



Environmental Education Research

Publication details, including instructions for authors and
subscription information:

<http://www.tandfonline.com/loi/ceer20>

Preservice early childhood educators' perceptions of outdoor settings as learning environments

Julie Ernst ^a & Ladona Tornabene ^a

^a Department of Health, Physical Education and Recreation,
University of Minnesota, Duluth, MN, USA

Version of record first published: 06 Jan 2012

To cite this article: Julie Ernst & Ladona Tornabene (2012): Preservice early childhood educators' perceptions of outdoor settings as learning environments, *Environmental Education Research*, DOI:10.1080/13504622.2011.640749

To link to this article: <http://dx.doi.org/10.1080/13504622.2011.640749>



PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Preservice early childhood educators' perceptions of outdoor settings as learning environments

Julie Ernst* and Ladona Tornabene

Department of Health, Physical Education and Recreation, University of Minnesota, Duluth, MN, USA

(Received 27 May 2011; final version received 4 November 2011)

In the context of encouraging the use of natural settings for educational experiences with young children, an exploratory study using survey research and photographs of outdoor settings was conducted to understand how preservice early childhood educators perceive these settings and what educational opportunities, motivations, and barriers they associate with them. Based on the results of 110 participants, this study suggests preservice early childhood educators perceive parks as the most conducive outdoor setting for achieving educational outcomes, specifically structured learning about nature, and that they are more inclined to use maintained outdoor settings than natural outdoor settings. The strongest predictors of intention to use natural outdoor settings were perceived difficulty in using natural settings, participants' level of nature relatedness, and the degree to which they agreed that experiences in nature were important for young children's health and wellness. Barriers to address include perceived lack of access to natural settings and safety concerns.

Keywords: early childhood education; preservice; natural settings; nature relatedness; landscape preference

Introduction

While environmental education (EE) has not been a common topic in early childhood education, there appears to be a growing consensus internationally regarding the need for EE to begin early in life (Samuelsson and Kaga 2008). Because of the importance of early childhood education in 'laying a sound intellectual, psychological, emotional, social and physical foundation for development and lifelong learning, it has enormous potential in fostering values, attitudes, skills and behaviors that support sustainable development' (Samuelsson and Kaga 2008, 12). At the early childhood level, EE can nurture a child's creativity, sense of wonder, and appreciation of beauty (Wilson 1994a). In addition, young children need frequent positive experiences in nature not only to grow in understanding of the natural world, but also to grow in the understanding of who they are (Wilson 1994a). There is a growing body of evidence to suggest that experiences in nature, particularly unstructured play in natural settings, aid in cognitive, physical, social, and affective development during the early childhood years (Lester and Maudsley 2007; World Forum

*Corresponding author. Email: jernst@d.umn.edu

Foundation 2010). Thus, experiences in nature seem to be critical to both EE and early childhood education.

As children are spending increasingly less time playing and less time outdoors interacting with nature (Burdette and Whitaker 2005) and as the potential increases for new early childhood educators to have grown up without experiences in nature (Crim, Desjean-Perrotta, and Moseley 2008), there is a need to examine the issue of preparing early childhood educators to effectively use experiences in natural settings for engaging young children in direct discovery of the world around them. In order to encourage preservice early childhood educators to use natural settings for educational experiences with their future students, it is important to understand how they perceive these settings and what education opportunities, motivations, and barriers they associate with them. It is in this context that the following exploratory study was conducted.

Literature review

Benefits of experiences in nature from an EE perspective

Early childhood nature experiences seem to be related to adult attitudes and behaviors relating to the environment; early experiences in nature have the potential to shape subsequent environmental paths (Wells and Lekies 2006). According to Phenic and Griffore (2003), regular and positive interactions with nature are instrumental to helping children develop a respect for the environment. Fjortoft (2001) suggests nature play results in a marked increase in children's interest in and knowledge of nature. Research by Ewert, Place, and Sibthorp (2005) suggests nature play experiences in childhood may foster proenvironment attitudes and beliefs later in life. Further, because curiosity about the natural environment starts early and because many lifelong attitudes and values are developed early in life, experiences in nature need to start during the early childhood years (Iozzi 1989; Wilson 1994a). Williams (2008) suggests early nature experiences support the development of scientific and esthetic thinking.

At an international workshop in Gothenburg, Sweden in 2007, *The Role of Early Childhood Education for a Sustainable Society*, participants agreed that educating for sustainability must start in early childhood, as that is when the development of values, attitudes, skills, and behaviors begin to develop (Samuelsson and Kaga 2008). Participants further agreed upon the enormous potential for early childhood education to contribute to sustainable development (Samuelsson and Kaga 2008). However, there appears to be relatively few studies on young children, EE, and education for sustainability (Arlemalm-Hagser and Sandberg 2011). Most of these studies have focused on young children's cognitive understanding of the environment or their relationship with nature, rather than on young children as agents of change in connection with sustainability (Davis 2009), thus signaling a need for longitudinal research on the impacts and benefits of education for sustainability in the early years (Samuelsson and Kaga 2008).

Benefits of experiences in nature from an early childhood perspective

From a physical perspective, preschool children are more physically active during outdoor play than indoor play (Baranowski et al. 1993). Considering that since 1980, obesity prevalence among US children and adolescents has almost tripled (Ogden et al. 2006), the opportunity to promote physical activity through outdoor

play is significant. Research by Fjortoft (2001, 2004) found young children playing in a natural environment had a greater increase in gross motor skill development, motor fitness, balance, and coordination than their peers in a traditional playground setting. This may be due to the physical challenges and diversity within natural settings that allows for activities such as climbing over rocks and ducking under tree branches (Benson and Miller 2008).

From a cognitive perspective, outdoor play in natural settings offers an enriched learning environment, where children's imaginations, inventiveness, and creativity flourish. Outdoor spaces tend to be more varied and less structured than indoor spaces, allowing children to have a wider range of gross motor movement and visual exploration, resulting in additional opportunities for decision-making, problem solving, and creative thinking (Burdette and Whitaker 2005). This is consistent with research by Charles (2009), which suggests young children's cognitive flexibility and creativity are enhanced if they experience problem solving in natural settings as opposed to highly maintained settings. Research also suggests that when children play in natural environments, their play tends to be more diverse, and they are more likely to engage in creative play that fosters the development of language skills (Fjortoft and Sageie 2000). Research also suggests children in a more natural day care center had greater attentional capacity than did those in less natural day care centers where less time was spent outdoors (Grahn 1997 cited in Wells 2000).

Additional benefits of experiences in natural settings lie in the affective and social domains. Children with more nature near their homes had lower levels of anxiety and higher self-concepts than their peers (Wells and Evans 2003). Wells and Evans (2003) also found stressful events appear not to cause as much distress in children living in high nature conditions. Moore (1996) suggests children who play together in nature have more positive feelings toward one another.

Guidance for early childhood EE

The North American Association for Environmental Education (NAAEE), as part of the National Project for Excellence in EE, developed the *Early Childhood Environmental Education Programs: Guidelines for Excellence* (2010). The guidelines are grounded in the belief that EE at the early childhood level is more than a cognitive learning process, and needs to incorporate affective experiences that ground young children's developing knowledge, skills, and dispositions (NAAEE 2010). The guidelines state that while formal K-12 EE tends to use a more structured approach, EE for young children is about discovery (NAAEE 2010). Because young children lack the cognitive and coping skills to make sense of environmental problems, EE should focus on helping children bond with nature, laying the groundwork that may encourage examination of issues and appropriate action when they are older (NAAEE 2010).

