Taylor & Kuo, 2011), buffer against later adult depression (Snell et al., 2016) and aid individuals' ability to recover from natural disasters (Fakharzadeh, 2015).

Essentially, there seems to be a dual-process model at work here whereby children's participation in nature may positively impact both their environmental attitudes (e.g., Collado, Staats, & Corraliza, 2013) and their psychological and

emotional well-being (e.g., Hinds, 2011a), including pro-social (community) behaviors (Dopko, Capaldi, & Zelenski, 2019; Hart, 1997). With that in mind, specific literature regarding both environmental attitudes and well-being pertinent to the present research will now be examined.

Nature Connection

It has been suggested that interactive outdoor activities for children (Wilhelm & Schneider, 2005) can promote personal and affective engagement with the environment (Chawla, 1999; Cook, 2008) and catalyze environmental knowledge into a stronger motivating force and thus bridge the attitude-action divide (Collado et al., 2013; Duerden & Witt, 2010). In particular, connectedness to nature has been demonstrated to consistently predict pro-environmental attitudes and behaviors (Mayer & Frantz, 2004; Nisbet, Zelenski, & Murphy, 2009; Tam, 2013). Moreover, exposure to natural environments, such as via experiential environmental programs, has been shown to elicit a sense of nature relatedness (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2008; Nisbet & Zelenski, 2011).

The present research was particularly concerned with understanding the effects of an outdoor program for middle-childhood-aged children on self-reported nature connectedness as an important proxy for environmental behaviors (Richardson et al., 2019; Zelenski, Dopko, & Capaldi, 2015). While there are various terms and measures associated with the concept of nature connectedness (e.g., nature relatedness / affiliation / connection), these are largely synonymous; moreover, these terms arguably capture more cognitive nature-related attitudes and are, in the main, adult-focused (Perrin & Benassi, 2009; Sparks, Hinds, Curnock, & Pavey, 2014). Despite research supporting the link between nature exposure and the development of nature connectedness in children (see Chawla, 2015 for a review), few empirical measures have been designed for either children or with an explicit affective focus; a few notable exceptions include Cheng and Monroe (2012) and Richardson et al. (2019). The present study defines nature connectedness as an affective or emotional attitude towards nature consisting of a sense of responsibility and empathy for, and unity with, nature (Cheng & Monroe, 2012).

Well-Being

Alongside the importance of developing pro-environmental attitudes and behaviors through outdoor experiential programs, the outdoors is also important for impacting psychological well-being. One particularly prevalent approach to introducing people, typically adolescents, to the outdoors for a range of benefits has been Outward Bound, adventure and wilderness-style programs. These cover an array of activities designed to build, for instance, confidence, self-esteem, social skills, and self-efficacy (see Hans, 2000 for a review). There is also a healthy corpus of qualitative research to support the idea that children benefit from exposure to nature in some form or another in middle childhood through, for instance, development of self through unstructured play and exploration (e.g., Sobel, 1990; Stanley, 2011). Moreover, a number of initiatives that have specifically focused on children and more organic exposure to "nearby nature" have catalogued a number of health benefits, both physical and psychological (see Chawla, 2015 for a review).

The Basic Psychological Needs theory (BPN; e.g., Deci et al., 2001) attempts to capture a comprehensive set of basic human needs required for well-being, and includes relatedness, competency and autonomy. Relatedness may be defined as the striving for close relationships to achieve a sense of communion and belongingness or simply “a sense of mutual respect, caring, and reliance with others” (Deci et al., 2001, p. 931). Importantly, peer group social interactions take up more time in the life of an average person during adolescence than during earlier childhood or adulthood (Brown, 1990) providing a major source of values, directives, feedback and social comparison (Harter, 1990); therefore, measures of social relatedness for early adolescents may be seen as an indicator of well-being and social adjustment (Ryan & Deci, 2000). There has been some promising research that seems to indicate that exposure to nature, via school field trips, can improve children’s (aged 10-11) pro-sociability, among other psychological benefits such as positive emotions (Dopko et al., 2019). Competency, or the degree to which one feels a sense of self-efficacy, is also related to psychological well-being, particularly to intrinsic motivation (Vansteenkiste, Lens, & Deci, 2006). In other words, competency and sociability are “innate psychological nutriment that are essential for ongoing psychological growth and well-being” (Deci & Ryan, 2000, p. 229).

