

Early childhood educators' use of natural outdoor settings as learning environments: an exploratory study of beliefs, practices, and barriers

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In efforts to encourage use of natural outdoor settings as learning environments within early childhood education, survey research was conducted with 46 early childhood educators from northern Minnesota (United States) to explore their beliefs and practices regarding natural outdoor settings, as well investigate predictors of and barriers to the educational use of these settings. Of the beliefs measured, only two were significantly related to frequency of use of natural outdoor settings: belief regarding difficulty in using natural outdoor settings and belief regarding their relationship to nature. The strongest predictor of use was belief regarding difficulty in using natural outdoor settings, accounting for 67.7% of the variance in the regression model. Results indicate primary barriers to be lack of walking access to natural outdoor settings, lack of time, winter weather, and safety concerns. These findings suggest efforts to increase early childhood educators' use of natural outdoor settings should not focus on influencing their beliefs about the value of using natural outdoor settings in early childhood education, but instead on reducing barriers, thereby making the use of these settings seem more feasible.

Keywords: early childhood; preschool; natural settings; beliefs; practices

Introduction

Educational spaces are essential elements of any educational approach (Gandini 1998). While there has been some effort to incorporate natural elements into the design of outdoor educational spaces (Keeler 2008; Moore and Cooper-Marcus 2008; Sobel 2008), natural outdoor settings have been under-utilized in early childhood education (Miller, Tichota, and White 2009). In the context of this study and as generally used in the literature, natural outdoor settings are outdoor environments that range from relatively natural to wild. They are in contrast to maintained or developed spaces, such as mowed grassy areas, landscaped park settings, paved areas, or playgrounds (Elliott 2010; Ernst and Tornabene 2012; Wilson 2012). The importance of natural spaces in education is not a new idea, as educational theorists such as Froebel, Dewey, Montessori, Steiner, Rousseau, and Malaguzzi all emphasized the role of experiences in nature for young children's development and well-being (Elliott 2010; Wilson 2012). Perhaps these theorists recognized children's special affinity for the natural environment, which has since then been documented in the research literature (Korpela 2002; Moore 1986; Sebba 1991).

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While natural outdoor settings hold endless possibilities for learning in all curricular domains, early childhood educators may not recognize the potential opportunities for learning in natural outdoor settings nor the alignment between early childhood pedagogy and the opportunities offered by nature experiences. Early childhood educators who were limited in their own childhood exploration of natural outdoor environments may lack the foundational experiences necessary to see the affordances in natural outdoor settings (Crim, Desjean-Perrotta, and Moseley 2008). For those early childhood educators who recognize the fundamental importance of nature experiences in childhood, these beliefs may not translate into practice, as an array of barriers might intervene between a desire to include nature experiences into their care of young children and the actual provision of these experiences. Understanding early childhood educators' beliefs, practices, and perceived barriers relating to natural outdoor settings can inform efforts to encourage and support the use of natural outdoor settings in early childhood education. It is in this context that the following exploratory study was conducted.

Literature review

There is a significant body of research showing the importance of early childhood education in shaping key academic, social, and cognitive skills that have lifelong consequences for the individual and society (McCain, Mustard, and McCuaig 2011; Shonkoff and Phillips 2000; Strickland and Riley-Ayers 2006). Consequently, there is growing attention being paid in the United States (US) to improving both the quality of and access to early childhood education programs. For preservice teacher preparation and licensing regulations, early childhood education in the United States includes young children within the age range of birth through eight. However, the term is more commonly used to describe education for young children who have not yet begun kindergarten (generally at age 5).

In addition to research consistently showing that young children who attend high-quality early learning programs prior to kindergarten are more successful academically and socially (Espinosa 2002), there have been significant advances regarding 'developmental neurobiology in early childhood and its effects on health, learning, and behavior throughout the life' that make a strong case for 'organizing our society to better support young children' (McCain, Mustard, and McCuaig 2011, 45).