One of the key characteristics of excellence in early childhood EE in the USA is developmentally appropriate practice (NAAEE 2010). This characteristic is evidenced by authentic experiences that are child-directed and inquiry-based. Another key characteristic is play and exploration, which emphasizes the importance of using the natural world and natural materials for open-ended exploration, investigation, creativity, and discovery (NAAEE 2010). In addition, the characteristic, curriculum framework for environmental learning, emphasizes the importance of intentionally providing opportunities that span cognitive, social-emotional, physical,

and language domains (NAAEE 2010). Young children also need opportunities to explore their environment and develop environmental knowledge and skills. At the early childhood level, this involves opportunities to learn about self-concept and self-control, develop respect for the rights and feelings of others and a respect for nature, develop questioning skills and curiosity, as well as opportunities to observe the environment around them (NAAEE 2010). This also includes, in age appropriate ways, opportunities for children to experience a variety of environmental conditions and investigate topics of their own choosing, as well as opportunities to make decisions about their own activities (NAAEE 2010). This may take the form of participating in and taking pride in caring for living things. It may also take the form of talking about how people can protect or harm the environment, or individual choices to not litter, for example, or group choices about classroom environmental actions, such as classroom recycling (NAAEE 2010). Collectively, these guidelines are consistent with an earlier research-based framework by Wilson (1994b) that emphasizes active rather than passive learning; direct rather than abstract experiences with nature; and a balance of teacher-initiated and child-initiated explorations.

Guidance for early childhood EE also stems from the 2007 international workshop in Gothenburg, Sweden, *The Role of Early Childhood Education for a Sustainable Society*, and the UNESCO document stemming from this workshop, *The Contribution of Early Childhood Education to A Sustainable Society* (Samuelsson and Kaga 2008). Participants emphasized the need for local, concrete experiences, rooted in real-life questions and local contexts (Samuelsson and Kaga 2008). They also agreed that in order for early childhood EE to contribute to sustainable development, it needs to be more than nature discovery and learning. Instead, it must include opportunities for concrete actions in favor of the environment, learning to be compassionate and respectful of difference, and developing a cultural identity while also developing an identity as world citizens (Samuelsson and Kaga 2008). To provide these opportunities for young children, participants suggested using the pedagogical traditions of early childhood education, such as theme-based interdisciplinary learning, parental and community involvement, and an emphasis on holistic and child-centered learning (Samuelsson and Kaga 2008).

Barriers to early childhood EE and the role of professional development

Barriers specific to early childhood education, raised during the 2007 international workshop in Sweden, include the concern that environmental issues are too depressing and scary for young children, and that environmental sustainability is too abstract for young children (Samuelsson and Kaga 2008). These barriers, along with barriers commonly appearing in the US-based EE literature, such as lack of training (Ham and Sewing 1988; McKeown-Ice 2000), lack of comfort or perceived competence (Ferry 1995; Simmons 1998), and the logistical barriers of lack of planning time, administrative support, transportation, and funding (Monroe, Scollo, and Bowers 2002), may also deter early childhood educators, particularly in light of the challenges unique to bringing very young children outdoors.

In addition, child care regulations in the USA, which are enforced at the state level, provide insight as to why nature experiences are not prominent in early childhood settings in the USA. While most states enforce similar regulations with respect to the safety of the outdoor environment, such as fencing around outdoor spaces and securely anchored play equipment, regulations related to the amount of time

outdoors and the minimum outdoor space per child differ widely (National Resource Center for Health and Safety in Child Care and Early Education 2011). For example, not all states require daily outdoor time. In light of these regulations, as well as barriers such as lack of training and awareness of benefits, it is understandable why outdoor play tends to occur in maintained rather than natural outdoor settings (Ernst 2011).

Wilson (1994b) suggests the need for preservice and in-service training focusing specifically on EE for preschool children, stating early childhood educators need to develop a personal awareness of and appreciation for their place in the natural environment and an enthusiasm for sharing the beauty and mystery of the natural environment with young children, in addition to learning how and why to incorporate EE into their programs. This is consistent with NAAEE's *Early Childhood EE Programs: Guidelines for Excellence* (2010), which suggests professional development should foster the recognition among early childhood educators of the broad view that EE takes (systems, interdependence, and interactions among human, other living organisms, and the natural and built environments) and opportunities for them to develop their own understandings, skills, and attitudes associated with environmental literacy, in addition to learning how to plan and implement EE learning experiences that are appropriate for young children (NAAEE 2010). Samuelsson and Kaga (2008) summarize discussion by international workshop participants on the vital importance of educator training, stating preservice and frequent in-service training should be used to build an awareness of the role that early childhood education should play in sustainable development and aid educators in translating the values and principles associated with sustainability into activities and learning experiences for young children.

Provision of nature experiences in early childhood education programs

There are an estimated 20 prominent nature preschools in the USA affiliated with community nature centers, and likely other lesser known early childhood programs that emphasize nature-based experiences (Green Hearts Institute for Nature in Childhood 2008). These nature preschools seem similar to the forest kindergartens of Germany, the UK, Scandinavia, and Canada, where staff and children spend their days outdoors in a forest or other natural setting in all types of weather (Elliott 2010). Friedrich Fröbel is credited with founding the first kindergarten (children's garden) in the nineteenth century, believing children should grow in harmony with nature (NAAEE 2010). While these original kindergartens focused on using gardens for play and learning, the forest kindergartens today have evolved from occasional activities in nature to the majority of time spent outdoors, with an emphasis on child-centered play and fostering a sense of local and cultural identity and environmental stewardship (Robertson et al. 2009). This movement appears to be spreading, as a report on the Swedish *I Ur och Skur* (rain or shine) schools, indicates this Swedish approach to forest kindergartens has been implemented in Japan, Germany, Russia, Finland, Latvia, and Norway (Robertson 2008).

Theoretical grounding

Theoretical grounding for this study stems from the role of cognitive beliefs and affective influences on teaching practices. Magnusson, Kracjick, and Borko (1999)

suggest teachers' beliefs are a critical part of teachers' pedagogical content knowledge and classroom practice. The teacher behavior literature suggests teachers' explicit and implicit beliefs guide their actions and practices in the classroom (Richardson 1994). Sandell, Ohman, and Ostman (2005) suggest teachers' own environmental ethical values and educational philosophy influence how they organize their own teaching. While teacher beliefs and their relationship to classroom teaching behaviors have been studied extensively, few studies have examined teachers' beliefs about outdoor play and how these beliefs influence teachers' practices in outdoor settings (Chakravarthi 2009).

More specifically, research suggests teachers perceive instructional settings differently, with differing sets of benefits, barriers, and educational affordances (Davies 1996; Simmons 1994; Skamp and Bergmann 2001). For example, in research exploring three types of settings (classrooms, zoos and museums, and natural settings), teachers reported using built settings more than natural settings to teach about nature (Simmons 1994). Similarly, teachers do not seem to perceive all nature settings similarly, but instead associate distinct educational opportunities and resource needs with specific settings (Simmons 1993). In contrast to the teachers reporting using built settings more than natural settings (Simmons 1994), teachers in Simmons (1993) study indicated a strong preference for taking students to natural settings (unpaved trails, woods, etc.). Simmons (1998) suggests that what motivates teachers to use various natural settings is complex. She also suggests the need to understand how teachers perceive natural settings in efforts to developing training programs to help teachers develop the necessary skills, knowledge, and attitudes to use these settings and to overcome the barriers they associate with these settings.