Paralleling the BPN theory in part, some qualitative research with middle childhood children involved in natural school yard environments (such as woodland, deciduous forest and creek), have found that play experiences in these environs provide opportunities to encourage competence, social support and stress relief (Chawla, Keena, Pevec & Stanley, 2014). In addition, it has been shown that wooded areas within school playgrounds may provide a creative space that enables both an environmental (place) connection and various competencies (Stanley, 2011). Moreover, important relationships between competencies for sustainable development, such as pro-environmental engagement behaviors, and hope have been found (Ojala, 2012). While the concept of hope is varied, and in some forms may even lead to inaction (e.g., wishful thinking), the characteristics of the context in which hope manifests—such as the availability of active social support, personal engagement, and emotional awareness—seem to be important factors that affect the ability of hope to be constructive and motivational (Ojala, 2017).

There has also been emerging research and interest in the notion of psychological resilience in children (e.g., Condly, 2006; Goldstein & Brookes, 2012). Childhood resilience has been defined as resulting from interpersonal processes and self-discovery mechanisms that mitigate the impact of biological, psychological and social factors that threaten a child’s health (Ungar, Dumond, & McDonald, 2005). Although resiliency has been a topic of interest for outdoor education program research (Ewert & Yoshino, 2011; Neill & Dias, 2001; Overholt & Ewert, 2015), there is far less quantitative research on resiliency in middle childhood. Moreover, the allied concept of hope, although studied in children (e.g., Snyder, Lopez, Shorey, Rand, & Feldman, 2003), has not been extensively quantitatively investigated within outdoor environmental educational settings.

In summary, how experiential encounters with the natural environment may simultaneously positively impact well-being and pro-environmental attitudes (nature connectedness) in children has not yet received the degree of quantitative empirical research that the importance of the subject warrants, albeit with a few notable exceptions (Dopko et al., 2019; Hinds, 2015). Therefore, the present study was conceived to further the knowledge of this potential dual-process model within an outdoor educational setting for children. The present research, therefore, proposes the following four working hypotheses based on the above literature review. There will be significant and positive effects of an outdoor experiential program on children's sense of: (1) *nature connection*, (2) *hope*, (3) *competence*, and (4) *relatedness*.

Present Study

Three primary schools (two inner-city and one rural) participated in a week-long (Monday - Friday) residential program at different times at an outdoor education site (Figure 1) in the southeast of the United Kingdom (Kent). The study collected data from three separate school groups during the weeks of October 5, 12 and 19, 2015. The program of activities and catering requirements were organized in advance between the class teacher and site tutor. The tutor delivered the program with schoolteachers providing additional support. The activities were delivered during both the day and evening to enable activities such as the campfire. Other key program activities included nature awareness games, basic bush and wood craft, rock pool fishing, shelter building, hiking, exploration, free play, field work skills, storytelling, food preparation (bread making, gardening activities) and teamwork challenges. Activities were conducted in small groups and supervised by an experienced adult. Outside of program activities, the school staff supervised the children and organized games using resources available at the residential site. The children shared dormitories for the week and the center provided appropriate outdoor gear if the weather was changeable.

Figure 1. Outdoor education site



Method

Participants

A group of 96 children participated in the program, and a total of 50 included within the study. Those included in the analysis were aged between 10 and 11 years (56 percent female) and from varied geographic residential locations (58 percent urban, 4 percent suburban, and 38 percent rural). The children were drawn from three participating schools that have high proportions of children in care, those from military service families, and children eligible for free school meals (thus representing a more deprived cohort than the national average).

Procedure

Researchers provided children with both verbal and written instructions to complete anonymous questionnaires at three time points: approximately one week prior to the residential program (Time 1), midway during the program, and approximately one month after the program (Time 3). While 96 children took part in the program, only 52 percent—50 children—returned completed and usable data for both Time 1 and Time 3. Because of incomplete Time 2 data, only the longitudinal data (i.e., Time 1 and Time 3) will be presented here.

Measures

All responses were on seven-point, fully anchored, Likert-like scales (*Disagree strongly* [1] to *Agree strongly* [7]). Reverse coding of variables was carried out where appropriate. The mean score for the items representing each of the variables was used to form a composite measure of each variable (see Table 2 for inter-item reliability).