Through federal funding, states in the United States are being encouraged to improve their systems of early learning through improved training for early educators and a more unified approach to supporting young children and families (US Department of Education 2012). As part of this federally funded initiative, states are also encouraged to create clear standards detailing what young children should know and be able to do and measure these outcomes through comprehensive standardized assessment systems (US Department of Education 2012). Additionally, there is an emphasis on defining dimensions of high-quality early childhood education programs in order to develop not only more but better early childhood education programs (Espinosa 2002).

The National Association for the Education of Young Children (NAEYC) oversees an accrediting system aiming toward quality in early childhood education programs for young children. All 50 states have accredited programs, but the number of programs per state varies widely, with Massachusetts, for example, have almost 800 accredited programs, and South Dakota, for example, having only four

accredited programs. Although demographic information compiled across accredited programs is not publicly available, the 2015 vision for NAEYC includes diversity and inclusivity, aiming toward members and accredited programs being more reflective of US demographics. While accreditation is optional and only about 6500 programs for young children in the United States are accredited, the early childhood program standards that are used in the accreditation process serve as general indicators of quality early childhood education programs. These program standards include positive relationships between children and adults; a curriculum that promotes learning and development in social, emotional, physical, language, and cognitive domains; the use of developmentally, culturally, and linguistically appropriate teaching practices; systematic and on-going assessment of children's learning and development; promotion of health and safety; qualified teaching staff; collaborative relationships with children's families; community relationships; safe and well-maintained indoor and outdoor physical environments; and effective leadership and management (NAEYC 2008).

In light of the emphasis on learning standards, it is not surprising that some early childhood educators use a basic-skills oriented approach and focus on academic preparation for elementary school, in spite of NAEYC's recommendation for more of a child-centered approach that allows for direct, open-ended, and self-initiated experiences and focuses on child development in all domains (Stipek and Byler 1997). Preparation for elementary school may include an emphasis on learning to read, practicing taking tests, and learning to instructions. Likewise, in spite of educational theorists such as Lev Vygotsky suggesting the developmental importance of play and recent brain research suggesting early childhood should be devoted imaginative, multisensory, and playful learning, play in early childhood programs in the United States appears to be decreasing as academic demands increase (Armstrong 2006). Thus, these multisensory, child-directed, and open-ended play experiences in early childhood education are being replaced by formal instruction in academic areas, 'seat work' (completing work sitting at a desk or table), technology-oriented experiences, where all children are engaged in the same activity at the same time. Research suggests that for some early childhood educators, a program philosophy focused on academic preparation, pressure from parents and administrators toward school readiness, and state policies regarding academic standards prevented them from being able to implement practices that were consistent with their beliefs about how young children learn and their views on the goals for early childhood education (Stipek and Byler 1997).

Consequently, it seems this focus on academic preparation at the early childhood level would make it difficult for early childhood educators in the United States to incorporate experiences in natural outdoor settings, despite a nationwide movement to reconnect children and nature (Louv 2005) as well as to reconnect Americans in general to the outdoors (as in President Obama's 'America's Great Outdoors Initiative'). Childcare regulations in the United States, enforced at the state level, also may inhibit use of natural outdoor settings, as regulations seem to focus on safety of the outdoor environment (fencing around outdoor spaces, securely anchored play equipment, etc.), and not all states require daily outdoor time (National Resource Center for Health and Safety in Child Care and Early Education 2011).

Similarly, as early childhood education programs aim to meet the NAEYC early childhood program standards for accreditation, there is only a brief mention of the natural environment within the outdoor portion of the physical environment standard:

Outdoor play areas should accommodate ‘exploration of the natural environment, including a variety of natural and manufactured surfaces, and areas with natural materials such as nonpoisonous plants, shrubs, and trees’ (NAEYC 9.B.01). Most of the physical environment standard focuses on the indoor environment, and the outdoor environment portion has an emphasis on providing motor experiences (riding, jumping, running, swinging, etc.), adaptations for children with disabilities, fences or natural barriers to prevent access to safety hazards (streets, water), minimum space requirements per child, space arrangements to allow for seeing and hearing children, and protecting children injury from falls, entrapment, tripping hazards, and excessive wind and direct sunlight. There is further specification relating to the tripping hazards, warning against abrupt changes in surface elevations, tree roots, tree stumps, or rocks, which can trip children or adults (NAEYC 9.B.06d). It seems these specifications would likely guide early childhood education programs striving for accreditation away from the kinds of settings and surfaces most conducive to nature play: diverse ground cover (rocks, stones, sand, mud, water, grass), open and secluded spaces, loose parts that can be manipulated by children, and the possibility of ‘chance’ events (Lester and Maudsley 2007).