This is consistent with Skamp and Bergmann's (2001) research on 'learnsapes,' which suggests perceptions of the value of out-of-classroom settings and self-reported use varies considerably among teachers. Similar to Simmons (1993, 1994) work, their research suggests an uneven and selective use of outdoor educational settings accompanied by multifaceted motivations and barriers. They, like Simmons, suggest a need for understanding how teachers perceive a range of settings and how to help them make effective pedagogical decisions relating to outdoor learning.

Research by Davies (1996) on Australian teachers and research by Chakravarthi (2009) further emphasizes the need to understand teachers' awareness of the range of benefits associated with outdoor learning, as teachers tend to associate outdoor learning with physical and social development, as opposed to a wider range of developmental benefits, and view the role of natural elements in outdoor environments as having esthetic value, rather than providing educational opportunities. This suggests teachers' beliefs as to benefits of outdoor settings may limit the opportunities that teachers provide for children in the outdoors (Chakravarthi 2009).

Additional grounding for this study stems from the environmental perception and preference literature. In this literature, the distinction is made between images of nature (people's beliefs regarding the relationship between humans and nature) and landscape preferences (affective responses relating to feelings of liking or disliking particular landscapes) (Buijs, Elands, and Langers 2009). While there appears to be some degree of universal preference toward trees and water, other studies indicate sociodemographic variables, such as race, ethnicity, age, and education, influence landscape preferences (Ulrich 1983). Further, while images of nature and landscape preferences are conceptually distinct, several studies have explored the influence of images of nature on landscape preference, with some evidence to

suggest that they are related. For example, Kaltenborn and Bjerke (2002) suggest people with anthropocentric values prefer managed landscapes, in contrast with people with ecocentric values preferring wild landscapes, and preferences for managed landscapes are related to functional images of nature, while preferences for natural landscapes are related to a wilderness image of nature (Buijs, Elands, and Langers 2009). Their work also suggests images of nature may provide a stronger and possibly more meaningful predictor of landscape preferences than age, education, and gender (Buijs, Elands, and Langers 2009). In light of this body of literature, it seems possible that preservice early childhood educators' outdoor setting (landscape) preferences may be influenced by their images of nature (beliefs regarding the relationship between humans and nature), and that these preferences and images in turn influence their intentions to use natural settings and the specific outdoor settings they intend to use. This suggests the need to explore these areas within the study presented here.

Shuman and Ham's *Model of Environmental Education Commitment* (1997) is useful for thinking about how to encourage preservice early childhood educators to provide experiences in nature for their future students. They suggest teachers' attitudes toward teaching EE, subjective norms, and perceived behavioral control related to teaching EE influence their commitment to teach EE, and that teachers with stronger commitments to teach EE are more likely to overcome existing barriers and actually implement EE (Shuman and Ham 1997). Thus, in efforts to encourage the use of natural settings with their future students, preservice education strategies might include either reducing the barriers or influencing preservice early childhood educators' attitudes, perceptions of norms, and perceived behavioral control.

Research objectives

The purpose of this study was to explore preservice early childhood educators' perceptions of outdoor settings, their intentions to use these settings, and the educational opportunities, motivations, and barriers they associate with these settings. This study also sought to explore the role of personal landscape preferences and personal connections with nature (nature relatedness) on these perceptions. The EE community, working with the early childhood teacher education community, can use this understanding to guide the development and provision of preservice training, programming for young children at nonformal sites, and other capacity-building efforts to encourage preservice early childhood educators to use natural settings and nature experiences with their future students.

Methods

Participants

Participants consisted of 110 students enrolled in the early childhood teaching licensure program at a university in Minnesota (USA). This program prepares students for work in a variety of settings with children of diverse ability levels, from birth through age eight. All students in this program complete a common core of courses in child development, parent-child relations, early childhood curriculum and programming, early childhood special education, community resources, and educational leadership and program administration. Completion of the program leads to Minnesota licensure in early childhood education (birth through grade three) and

early childhood special education. Of the 110 participants, 38 (34.5%) were in the first year of the program, 25 (22.7%) were second-year students, 22 (20%) were third-year students, and 25 (22.7%) were in their fourth year of the program and student teaching in an early childhood setting.

Research instrument

The research instrument consisted of a questionnaire to be used with a set of 16 photographs. The questionnaire was designed specifically for this study in response to the research questions, with grounding in the literature described previously (Simmons 1993, 1998 in particular). Each questionnaire was accompanied by a set of 16 photographs selected by the researchers. All photographs were of the same season (late spring), and none of the photographs contained people, so as to keep these factors from potentially influencing preference selections. The photographs were of four outdoor setting types found within the part of the state where the university is located: water, woods, open field/grassy area, and park. There were four photographs in each setting type, and in each setting type, there were photographs with maintained aspects and photographs that were primarily natural (undeveloped or unmaintained, based on the human influence setting attribute, as in Kaplan 1985). See Table 1 for a description of the 16 photographs.

The first section of the questionnaire asked participants to view the set of photographs, indicate the three settings they would personally like to visit most and least, and indicate why they selected those settings. The second section asked participants to indicate which three settings they felt as being most and least conducive to meeting educational outcomes for their future early childhood students. For the purpose of this study, the term educational outcomes referred to a range of potential outcomes, including cognitive, socioemotional, physical, health and wellness, and environmental appreciation outcomes. They were also asked to indicate why they selected those settings, as well as indicate what they would do with their students in such settings, and what resource needs they anticipated for bringing students to those settings. This approach of using photographs to indicate outdoor setting (landscape) preference was based on the preference-rating approach described in Kaplan (1985). While the preference-rating approach uses a five-point rating scale, with respondents rating every photograph shown and an average preference rating computed for each photograph, the approach used in this study was preference ranking (participants selecting, ranking, their top three preferences). This use of ranking allowed for follow-up questions regarding participants' top ranked preferences (which used less time than having participants rate each photograph and also prevented 'ties' in top preferences from occurring).

The third section of the questionnaire asked participants to indicate how likely they were to use maintained outdoor settings with their future students, how likely they were to use natural outdoor settings with their future students, and how difficult they perceived it would be to use natural settings with their future students. They were also asked to respond to open-ended questions regarding motivations and barriers associated with use of natural settings with their future students. This section also contained statements regarding benefits of experiences in nature, and participants were asked to indicate the extent to which they agreed with the statements. For this section of the questionnaire, natural settings was defined to

Table 1. Description of outdoor setting photographs.