The researchers established the variables to be tested from a range of literature and previous research. From the Basic Need Satisfaction Scale (www.psych.rochester.edu; see also Ryan & Deci, 2000), the researchers adapted three key constructs to suit the cohort in line with previous research (e.g., Gillison, Standage & Skevington, 2008): *competence, relatedness, and autonomy*. Competence was measured with six items, for example, "I have been able to learn interesting new skills recently" and "Most days I feel a sense of accomplishment." Relatedness was measured with seven items, for example, "I really like the people I hang around with" and "I get on with most people I meet." Autonomy was measured with seven items, for example, "I usually feel free to express my ideas and opinions" and "I feel like I can be myself in most daily situations." This variable was not included in the analysis due to a poor inter-item reliability for both time points (T1 $\alpha = .22$; T3 $\alpha = .42$). From the Children's Hope Scale (Snyder et al., 2003, *hope* was measured with six items, for example, "When I have a problem, I can come up with lots of ways to solve it" and "Even when others want to quit, I know that I can find ways to solve the problem." *Nature connection* (Cheng & Monroe, 2012) was measured with 16 items, for example, "Being outdoors makes me happy" and "My actions will make the natural world different."

Results

The researchers screened each variable at both time points for normality and reliability and found them to be generally acceptable given the sample size and field nature of the research. The pattern of inter-correlations at both time points indicated no overly high relationships between variables (see Table 2). A test of differences between Time 1 and Time 3 was carried out for each of the included outcome variables using paired-samples *t*-tests (see Table 1). Results indicate that for the overall sample there were significant differences for nature connection, hope, and competence. In other words, after their experience, children generally reported feeling a stronger nature connection, having greater hope, and perceiving greater personal competence. There were no effects for relatedness.

Table 1. Means, standard deviations and time differences for the research variables (*N* = 50)

Variables	Mean (SD)		<i>df</i>	<i>t</i> -Test Statistic	<i>p</i> Value	Level of Significance
	Time 1	Time 3				
Nature Connection	5.92 (0.75)	6.08 (0.73)	49	2.43	.01	**
Hope	5.74 (0.85)	6.06 (0.65)	48	-2.61	.01	**
Competence	4.68 (0.79)	5.00 (0.87)	49	-2.71	.01	**
Relatedness	5.58 (0.65)	5.52 (0.69)	49	0.60	.55	<i>ns</i>

**p* < .05; ** *p* < .01

Table 2. Inter-correlations and reliability for the research variables: Time 1 appears above the diagonal and Time 3 below (*N* = 50)

Variables	1	2	3	4	5	6	T1 α	T3 α
1. Gender	-	-.15	-.03	.25*	.05	.21	-	-
2. Geographic Location	-.15	-	-.29*	-.22	.06	.11	-	-
3. Nature Connection	.03	-.38**	-	.31*	.26*	.11	.83	.86
4. Hope	.15	-.11	.20	-	.44***	.27*	.60	.74
5. Competence	-.02	.10	-.26*	.10	-	.40**	.45	.51
6. Relatedness	.10	.19	-.15	.11	.37**	-	.49	.58

p* < .05; ** *p* < .01; * *p* < .001

Discussion

The present findings provide some promising support for the impact of an experiential residential program on children's well-being and nature connectedness. In particular, there is evidence here to suggest that perceived competence and hope may be positively affected through this experiential residential program, which supports other research with similar psychological findings (Chawla, 2015). Moreover, the current results for nature connectedness alongside other related research (e.g., Hinds, 2011b) further support the benefits of an outdoor education for impacting emotional environmental attitudes as a proxy for environmental behavior. Given the acknowledged importance of affective engagement with nature for a range of pro-environmental behaviors (Chawla, 1999; Collado et al., 2013; Perrin & Benassi, 2009; Richardson et al., 2019), the inclusion of this measure would seem to be particularly pertinent for children.

These positive and significant differences in the research variables were present after approximately one month after the completion of the program, which stands in contrast to similar research, such as Stern, Powell and Ardoin (2008) who found significant gains in environmental stewardship and awareness but not for environmental connectedness after a three-month follow-up. Indeed, while the overall longitudinal effects of the present study are promising, we cannot be sure the effects found for nature connectedness would still be present with a longer follow-up period. Therefore, an extended period of follow-up would enable more robust claims to be made for the effectiveness of this and other similar programs.

While on the whole these findings may be accepted at face value, the variable of *competence*, alongside *relatedness*, had relatively poor inter-item reliability and therefore some caution must be applied to the interpretation of this particular result. Indeed, further work to target potential issues of age-related comprehension of the wording of this and other measures, the provision of additional verbal instructions, and the additional testing of this and other measures for specific groups of children, including age considerations, would be of benefit. That these measures had poor inter-item reliability may be indicative of children having different conceptual understandings than previous, and typically older, cohorts. However, previous research with correspondingly aged children has used similarly adapted measures with more favorable inter-item results (Gillison et al., 2008). Given the qualitative research indicating that there may be opportunities to build competence and social support (akin to relatedness) as well as allowing stress relief in natural settings for children (Chawla et al., 2014), this ambiguity does seem to warrant further elucidation.