Additionally, early childhood educators may not associate natural outdoor settings with learning, nor may they see the alignment between developmentally appropriate practice in early childhood experiences and unstructured play experiences in nature. For example, Chakravarthi (2009), consistent with Davies (1996), found an early childhood educator tendency to associate outdoor settings with physical and social development, as opposed to a wider range of developmental benefits, and view the role of natural elements in outdoor settings as having aesthetic rather than educational value. This suggests teachers’ beliefs as to benefits of outdoor settings may limit the opportunities that teachers provide for children in the outdoors (Chakravarthi, 2009). For additional discussion of constraints to unstructured play experiences in nature at the early childhood level, see Ernst (2012) and Ernst and Tornabene (2012).

While potentially difficult to include, nature experiences in early childhood education settings are critical. Based on US Census Bureau data from 2005, three- and four-year olds spent an average of 32 h per week in childcare (Laughlin 2010). In Minnesota, the state in which the following study was conducted, about three-fourths of families with children regularly use some form of childcare (Chase et al. 2005). In light of US study finding about half of preschoolers lack even one parent-supervised outdoor play opportunity per day, early childhood education settings seem integral to providing opportunities for young children to play outdoors and, in particular, experience nature (Tandon, Zhou, and Christakis 2012).

In addition to the logistical consideration of the amount of time children spend in early childhood education settings, early childhood is a critical time period for developing a sense of respect and an ethic of care for the natural environment (Wilson 1996 based on Tilbury 1994). Because many lifelong attitudes and values are developed early in life, experiences in nature need to start during the early childhood years (Iozzi 1989). Phenice and Griffiore (2003) suggest regular and positive interactions with nature are instrumental to helping children develop a respect for the environment. Research by Ewert, Place, and Sibthorp (2005) indicates nature play experiences in childhood may foster pro-environment attitudes and beliefs later in life. This premise was reiterated at a workshop in Gothenburg, Sweden in 2007, *The Role of Early Childhood Education for a Sustainable Society*,

where international participants agreed the development of environmental values, attitudes, skills, and behaviors begins early in childhood (Samuelsson and Kaga 2008).

Additionally, positive interactions with and in nature are integral to the health and development of young children. Nature experiences have been associated with improved physical health and development (Baranowski et al. 1993; Fjortoft 2001, 2004), psychological well-being (Moore 1996; Wells and Evans 2003), and superior cognitive functioning (Burdette and Whitaker 2005; Charles 2009; Fjortoft and Sageie 2000; Wells 2000). Further support lies in the studies examining the effects of the absence of nature experiences. These studies suggest children who lack access to nature may exhibit poorer social, behavior, and motor skills than those who do (Bartlett 1997; Hüttenmoser 1995). Further, developmental theories propose young children learn through active physical and sensory engagement in their surroundings (Elliott 2010). Nature experiences provide rich sensory stimuli as well as the opportunity for sensory integration processes critical to development in early childhood (Sebba 1991; Wilson 2012). Collectively, these physical, psychological, cognitive, and sensory development benefits support Elliott's claim that 'contact with nature outdoors is as important for health and well-being as are daily food and sleep for children' (2010, 62).

Theoretical framework

The following study is grounded in the research and theory relating to teacher beliefs and practices. The literature on teacher beliefs suggests teachers' explicit and implicit beliefs guide their actions and practices in the classroom (Richardson 1994). Although these beliefs have different sources of information (education and professional training, childhood experiences, personal teaching experience, etc.), explicit and implicit beliefs are interwoven into the teacher's belief system (McMullen 1997). Pajares (1992) uses multiple studies to propose that there is 'a strong relationship between teachers' educational beliefs and their planning, instructional decisions, and classroom practices' (307). Smylie (1988) found teachers' perceptions and beliefs to be the 'most significant predictors of individual change' (23). Haney, Czerniak, and Lumpe (1996) also found teacher beliefs to be significant indicators of teaching behaviors in the classroom.