Outdoor setting type	Setting label	Photograph description	Human influence attribute
Water	13	Stream dotted with small rocks; water appears still; wooded/brushy vegetation on edge; narrow foot path leading down to water's edge	Natural
	14	Stream cutting through large rock outcropping, forming small waterfalls; dense forest/vegetation along rock outcropping	Natural
	15	Small lake with calm water; trail alongside edge of lake; small dock and shelter with canoes; forested backdrop	Maintained
	16	Shore of larger lake (likely recognizable as Lake Superior from its distinct pebbly beach), with forested shoreline	Natural
Forest	9	Dense forest with a wide paved trail winding through; visually 'open' due to the wideness of trail, allowing enough sun to create shadows on pavement	Maintained
	10	Dense forest; narrow foot path winding through; very little light appears to be shining through forest cover	Natural
	11	Open forest with a mix of grasses/vegetation on forest floor; crushed gravel path lined by wooden fencing	Maintained
	12	Open forest, with vegetation, underbrush, and fallen trees on forest floor; no path	Natural
Open field/ grassy area	6	Open natural area, with tall grasses, wildflowers, and a small wet area visible; several trees in the background	Natural
	5	Open natural area, with tall grasses, wildflowers, and a small area visible; several trees and a building in the background; gravel road leading to and alongside grassy area	Maintained
	8	Open area of grass and wildflowers, with a single tree near the foreground; no paths	Natural
	7	Open area of grass and wildflowers, with a single tree near the foreground; a gravel path with a wooden bridge midway	Maintained
Park	4	Open area with a mix of tall grass and wildflowers, with a forested background; park bench that seems almost hidden by long grass	Natural
	3	Open grassy area, with several park benches scattered about; grass is very short and appears mowed	Maintained
	2	Open area, with several large trees dotting foreground; pavilion with picnic tables; forested background; grass appears mowed	Maintained
	1	Playground on a raised woodchip-filled area, with mowed grass and trees in background	Maintained

participants as outdoor settings that range from relatively natural to wild, as opposed to maintained or developed outdoor spaces, such as mowed grassy areas, landscaped park settings, and playgrounds.

In light of the literature suggesting the potential influence of images of nature (beliefs regarding the relationship between humans and nature) on landscape preference (Buijs, Elands, and Langers 2009), it seems possible that preservice early childhood educators' outdoor setting (landscape) preferences may be influenced by their images of nature and that these preferences and images in turn influence their intentions to use natural settings and the specific outdoor settings they foresee using. Thus, final section of the questionnaire was the 21 items of the 'Nature relatedness scale' (Nisbet, Zelenski, and Murphy 2009), used with the permission of the authors. Nature relatedness is defined as an individual's level of connectedness with the natural world (Nisbet, Zelenski, and Murphy 2009). It is further described as one's appreciation for and understanding of the interconnectedness among humans and all other living things on the earth (Nisbet, Zelenski, and Murphy 2009). The 'Nature relatedness scale' assesses the affective, cognitive, and experiential aspects of individuals' connection to nature. It was selected for this study because of its ability to serve as a quantitative method for measuring images of nature and its potential influence on setting preference and use intentions.

Procedures

During the spring semester of the 2010–2011 academic year, I requested permission from the early childhood teacher education faculty to visit one section of a required course from each of the four levels (years) in the program. Students were invited to participate, and those consenting completed the questionnaire using the set of photographs. Data analysis is described in greater detail in the results, but in general consisted of descriptive statistics, correlational analyses, and inferential tests. Responses to open-ended questions were coded for the purpose of data-reduction and sense-making, as in Patton (2002). Initial coding was used, as responses were read and entered, followed by focused coding where codes were reviewed, less useful ones eliminated, smaller categories combined into larger ones, and large or broad categories divided into smaller ones (as in Lofland and Lofland 1995).

Results

Outdoor settings most and least conducive to achieving educational outcomes

Frequencies of responses selected by participants as being the three most and least conducive were used to address which settings were perceived as most and least conducive to achieving educational outcomes and to explore if personal preferences were related to educational preferences. The three settings with the highest frequencies of being selected as among the three *most* conducive were Setting 1 (playground), Setting 2 (pavilion in open woods), and Setting 16 (pebbly shoreline of Lake Superior), $n = 64$, $n = 44$, and $n = 42$, respectively. The three settings with the highest frequencies of being selected as among the three *least* conducive were Setting 12 (open forest with no path), Setting 8 (open, unmowed grassy area with no path), and Setting 13 (stream in wooded area with narrow foot path), $n = 34$, $n = 33$, $n = 31$, respectively.

The three settings with the highest frequencies of being selected as among the three outdoor settings participants personally preferred *most* were Setting 16 (pebbly shoreline of Lake Superior), Setting 14 (stream cutting through rocky outcropping forming small waterfalls), and Setting 13 (stream in wooded area with narrow foot path), $n=90$, $n=62$, $n=36$, respectively. The settings participants personally preferred *least* were Setting 3 (open mowed grassy area with park benches), Setting 2 (pavilion in open woods), Setting 8 (open unmowed grassy area with no path), $n=65$, $n=44$, and $n=35$, respectively. Based on these descriptive results, it appears there is some overlap in educational and personal preferences (the pebbly shoreline of Lake Superior was one of the three most preferred both educationally and personally, and the open, unmowed grassy areas with no path being one of the least preferred both educationally and personally), but also a distinctness to these preferences (the pavilion in open woods being one of the most preferred sites educationally but one of the least preferred personally, and the stream in the wooded area with narrow foot path being one of the least preferred educationally, but one of the most preferred personally).

To explore if preferences were related to participants' levels of nature relatedness, their selections of the setting most conducive to achieving educational outcomes and the setting they personally most preferred (the setting they listed first for each) were recoded by outdoor setting type (water, forest, open field/grassy area, park) and also by human influence attribute (natural or maintained). Analyses of Variances were conducted to determine if there were significant differences in participants' nature relatedness scores by outdoor setting type preference, and independent *t*-tests were conducted to determine if there were significant differences in nature relatedness scores by human influence attribute. The results for outdoor setting type indicated no significant differences in nature relatedness for *educational* outdoor setting preference, $F(3, 101)=1.67$, $p=.19$, and for *personal* setting preference, $F(3, 104)=1.49$, $p=.22$, suggesting setting type preferences were not related to participants' level of nature relatedness. The results for human influence attribute also indicated no significant differences in nature relatedness for *educational* outdoor setting preference, $t(36.52)=.05$, $p=.96$ (equal variances not assumed), and for *personal* setting preference, $t(36.26)=.33$, $p=.75$ (equal variances not assumed), suggesting human influence attribute preferences were not related to participants' level of nature relatedness. The overall mean nature relatedness score was 3.48 ($SD=.48$), with possible scores ranging from one (low level of nature relatedness) to five (high level of nature relatedness).

In summary, based on some overlap in educational and personal preference selections, it appears that the outdoor settings that participants' perceive as most conducive to achieving educational outcomes may potentially be influenced by personal preferences, but preferences do not appear to be influenced by level of nature relatedness.

Characteristics of educationally conducive outdoor settings

Coding of participants' responses to the questions as to why they selected those particular most and least preferred settings was used to investigate the characteristics that make outdoor settings most conducive to achieving educational outcomes. The most frequent reason as to why a site was most conducive to achieving education outcomes was easy to use with young children (clear boundaries, clear course

of direction/trail, a place to gather or sit, even terrain for walking or for strollers), and the most frequent reason as to why a site was least conducive was safety hazards. The most frequent reason as to why a site was preferred personally was presence of water, and the most frequent reason as to why a site was least preferred personally was lack of things to do (see Table 2).