In addition, a brief discussion is warranted in regard to the non-significant effects of *relatedness* in the present study. While past research has indicated that social support is a key element of well-being (Ojala, 2017; Harter, 1990), despite positive changes in other aspects of measured well-being here, there was no similar change in social interactions (i.e., relatedness). Within her review of the benefits of nature for children (Chawla, 2015) and others (e.g., Hart, 1997) there is qualitative evidence for children developing an affiliation with other people and the natural world, albeit not explicitly simultaneously. Similarly, while there have been

suggestions from past quantitative research that there may be a link between a developing nature connection and relatedness in the form of pro-sociability via nature exposure (Dopko et al., 2019), the present research was not able to substantiate this. This may be due to the program having an individualistic, competency-based focus—although activities were often group-based with a collective goal (e.g., shelter construction). Alternatively, a fine tuning of the items designed to measure social relatedness may be needed in order to detect change; the existing measures of relatedness may in fact be too broad. There is the added issue of a relatively poor reliability for this variable at both time points suggesting the items were not perceived as being associated by the children. Therefore, future research, perhaps of a mixed methodology, may be harnessed to determine if there are simultaneous developments of both environmental and social connectedness. However, some previous research has also failed to detect changes in sociability (e.g., Hinds, 2011b) suggesting that this may not be a relevant or salient issue for participants of this age; their social bonds may already be at an optimum level or children are relating in ways that are not related to the substantiated measures used. A final observation here is that it may require longer exposure times to a new social group to affect change in social relatedness. Therefore, while there may be qualitative support for the theory of a simultaneous development of both social and nature connectedness for this and other age groups (Chawla, 2015), we have yet to see this substantiated in quantitative research presented here. As this seems to sit in opposition to a number of qualitative investigations, we suggest that this be a focus for future research.

The validity of future findings will be given extra weight with the incorporation of a control group. The purpose of comparing an outdoor experiential sample with a matched-pairs sample, would help to determine whether or not changes that have been detected are in fact the result of these experiences and not through chance or more global occurrences. However, there is some evidence to suggest that the inclusion of a comparison group can substantiate the effects of an experiential environmental educational program for both nature connection and positive emotions (see Dopko et al.'s study of a forest nature school, 2019). By utilizing a variety of comparative groups with a diversity of activities there would be the opportunity to substantiate both the current research findings and that of other similar research (e.g., Dopko et al., 2019) and further develop and advance research into young people's understandings of and connections with the natural environment. What would be of particular interest here would be a more extensive longitudinal study of participants' experiences including critical analysis of the effectiveness of early environmental experiential programs on later secondary- and tertiary-level formal education achievements through improvement of the cognitive functions of attention and focus (Chawla et al., 2014; Lugg, 2007).

Given the importance of enhancing psychological well-being and the increasing need to raise awareness of nature concerns and promote greater pro-environmental behaviors, the present study gives some added empirical support for the ability of experiential nature programs to enhance both. In particular, the potential for the presented program to benefit children in terms of their skill acquisition (competency), specific well-being indicators (hope), and garnering more positive

environmental relationships (nature connection) holds particular promise. Future research of similar programs may be able to provide robust substantiation for the current findings, thus lending important support for alternative education for children to benefit their psychological well-being and the environment that sustains them.

Dr. Joe Hinds is a Senior Lecturer in Counselling at the University of Greenwich, UK and a practicing integrative psychotherapist. He has published a number of papers related to the relationship between the natural environment and psychological well-being including a recent co-edited volume (*Ecotherapy*) that examines the diverse psychotherapeutic ways of encountering nature. He has a passion for the outdoors and spends time in nature as a therapist and for relaxation as often as he can.

Dr. Sarah O'Malley is a Postdoctoral Researcher, UNESCO Chair in Inclusive Physical Education, Sport, Recreation and Fitness, in the Institute of Technology Tralee, Ireland. Her research areas include the impact of environmental education on environmental connectedness and well-being. She has published on these subjects and convenes an Outdoor Learning Research Practice Hub in the UK which is supported by the University of Cumbria, Institute of Outdoor Learning, Natural England and the Council for Learning Outside the Classroom.

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