However, other studies suggest a less clear relationship with teacher beliefs being a weak influence on practice or the relationship between the two being complex (Bingimlas and Hanrahan 2010). This may be due to measuring attitudes (beliefs) and behaviors (practices) at differing levels of specificity, thus reducing the potential for correlations (Ajzen 1996). Wilcox-Herzog (2002) suggests the inconclusive relationship between the two may also be due to other potential influences on the link between beliefs and practices, such as situational factors like opportunities or constraints, that are not accounted for in data collection and analysis (as in Stipek and Byler 1997). Further, there is some evidence that teacher beliefs are more developmentally appropriate than their practices (Charlesworth et al. 1993; McMullen 1999). Similarly, evidence suggests that a teacher's personal practical knowledge determines his/her decisions rather than the child development and learning theory (Spokek 1987). In spite of mixed evidence regarding the extent of influence of teacher beliefs on their practice, understanding the influence of teacher beliefs on practice allows for greater insight into both the teaching process (Aguirre and Speer

2000) and teachers' professional development needs (Bingimlas and Hanrahan 2010).

Consequently, Clark and Peterson's Model of Thought and Action (1986) was used to ground this study. While their model reflects a reciprocal relationship between teachers' thoughts (beliefs) and instructional actions (practices), their model incorporates the opportunities and constraints encountered in teaching, as these factors are integral to understanding thoughts and actions. Their model reflects an interplay of thoughts (beliefs), actions (practices), and constraints and opportunities, each influencing and being influenced by the others. As noted in Chakravarthi (2009), this model can be applied to the outdoor teaching environment, and subsequently was used in her study of teachers' beliefs and practices in outdoor settings. Clark and Peterson's Model of Thought and Action (1986) also is useful in thinking about how to encourage and support early childhood educators in the provision of nature experiences for their students. Stemming from this model, strategies might include influencing early childhood educators' beliefs regarding natural outdoor settings and nature experiences, as well as reducing barriers to accessing these settings and opportunities.

Research objectives

In spite of extensive literature on the general relationship between teacher beliefs and teaching behaviors, fewer studies have examined the relationship between teachers' beliefs and practices in the context of natural outdoor settings (Chakravarthi 2009). Consequently, the purpose of this study was to explore early childhood educators' beliefs and practices regarding natural outdoor settings, as well investigate predictors of and barriers to the educational use of these settings. Specifically, the following research questions were addressed:

- (1) What are early childhood educators' beliefs regarding natural outdoor settings as learning environments? What are their beliefs regarding their relationship to nature?
- (2) Are their beliefs related to frequency of use of natural outdoor settings as learning environments, and if so, which best predicts their frequency of use of natural outdoor settings as learning environments?
- (3) What do they perceive as barriers to use of natural outdoor settings as learning environments within early childhood education?

The environmental education community, working with the early childhood teacher education community, can use this understanding of beliefs and practices to guide the development and provision of professional development, programming for young children at nonformal sites, and other capacity-building efforts to encourage use of natural outdoor settings and nature experiences in early childhood education.

Methods

Participants

Participants consisted of 46 early childhood educators in center-based early childhood education programs (in the US, these include preschools, childcare centers,

and Head Start programs, as opposed to family-based or in-home childcare providers) in a city in northern Minnesota. Northern Minnesota is noted for its abundance of natural resources, and this particular city in Northern Minnesota is known for its green space and natural resource-based outdoor recreation opportunities.

Two recruitment strategies were used to invite participants. The school district maintains a list of 50 childcare centers, preschools, and Head Start providers that is shared with parents during early childhood screenings, as well as being publicly available. All providers on this list received an invitation to participate. Thirty-three participants were recruited through this strategy. The remaining 13 participants were recruited through the university located in the same city, which has a program for practicing early childhood educators with associate degrees who are working toward a bachelor's degree in early childhood education (program enrollment was 13, and all elected to participate). Thus, all study participants had at least a two-year post-secondary degree in early childhood education. Demographic data regarding gender and ethnicity were not collected, as this was not the focus for this study and there was limited variation on these two variables within the accessible population for this study.