To further explore characteristics of educationally conducive outdoor settings, characteristics that surfaced through the open-ended responses were compared with the preference frequencies within the two categorizations used in the first research question, outdoor setting type and human influence attribute. Regarding educational preferences, most participants selected an outdoor setting that was a park (setting type) and maintained (human influence attribute) for the outdoor setting they perceived as most conducive to achieving educational outcomes, with the least frequent selections being the open field (setting type) and natural (human influence attribute). In contrast, most participants selected an outdoor setting that was water (setting type) and natural (human influence attribute) for their personal preference, with the least frequent selections being the open field (setting type) and maintained (human influence attribute) (see Table 3). These preferences are consistent with the following characteristics of educationally conducive outdoor settings identified through the open-ended questions: easy to use, safe, and opportunities for unstructured play. They are also consistent with the characteristics of personal preferences identified through the open-ended questions: presence of water, lack of human influence, opportunities for things to do, and easy to navigate.

Educational affordances and resource needs

To explore what activities and resource needs preservice early childhood educators associate with the outdoor settings are perceived as most conducive to achieving educational outcomes, responses from the open-ended questions regarding the three settings they had selected as most conducive were coded and frequencies calculated. Results are summarized in Tables 4 and 5. The most frequently listed activity for

Table 2. Characteristics of educationally conducive and personally preferred outdoor settings.

Reasons why most preferred (frequency)	Reasons why least preferred (frequency)
<i>Educational preferences</i>	
Easy to use (42)	Safety hazards (47)
Opportunities for unstructured play (22)	Lack of things for children to do (37)
Opportunities for structured learning about nature (21)	Difficult to use (13)
Opportunities for unstructured learning about nature (11)	
Safe (8)	
Familiar (5)	
<i>Personal preferences</i>	
Presence of water (49)	Lack of things to do (54)
Setting seemed relaxing (44)	Hard to navigate/easy to get lost (21)
Setting was pretty (29)	Too much human influence (18)

Table 3. Preferences by outdoor setting type and human influence attribute.

	Frequency of participants selecting setting as educational preferences	Frequency of participants selecting setting as personal preferences
<i>Outdoor setting type</i>		
Park	67	11
Forest	19	15
Water	12	73
Open field/grassy area	8	10
<i>Human influence attribute</i>		
Maintained	87	25
Natural	22	84

all settings combined was structured learning *about* nature, and the most frequently listed resource need was extra adult supervision.

Motivations for and barriers to the use of natural outdoor settings

To address motivations for and barriers to the use of natural outdoor settings, participants' responses from the open-ended questions were coded and frequencies calculated. For participants selecting on a prior question, the response that they were likely or very likely to use natural outdoor settings for educational opportunities with their future early childhood students, the most frequent motivations were because of the opportunity for hands-on, experiential learning ($n=28$), and the opportunity for learning in an alternative setting ($n=15$). Other motivations were physical/health benefits ($n=11$), student enjoyment ($n=9$), to foster and appreciation for nature ($n=8$), because of the importance of learning about nature ($n=8$), and educator enjoyment ($n=4$).

For participants indicating they anticipated it being difficult or very difficult, the most frequent barrier to the use of natural outdoor settings for educational opportunities with their future early childhood students was lack of access/need for transportation to a natural outdoor setting ($n=20$). Other barriers were safety concerns ($n=11$), lack of supervision ($n=6$), lack of parent support ($n=5$), and accessibility/disability needs ($n=3$). To explore a potential attitudinal barrier to the use of natural

Table 4. Activities associated with educationally preferred outdoor settings.

	Park	Forest	Water	Open field/ grassy area	Frequency total by activity
Structured learning about nature	31	28	32	10	101
Nature hike	3	47	4	9	63
Unstructured play for physical/ health/social benefits	59	—	1	—	60
Unstructured learning about nature	10	6	11	2	29
Picnic	20	1	—	—	21
Reading and/or art activities	7	1	1	—	9
Pick up litter	2	—	—	—	2

Note: Numbers represent the frequencies of participants indicating that particular activity.

Table 5. Resource needs associated with educationally conducive settings.

	Frequency identified as a need across all outdoor settings
<i>Safety-related</i>	
Extra adults to supervise children	75
Appropriate shoes	16
First aid kit	7
Accessibility accommodations	6
Nice weather	5
Safety rules/behavioral expectations	3
<i>Materials</i>	
Field equipment specific to activity	34
Bags/jars for collecting nature items	27
Activities/lesson plans	19
Worksheets	2
<i>Content/information-related</i>	
Field guide for instructor	20
Prior knowledge/background information	13
Naturalist to accompany group	4

outdoor settings, participants were asked to rate the extent to which they agreed with nature experiences belonging within the formal school setting. The mean response was 3.78 (SD=1.20), on a scale of one indicating very strong disagreement, and five indicating very strong agreement. This indicates some agreement with nature experiences belonging in the formal setting, but also that for some, there may be an attitudinal barrier toward the use of natural settings in formal early childhood education.

Recognition of benefits of experiences in nature

Participants were asked to rate the extent to which they agreed with five statements regarding potential benefits of experiences in nature for young children. Descriptive statistics of these items were used to indicate participants' recognition of the benefits associated with experiences in nature for young children. Participants were in strongest agreement with the environmental benefits of experiences in nature (fostering appreciation for the environment), $M=4.82$, $SD=.44$ (1 corresponding to a rating of strong disagreement and 5 to a rating of strong agreement). Participants also generally agreed with the importance of experiences in nature for children's cognitive, socioemotional, physical development, as well as for the overall health and wellness (see Table 6).

Intentions regarding and predictors of the use of natural settings

Respondents indicated they would likely use natural outdoor settings with their future early childhood students, $M=4.07$, $SD=.86$, with a rating of 1 indicating very unlikely to use, and 5 indicating very likely to use. They indicated being slightly more likely to use maintained outdoor settings, $M=4.33$, $SD=.80$. Multiple regression was used to explore which of the following were significant predictors of intention to use natural settings with their future early childhood students: level in preservice program, age of students they plan to teach, recognition of benefits

Table 6. Recognition of benefits of experiences in nature.

	<i>M^a</i>	SD
Development of environmental appreciation	4.82	.45
Physical development	4.69	.52
Health and wellness	4.67	.53
Cognitive development	4.39	.61
Socioemotional development	4.05	.73

^a1 = Strongly disagree; 5 = strongly agree.

related to experiences in nature, perceived difficulty in using natural settings, belief regarding nature experiences belonging within the formal school setting, intention to use maintained outdoor settings, and personal level of nature relatedness. The regression model was significant, $F(11, 90) = 2.50$, $p < .01$, with the set of predictors accounting for 23.4% of the variance in intention to use natural outdoor settings. There were three significant predictors: perceived difficulty in using natural settings, $b = .24$, $SE = .09$, $p = .02$; recognition of the importance of experiences in nature on children's health and wellness, $b = .45$, $SE = .20$, $p = .02$; and level of nature relatedness, $b = .39$, $SE = .18$, $p = .03$. The results of a stepwise regression analysis indicated recognition of the importance of experiences in nature on children's health and wellness as the strongest predictor of intention to use natural outdoor settings. A model incorporating these three significant predictors accounted for 16.7% of the variance in intention to use natural outdoor settings.

Discussion and implications

Based on a synthesis of the results of this study, it appears preservice early childhood educators perceive parks as the most conducive setting for achieving educational outcomes with their future students, and that they are slightly more inclined to use maintained outdoor settings than natural settings. This appears to be consistent with Simmons (1994), who found elementary teachers were more likely to use built settings to teach about nature, but in contrast with Simmons (1993), which indicated elementary teachers had a strong preference for taking students to natural settings rather than maintained outdoor settings. Given the important influence of perceived difficulty to use natural settings, as evidenced by this study, it is possible that this inconsistency has to do with what they would like to do and what they perceive as feasible.

Shuman and Ham's *Model of Environmental Education Commitment* (1997) suggests efforts to increase commitment to use natural outdoor settings would increase the likelihood that preservice educators would overcome perceived barriers. Based on this model, strategies to influence attitudes toward teaching EE, subjective norms, and perceived behavioral control would be useful in increasing a commitment to use these natural settings. Results of this study suggest influencing preservice educators' beliefs regarding the appropriateness of experiences in nature in formal education may be one way to address the attitude component of this model. Results regarding barriers and resource needs suggest that while preservice early childhood educators did not outright express a lack of comfort or confidence in being able to use natural settings, barriers such as safety concerns and content-

related needs (prior knowledge, naturalist to accompany us, etc.) suggest opportunities for increasing their perceived behavioral control. Another approach stemming from this model involves reducing perceived strength of barriers, which is warranted particularly in light of perceived difficulty being a significant predictor of intention to use natural outdoor settings. Barriers to be reduced include lack of access/need for transportation and safety concerns.

It appears from this study that preservice early childhood educators' personal preferences have limited influence on their educational preferences, with personal preferences toward natural settings (specifically water) and educational preferences toward maintained settings (specifically parks). There was, however, one specific setting, the pebbly shoreline of Lake Superior, that was one of the most preferred settings both educationally and personally. This was also the one setting that likely would have been specifically recognizable to participants. This may speak to the role of familiarity in landscape preferences, with some studies suggesting landscapes we prefer are the ones we are familiar with; other studies, however, suggest novelty dominates preference in natural scenes (Park, Shimojo, and Shimojo 2010). This study also suggests preservice early childhood educators' level of nature relatedness does not influence their educational and personal outdoor setting preferences. Assuming level of nature relatedness is a construct similar to the nature image construct in the landscape planning literature, the results of this study support research suggesting images of nature and landscape preferences are conceptually distinct, rather than image of nature influencing landscape preference.

In light of personal outdoor setting preferences and personal levels of nature relatedness appearing to lack influence on educational outdoor setting preferences, other characteristics that emerged from this study have implications for EE, and in particular, managers of natural areas. Preservice early childhood educators indicated preferring outdoor settings that were easy to use. It may be that clear boundaries (rocks outlining a grassy space, for example), a trail to guide course of direction, places to sit, and even terrain for walking/stroller use may be of particular importance to educators bringing young children into nature, and that these characteristics aid in reducing the barriers of safety concerns and accessibility needs. Further, they indicated educationally conducive outdoor sites provided the opportunities for unstructured play, and they perceived parks as the outdoor setting most conducive to providing opportunities for unstructured play. Thus, there seems to be a need for helping preservice early childhood educators recognize the breadth of outdoor settings where unstructured play can happen (grassy areas, forests, near water environments, as well as in parks and on playgrounds). These efforts might include helping them recognize the added benefits in terms of cognitive development and environmental benefits afforded by unstructured play in natural settings, in addition to the physical and social benefits.

Based on this study, preservice early childhood educators appear to associate outdoor settings with educational outcomes regarding learning about nature, and in particular *structured* learning about nature, with park, forest, and water environments being most conducive for doing so. They also appear to associate outdoor settings with educational outcomes regarding physical development, health and wellness, and social development, with parks (playgrounds) being most conducive to achieving these outcomes. This seems in slight contrast with the teachers in the Simmons (1993) study who tended to perceive the educational opportunities of outdoor settings as primarily science- or recreation-based, but consistent with

Davies (1996) who found teachers associate the primary function of the outdoor setting with promoting physical and social development. These results suggest there is an opportunity for environmental educators to better convey the importance of unstructured learning and nature exploration, as suggested in NAAEE's early childhood guidelines (2010), as well as to reduce the perceived need for content and information, such as field guides, prior knowledge, and naturalists to accompany them while in nature. On the other hand, while good early childhood education programs incorporate child-initiated explorations, the teacher's role in introducing and facilitating learning activities is also important (Bredenkamp 1987). Consequently, it appears what is needed is a balance, with future early childhood educators using both unstructured and teacher-guided nature learning experiences. There also is an opportunity for environmental educators to foster the recognition among preservice early childhood educators as to the possibility for physical and social development outcomes to be achieved in natural settings, accompanied by ideas for doing so, as well as an opportunity to foster a stronger recognition of the cognitive benefits of experiences in natural settings.

While level of nature relatedness did not influence outdoor setting preferences, it was a significant predictor of preservice educators' intention to use natural settings with their future early childhood students. Literature on connectedness to nature and nature relatedness offers insight into factors that promote these cognitive, affective, and experiential connections with nature. Tanner's (1980) work identified variables perceived by participants to have influenced their choice of conservation work or to have contributed to their environmental attitudes, such as interaction with natural areas, frequent contact with habitat, family, hunting/fishing, teachers and other nonfamilial role models, books, habitat alteration, and solitude. Subsequent studies have found similar categories of influences, with the most cited influence being outdoor experiences in natural or rural settings, usually with family, but also with other role models (Chawla 1999; Palmer 1993; Sivek 2002; Sward 1999). Consequently, Chawla and Cushing (2007, 449) recommend environmental educators provide time during their programs for children to experience nature, enabling them to bond with nature by just 'being' in nature. Chawla and Cushing (2007) further reference evaluations of EE programs, where programs most effective in increasing young people's environmental concern exhibited the characteristics of an extended duration of time, opportunities to learn and practice action skills, and success in achieving valued goals. These influences can be used to shape the types of professional development experiences that could be used within their preservice training to foster these connections to nature among future early childhood educators, such as opportunities to simply spend time in nature and opportunities to develop and practice environmental action skills – experiences that are not typically part of teacher preparation programs.

Additionally, it is worth considering these results from the perspective of what we are aiming for in quality EE at the early childhood. Preservice early childhood educators did not seem to associate nature experiences with outcomes such as developing questioning and investigation skills or developing a personal sense of responsibility, which are important outcomes in the NAAEE *Early Childhood Environmental Education Programs: Guidelines for Excellence* (2010). The closest response to these outcomes was 'picking up litter' indicated by two participants. Their intentions seem to fall even further from the type of education needed for contributing to a sustainable society, as described by participants at the international

conference in Sweden, who agreed that in order for early childhood EE to contribute to sustainable development, it needs to be more than opportunities to discover and appreciate nature, and include concrete actions in favor of the environment and opportunities for children to learn to be compassionate and respectful of differences (Samuelsson and Kaga 2008, 12). In order for preservice early childhood educators to view educational experiences in outdoor settings in this manner, there is a clear need for further exploration and effort through professional discussions, research, and program development, especially when some have yet to be convinced that experiences in nature in general have a role in formal education.