Research instrument

The research instrument was a self-administered questionnaire. Natural outdoor settings were defined for participants as outdoor environments that range from relatively natural to wild, in contrast with maintained or developed spaces, such as mowed grassy areas, landscaped park settings, or playgrounds. Participants were also asked to respond in the context of the preschool-aged children (typically three- and four-year olds), anticipating that responses would differ if the context included infants and toddlers and/or older children (five through eight-year olds, which still fall within the early childhood designation within the US).

Beliefs regarding natural outdoor settings as learning environments were measured by asking participants to rate the extent to which they agreed or disagreed with statements regarding the importance of experiences in natural outdoor settings on young children's cognitive, social, and physical development and on young children's development of an appreciation for the environment. This section also asked participants to rate their belief regarding experiences in the natural outdoor environment belonging within early childhood education settings. These items used a five-point response format, ranging from one (strongly disagree) to five (strongly agree). Belief regarding difficulty in using natural outdoor settings was measured using one item that asked participants to rate on a scale of one to five (very easy to very difficult) how difficult they believed it to be to use natural outdoor settings with the young children in their early childhood education settings.

Belief regarding their relationship to nature was measured using the 21 items of the Nature Relatedness Scale (Nisbet, Zelenski, and Murphy 2009), used with permission of the authors. This scale is designed to assess the affective, cognitive, and physical relationship individuals have with the natural world. The response format for these items is a scale of one to five, with one indicating strong disagreement and five indicating strong agreement. Research to establish the construct validity of this scale indicated those with higher scores on this scale (higher levels of nature relatedness) reported spending more time in the natural environment, more concern for the environment, and more self-reported environmental behavior

(Nisbet, Zelenski, and Murphy 2009). This instrument was selected for the study due to its ability to serve as a quantitative measure of belief regarding relationship to nature and the potential influence of this belief on frequency of use of natural outdoor settings.

Participants' frequency of use of natural outdoor settings was measured through asking them to indicate how often they use these areas with the children in the early childhood education settings. Participants were also asked to respond to how often they used maintained outdoor settings. The response format for these two items included these options: never, rarely (approximately once a year), occasionally (once a month), often (once a week), and very often (daily or almost daily). Finally, participants who indicated using natural outdoor settings to be difficult or very difficult were asked to respond to an open-ended question regarding what they believe to be the primary barrier to using natural outdoor settings within their early childhood education setting.

Procedures

An invitation and consent letter and questionnaire were mailed to the lead educator at each of the 50 early childhood education programs on the list maintained by the school district. In addition to the questionnaire, they received a prepaid mailer for returning the questionnaire and a gift card for an on-line bookstore in the amount of \$5 in advance appreciation for their participation. Responses were received from 33 early childhood educators. Permission was requested from the university's early childhood teacher education faculty to visit the early childhood educators enrolled in the bachelor's degree early childhood education program. All 13 educators consented to participate and received the same materials, but in person rather than through the mail. These early childhood educators were practicing teachers but had associate degrees in early childhood education, with bachelor's degrees in progress.

Results

Beliefs regarding natural outdoor settings as learning environments and their relationship with nature

Participants most strongly agreed that experiences in natural outdoor settings are important for young children's development of environmental appreciation, $M = 4.43$, $SD = 1.28$ (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 natural outdoor settings for children's cognitive, social, and physical development, as well with these experiences belonging within early childhood education (see Table 1). Regarding perceived difficulty, participants believed using these natural outdoor settings to be in between difficult and easy ($M = 3.00$, $SD = 1.41$). Participants average nature relatedness score was 3.80 ($SD = .52$), with possible scores ranging from one (low level of nature relatedness or less strong belief in one's interconnectedness with the natural world) to five (high level of nature relatedness or strong belief in one's interconnectedness with the natural world).

Table 1. Beliefs regarding natural outdoor settings.