Finally, it is important to consider these findings in light of their generalizability. Because of the influence of culture on landscape preferences and nature images (Buijs, Elands, and Langers 2009), the results of this study seem limited to Anglo-American preservice early childhood educators. For example, research suggest Anglo-Americans generally prefer a more natural environment, with African-American and Latin-American groups generally preferring more managed environments (Zube and Pitt 1981), which appears consistent with the preservice early childhood educators' personal preferences toward natural settings.

However, crosscultural comparison literature regarding preferences for natural environments shows high agreement when cultures are relatively similar (Zube 1984). This may explain why findings from a Scottish study of early childhood educators seem consistent with this study, particularly in terms of lack of woodland use, recognition of physical benefits associated with nature play, and concerns regarding lack of access, safety, and lack of expertise (Robertson 2008). Thus, findings from this study may be cautiously generalized to similar cultural groups. Yet literature also notes that even within the same culture, preferences and nature images are not always consistent, with differences among age groups and other background variables, such as educational or urban/rural differences (Kaplan and Herbert 1987). This complexity suggests the need for further research regarding the interplay of culture and other background variables among landscape preferences, nature images, nature relatedness, and educational use of nature settings and experiences. Future research grounded in sociocultural theory (Cobb and Yackel 1996) could be particularly insightful, allowing for an exploration of the interdependence of cultural and individual processes in shaping one's preferences and intentions to use natural settings and a broader consideration of the social system in which this takes place. A sociocultural perspective (Gallimore and Tharp 1990) could also aid in application of findings to early childhood education teacher preparation programs.

Conclusion

The purpose of this exploratory study was to explore preservice early childhood educators' perceptions of outdoor settings, their intentions to use these settings, and the educational opportunities, motivations, and barriers they associate with these settings. This study also sought to explore the role of personal landscape preferences and personal connections with nature (nature relatedness) on these perceptions. The findings are intended to inform professional development and other efforts toward encouraging preservice early childhood educators to use natural experiences with their future students. This study provides some suggestions to add to the guidance from Wilson (1994b), NAAEE (2010), and Samuelsson and Kaga

(2008), such as reducing barriers of safety concerns and lack of access, fostering recognition of the wide range of benefits afforded by unstructured play and exploration in natural settings, and incorporating affective experiences in nature and environmental action project into professional development with the aim of increasing preservice early childhood educators' levels of nature relatedness. There are, however, several important limitations to note.

First, landscape preferences are complex, and even the construct 'landscape' is illusive (Kaplan 1985). It is difficult to capture the range of potential outdoor settings through 16 photographs, and the range within any one setting type through four photographs. Thus, participants' preferences may have been influenced by the particular photographs chosen to represent that setting type, and a photograph substituted in its place could have led to different results. Their preferences may also have been influenced by the questionnaire wording, which prompted them to select settings they'd most like to visit, which in hindsight, might measure something different from landscape preference. Second, nature relatedness was intended to be a measure of participants' nature image (from the environmental perception literature and due to its potential influence on landscape preference). While the constructs overlap, it seems nature image may tap more of the cognitive beliefs one has regarding their relationship with nature and the human-nature relationship in general, which could be different from the cognitive, affective, and experiential aspects of nature relatedness. Thus, construct validity of the nature relatedness score as a measure of nature image could be lacking.

In spite of these limitations, this study can inform efforts toward encouraging the use of nature settings with young children, and in doing so, contribute to the growing initiative to reconnect children and nature. Further, these results can inform further research on preservice early childhood educators, an audience with the potential to make a significant impact on the development of young children and a significant contribution to a sustainable society.

Notes on contributors

Julie Ernst is an associate professor in the Department of Health, Physical Education and Recreation at the University of Minnesota Duluth. She teaches undergraduate courses in outdoor and EE and graduate courses in EE methods, formal classroom applications, theories of behavior change, program evaluation, and research methods and statistics.

Ladona Tornabene is an associate professor in the Department of Health, Physical Education and Recreation at the University of Minnesota Duluth. She teaches in the health education and community health programs.

References

- Arlemalm-Hagser, E., and A. Sandberg. 2011. Sustainable development in early childhood education: In-service students' comprehension of the concept. *Environmental Education Research* 17, no. 2: 187–200.
- Baranowski, T., W. Thompson, R. Durant, J. Baranowski, and J. Puhl. 1993. Observations on physical activity in physical locations: Age, gender, ethnicity, and month effects. *Research Quarterly for Exercise and Sport* 64: 127–33.
- Benson, J., and J. Miller. 2008. Experiences in nature: A pathway to standards. *Young Children* 63, no. 4: 22–8.
- Bredenkamp, S., ed. 1987. *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*. Washington, DC: National Association for the Education of Young Children.

- Buijs, A., B. Elands, and F. Langers. 2009. No wilderness for immigrants: Cultural differences in images of nature and landscape preferences. *Landscape and Urban Planning*. DOI: 10.1016/j.landurbplan.2008.12.003.
- Burdette, H.L., and R.C. Whitaker. 2005. Resurrecting free play in young children. *Archives of Pediatrics and Adolescent Medicine* 159: 46–50.
- Chakravarthi, S. 2009. Preschool teachers' beliefs and practices of outdoor plan and outdoor environments. Unpublished dissertation, University of North Carolina.
- Charles, C. 2009. The ecology of hope: Natural guides to building a children and nature movement. *Journal of Science Education and Technology* 16: 467–75.
- Chawla, L. 1999. Life paths into effective environmental action. *Journal of Environmental Education* 31, no. 1: 15–26.
- Chawla, L., and D.F. Cushing. 2007. Education for strategic behavior. *Environmental Education Research* 13, no. 4: 427–52.
- Cobb, P., and E. Yackel. 1996. Constructivism, emergent, and sociocultural perspectives in the context of developmental research. *Educational Psychology* 31: 175–90.
- Crim, C., B. Desjean-Perrotta, and C. Moseley. 2008. Partnerships gone wild: Preparing teachers of young children to teach about the natural world. *Childhood Education* 85, Fall: 6–12.
- Davies, M. 1996. Outdoors: An important context for young children's development. *Early Child Development and Care* 115: 37–49.
- Davis, J. 2009. Revealing the research 'hole' of early childhood education for sustainability: A preliminary survey of the literature. *Environmental Education Research* 15, no. 2: 227–41.
- Elliott, S. 2010. Children in the natural world. In *Young children and the environment: Early education for sustainability*, ed. J. Davis, 43–75. Melbourne: Cambridge University Press.
- Ernst, J. 2011, Winter. Are childcare providers encouraging nature play? *Minnesota Association for Environmental Education's Quarterly Newsletter* 1: 9.
- Ewert, A., G. Place, and J. Sibthorp. 2005. Early-life outdoor experiences and an individual's environmental attitudes. *Leisure Science* 27: 225–39.
- Ferry, B. 1995. Enhancing environmental experiences through effective partnerships among teacher educators, field study centers, and schools. *Journal of Experiential Education* 18: 133–7.
- Fjortoft, I. 2001. The natural environment as a playground for children: The impact of play activities in pre-primary school children. *Early Childhood Education Journal* 29, no. 2: 111–7.
- Fjortoft, I. 2004. Landscapes as playscape: The effects of natural environments on children's play and motor development. *Children, Youth and Environments* 14, no. 2: 21–44.
- Fjortoft, I., and J. Sageie. 2000. The natural environment as a playground for children. *Landscape and Urban Planning* 48, no. 1/2: 83–97.
- Gallimore, R., and R. Tharp. 1990. Teaching mind in society: Teaching, schooling, and literate discourse. In *Vygotsky and education: Instructional implications of sociohistorical psychology*, ed. L.C. Moll, 175–205. New York, NY: Cambridge University Press.
- Green Hearts Institute for Nature in Childhood. 2008. Nature preschools. www.greenhearts-inc.org/Nature_Preschools.html (accessed September 10, 2011).
- Ham, S., and D. Sewing. 1988. Barriers to environmental education. *Journal of Environmental Education* 19, no. 2: 17–24.
- Iozzi, L. 1989. What research says to the educator. Part two. Environmental education and the affective domain. *Journal of Environmental Education* 20, no. 4: 6–13.
- Kaltenborn, B., and T. Bjerke. 2002. Associations between environmental value orientations and landscape preference. *Landscape and Urban Planning* 59: 1–11.
- Kaplan, R. 1985. The analysis of perception via preference: A strategy for studying how the environment is experienced. *Landscape Planning* 12: 161–76.
- Kaplan, R., and E. Herbert. 1987. Cultural and sub-cultural comparisons in preferences for natural settings. *Landscape and Urban Planning* 14: 281–93.
- Lester, S., and M. Maudsley. 2007. *Play, naturally: A review of children's natural play*. London: National Children's Bureau.