	<i>M</i> ^a	SD
Importance of experiences in natural settings for development of environmental appreciation	4.43	1.31
Importance of experiences in natural settings for physical development	4.39	1.31
Importance of experiences in natural settings for cognitive development	4.33	1.30
Importance of experiences in natural settings for social development	4.20	1.28
Experiences in natural outdoor settings belonging in the early childhood education	3.87	1.50

^a1 = Strongly disagree; 5 = Strongly agree.

Relationship between beliefs and use

The mean response regarding how often they used natural outdoor settings was 3.13 (SD = 1.26), corresponding to a rating of occasionally (once a month). They reported using maintained outdoor settings more frequently ($M = 4.28$, SD = 1.13, corresponding to a rating of often or once a week). Of the beliefs measured, only two were significantly related to frequency of use of natural outdoor settings: belief regarding difficulty in using these settings and belief regarding one's relationship with nature (nature relatedness), $r = .83$ and $r = .31$ respectively (see Table 2).

Multiple regression was used to explore which beliefs were significant predictors of use of natural outdoor settings with their preschool-aged students. For this analysis, beliefs regarding importance of experiences in natural outdoor settings for children's cognitive development, social development, and physical development were combined into a single variable to reflect beliefs regarding the importance of these experiences on child development outcomes. The regression model was significant, $F(5, 37) = 19.39$, $p < .001$, with the set of predictors accounting for 72.4% of the variance in frequency of use of natural outdoor settings. There was one significant predictor in the regression model: belief regarding difficulty in using natural outdoor settings, $b = .71$, SE = .08, $<.001$ (see Table 3). The unique contribution of this variable to the model was .84, thus accounting for approximately 69% of the variance in respondents' reported frequency of use of natural outdoor settings. While

Table 2. Relationships between beliefs and use of natural outdoor settings.

	<i>r</i>
Belief regarding importance of experiences in natural outdoor settings for cognitive development	.05
Belief regarding importance of experiences in natural outdoor settings for social development	.05
Belief regarding importance of experiences in natural outdoor settings for physical development	.05
Belief regarding importance of experiences in natural outdoor settings for developing environmental appreciation	.05
Belief regarding experiences in natural outdoor settings belonging in the early childhood education setting	.02
Belief regarding difficulty in using natural outdoor settings	.83*
Belief regarding one's relationship with nature	.31*

* $p \leq .05$.

Table 3. Summary of regression analysis for predictors of respondents' intention to use natural setting with future students.

Variable	<i>b</i>	SE	β	<i>t</i>	<i>p</i>
Belief regarding importance of experiences in natural outdoor settings for child development outcomes	.72	.39	.73	1.87	.07
Belief regarding importance of experiences in natural outdoor settings for development of environmental appreciation	.70	.38	.73	1.82	.08
Belief regarding experiences in natural outdoor settings belonging in the early childhood education setting	.04	.10	.05	.40	.70
Belief regarding difficulty in using natural outdoor settings	.71	.08	.83	9.23	<.001
Belief regarding one's relationship with nature	.25	.21	.11	1.18	.25

Notes: $n = 47$. $R^2 = .72$.

belief regarding one's relationship with nature (nature relatedness) showed a positive correlation with frequency of use of natural outdoor settings, it did not retain a significant influence on use when taken into consideration with the other belief variables.

Barriers to use of natural outdoor settings

To address barriers to use of natural outdoor settings, participants' responses from the open-end questions were coded and frequencies calculated. For participants indicating they found it difficult or very difficult to use natural outdoor settings, the most frequent barrier was lack of walking access to a natural outdoor setting and/or the need for transportation to a natural outdoor setting ($n = 13$). Other barriers were lack of time ($n = 5$), winter weather ($n = 5$), safety concerns ($n = 2$), and lack of extra supervision ($n = 1$).

Discussion and implications

The purpose of this study was to explore early childhood educators' beliefs and practices regarding natural outdoor settings, as well investigate predictors of and barriers to the educational use of these settings. Regarding their beliefs, early childhood educators in this study seem to recognize the value of experiences in natural outdoor settings in terms of developing environmental appreciation within young children, as well as in fostering children's physical, cognitive and social development. This suggests influencing these beliefs through professional development or through more informal awareness-raising campaigns regarding the value of experiences in natural outdoor settings is not needed. Further, these beliefs were not predictive of use of natural outdoor settings, similarly suggesting a lack of need for influencing early childhood educators' beliefs regarding the importance of natural outdoor settings. This finding is consistent with research that has shown teachers' beliefs to be more developmentally appropriate than their practices (Charlesworth et al. 1993; McMullen 1999), as while early childhood educators seemed to recognize the developmental importance of these experiences, they reported using natural outdoor settings occasionally (about once a month). Likewise, Spokek (1987) suggests a teacher's personal practical knowledge determines his/her decisions rather than the child development and learning theory (Spokek 1987). For the early

childhood educators in this study, it may be that while they recognize the value of natural outdoor settings, their prior experience in providing experiences in these settings has led them to a practical knowledge relating to the difficulty in doing so, consequently resulting in only occasional use.

There was slightly less agreement as to experiences in natural outdoor settings belonging within early childhood education. While this may at first seem to suggest the need to address this belief, helping early childhood educators see the alignment among early childhood education pedagogy, development outcomes across multiple domains, and experiences in natural outdoor settings, this belief was not related to early childhood educators' use of natural outdoor settings. Consequently, this also may not be an area in which to invest professional development efforts.

There seemed potential for early childhood educators' own beliefs regarding their relationship with nature to influence or predict use of natural outdoor settings. Sandell, Ohman, and Ostman (2005), for example, suggest teachers' environmental ethical values may influence their teaching. Nisbet, Zelenski, and Murphy (2009) found those with higher levels of nature relatedness reported spending more time in the natural environment; potentially an inclination to spend personal time in the natural environment could transfer over into instructional time in the natural environment. Ernst (2009) found teachers' environmental sensitivity and positive environmental attitudes to be influences on teachers' decision to use an environment-based approach to teaching. The results of this study suggest that belief regarding their relationship to nature was significantly related to frequency of use of natural outdoor settings. However, when this variable was incorporated into an analysis along with other belief values, it no longer retained its significance. Thus, this, too, may not be an area on which to focus professional development efforts.

Instead, this study suggests efforts to encourage the use of natural outdoor settings in early childhood education should focus on reducing perceptions of difficulty in using these settings, as belief regarding difficulty in using natural outdoor settings was the strongest and only significant predictor of frequency of use of natural outdoor settings, when multiple belief variables were incorporated into the analysis. Responses regarding barriers provide insight into how using natural outdoor settings can be made to seem less difficult within early childhood education. The most frequent barrier was lack of walking access to a natural outdoor setting and/or the need for transportation to a natural outdoor setting. Other barriers were lack of time, winter weather, safety concerns, and lack of extra supervision. These barriers are similar to those anticipated by preservice early childhood educators; they also anticipated lack of parent support and accommodating for disabilities to be barriers (Ernst and Tornabene 2012). Likewise, the barriers of lack of walking access and safety concerns were experienced by licensed in-home childcare providers in Ernst (2012); lack appropriate outdoor clothing for children was also a barrier indicated by the in-home childcare providers.

In a city known for its green space, it seems surprising that the most frequent barrier was lack of walking access to a natural outdoor setting. Addressing this barrier might involve helping early childhood educators recognize places on-site or nearby that could be used for nature experiences. Further, additional research is needed to explore their perceptions as to natural outdoor settings to better understand this barrier. It may be that lack of access is really a perceived lack of access. For example, they may have a small unmaintained place in their yard that could be used for an experience in nature, but think they need a much larger space in order

for it to be considered a natural outdoor setting. Further, it seems likely that if lack of walking access to natural outdoor settings is a concern to the early childhood educators in this study, this would be an even stronger barrier for early childhood educators in more urban areas or in areas that lack green space. Thus, environmental educators can support early childhood educators by helping them recognize existing nearby natural outdoor settings or helping them create a small patch of nature on site.