- Lofland, J., and L. Lofland. 1995. *Analyzing social settings: A guide to qualitative observation and analysis*. Belmont, CA: Wadsworth.
- Magnusson, S., J. Kracjick, and H. Borko. 1999. Nature, sources, and development of pedagogical content knowledge for science teaching. In *Examining pedagogical content knowledge: The construct and its implications for science education*, ed. J. Gess-Newsome and N. Lederman, 95–132. Dordrecht: Kluwer Academic.
- McKeown-Ice, R. 2000. Environmental education in the United States: A survey of pre-service teacher preparation programs. *Journal of Environmental Education* 32, no. 1: 4–15.
- Monroe, M., G. Scollo, and A. Bowers. 2002. Assessing teachers' needs for environmental education services. *Applied Environmental Education and Communication* 1: 37–43.
- Moore, R. 1996. Compact nature: The role of playing and learning gardens on children's lives. *Journal of Therapeutic Horticulture* 8: 72–82.
- National Resource Center for Health and Safety in Child Care and Early Education. 2011. State childcare licensure regulations. <http://nrckids.org/STATES/states.htm> (accessed September 9, 2011).
- Nisbet, E., J. Zelenski, and S. Murphy. 2009. The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior* 41: 715–40.
- North American Association for Environmental Education (NAAEE). 2010. *Early childhood environmental education programs: Guidelines for excellence*. Washington, DC: NAAEE.
- Ogdenm, C., M. Carroll, L. Curtin, M. McDowell, C. Tabak, and K. Flegal. 2006. Prevalence of overweight and obesity in the United States, 1999–2004. *Journal of American Medical Association* 295: 1549–55.
- Palmer, J. 1993. Development of concern for the environment and formative experiences of educators. *Journal of Environmental Education* 24, no. 3: 26–30.
- Park, J., E. Shimojo, and E. Shimojo. 2010. Roles of familiarity and novelty in visual preference judgments are segregated across object categories. *Proceedings of the National Academy of Sciences* 10, no. 33: 14552–5.
- Patton, M.Q. 2002. *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.
- Phenice, L., and R. Griffiore. 2003. Young children and the natural world. *Contemporary Issues in Early Childhood* 4, no. 2: 167–78.
- Richardson, V. 1994. *Teacher change and the staff development process*. New York, NY: Teachers College.
- Robertson, J. 2008. *I ur och skur: Swedish forest schools*. Aberdeenshire: Creative Star Learning Company.
- Robertson, J., P. Martin, L. Borradaile, and S. Alker. 2009. *Glasgow and the Clyde Valley forest kindergarten feasibility study*. Aberdeenshire: Creative Star Learning Company.
- Samuelsson, I., and Y. Kaga. 2008. *The contribution of early childhood education to a sustainable society*. Paris: UNESCO.
- Sandell, K., J. Ohman, and L. Ostman. 2005. *Education for sustainable development: Nature, school and democracy*. Lund: Studentlitteratur.
- Shuman, D., and S. Ham. 1997. Toward a theory of commitment to environmental education teaching. *Journal of Environmental Education* 28, no. 2: 25–32.
- Simmons, D. 1993. Facilitating teachers' use of natural areas: Perceptions of environmental education opportunities. *Journal of Environmental Education* 24, no. 3: 8–16.
- Simmons, D. 1994. Where is EE taught? Urban teachers' experiences. In *Pathways to partnerships: Coalitions for environmental education*, ed. R. Mrazek, 123–9. Troy: North American Association for Environmental Education.
- Simmons, D. 1998. Using natural settings for environmental education: Perceived benefits and barriers. *Journal of Environmental Education* 29, no. 3: 23–31.
- Sivek, D.J. 2002. Environmental sensitivity among Wisconsin high school students. *Environmental Education Research* 8, no. 2: 155–70.
- Skamp, K., and I. Bergmann. 2001. Facilitating learnscape development, maintenance and use: Teachers' perceptions and self-reported practices. *Environmental Education Research* 7, no. 4: 333–58.
- Sward, L.L. 1999. Significant life experiences affecting the environmental sensitivity of El Salvadoran environmental professionals. *Environmental Education Research* 5, no. 2: 201–6.

- Tanner, R.T. 1980. Significant life experiences: A new research area in environmental education. *Journal of Environmental Education* 11, no. 4: 20–4.
- Ulrich, R.S. 1983. Aesthetic and affective response to natural environment. In *Human behavior and environment*, ed. I. Altman and J.F. Wohlwill, Vol. 6, 85–125. New York, NY: Plenum.
- Wells, N.M. 2000. At home with nature: Effects of ‘greenness’ on children’s cognitive functioning. *Environment and Behavior* 33: 775–95.
- Wells, N., and G. Evans. 2003. Nearby nature: A buffer of life stress among rural children. *Environment and Behavior* 35, no. 3: 311–30.
- Wells, N.M., and K.S. Lekies. 2006. Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments* 16, no. 1: 1–24.
- Williams, A. 2008. Exploring the natural world with infants and toddlers in an urban setting. *Young Children* 63, no. 1: 22–5.
- Wilson, R. 1994a. Pairing early childhood education and environmental education. In *Environmental education at the early childhood level*, ed. R. Wilson, 5–9. Troy: North American Association for Environmental Education.
- Wilson, R. 1994b. A framework for quality. In *Environmental education at the early childhood level*, ed. R. Wilson, 39–48. Troy: North American Association for Environmental Education.
- World Forum Foundation. 2010. Connection children with nature action forum: A project of the world forum foundation’s nature action collaborative for children. www.worldforumfoundation.org/wr/wf2010_nature/index.php (accessed November 19, 2010).
- Zube, E. 1984. Themes in landscape assessment theory. *Landscape Journal* 3: 104–10.
- Zube, E., and D. Pitt. 1981. Cross-cultural perceptions for scenic and heritage landscapes. *Landscape Planning* 8: 69–87.