Several of the barriers relate to lacking the ‘know-how’ to provide these experiences in natural outdoor settings. Thus, professional development efforts might include things such as how to reduce the time involved in getting children ready for going outside, how to incorporate these experiences in winter, and how to provide these experiences safely. While this could be accomplished through formal professional development, reducing these barriers could also be facilitated through informal sharing and networking – perhaps an online forum for asking questions, getting answers, and sharing ideas.

In light of the momentum in United States early childhood education toward decreasing playtime as academic demands increase, and the increasing focus on learning outcomes, standards, as assessment, it was anticipated that early childhood educators would mention this as a barrier, similar to the way in which state standards and standardized testing has become a barrier to environmental education in K-12 schools in the United States. Early childhood educators in this study did not mention academic demands as a barrier, perhaps fortunately or perhaps not yet. States in the United States are at different stages in adopting federal initiatives relating to early childhood education reform. It may be that academic demands relating to school readiness and an emphasis on learning standards and assessment will become a stronger barrier to experiences in natural outdoor settings in the future.

Additionally, it was anticipated that safety concerns would be a primary barrier for the early childhood educators in this study. Renick (2009), in her case study of early childhood educators in northern Texas, US, found early childhood educators to display an adherence to rules, thus limiting the outdoor play opportunities they provided. Safety concerns were a barrier to the early childhood educators in this Minnesota study, but not as frequent of a barrier as might be expected, in light of the safety regulations guiding childcare centers and licensed in-home providers, and in light of the NAEYC program accreditation standards described earlier. None of the early childhood educators were from NAEYC-accredited programs, which may explain why safety concerns didn’t appear to be as strong of a barrier. However, in spite of the findings from this study, it seems professional development efforts, as well as advocacy efforts toward philosophy and policy reframing, are needed to reverse the trend toward risk aversion and safety concerns regarding outdoor and nature play.

Gill (2007) writes eloquently about the need for institutions to ‘reject what might be called the philosophy of protection and instead adopt a philosophy of resilience’ (76). Similarly, Keeler (2008) suggests putting challenge and risk back into children’s environments, making them as ‘safe as necessary – not safe as possible’ (281). Gill (2007) describes resilience as an ability to find ways to function in a world where bad things can happen; resilience allows children to grow into adults who feel they have some control over their own destiny. To foster resilience, Gill maintains there must be frequent, unregulated, self-directed contact with people and places beyond family and school within childhood, as well as the chance to learn

from their mistakes. It would seem, then, that if experiences in natural outdoor settings are to take hold in early childhood education, efforts are needed to reorient licensing regulations and program accreditation standards toward greater consideration of the kind and extent of risk associated with natural outdoor settings, as well as the role that exposure to risk plays in a child's learning and development. Rather than discouraging outdoor spaces that contain uneven terrain or a rock or tree stump for fear of children tripping, regulations and accreditation standards oriented toward resilience might guide early childhood educators to recognize the value of an occasional trip over a tree root in helping a young child develop balance or agility and ultimately that sense of being 'alive to the consequences of their actions' (Gill 2007, 84).

Regarding the broader question of the relationship between teacher beliefs and practices in the education literature, this study adds to the body of literature suggesting the relationship between teacher beliefs and practices as a complex one. Chakravarthi, Hatfield, and Hestenes (2009) found moderate correlations between teachers' beliefs and self-reported behaviors relating to outdoor play. In this study, two beliefs (belief regarding the difficulty in using these settings and belief regarding one's relationship with nature) were moderately to strongly related to practice (use of natural outdoor settings). Other beliefs, such as their beliefs regarding the importance of experiences in natural outdoor settings for cognitive, social, and physical development and for developing environmental appreciation and belief regarding experiences in natural outdoor settings belonging in early childhood education settings, were not related to practice.

The lack of clear relationship between beliefs and practice may be due to the difficulty in changing teacher pedagogy. Quinn and Wilson (1997) found teachers to cite lack of teacher time and class time as primary reasons preventing them from putting a new belief into practice. Thus, as teachers are exposed to new teaching ideas, programs, or methodologies and find them favorable, they may change their beliefs to reflect these new ideas without changing their teaching behavior, resulting in espoused beliefs being incongruent with their classroom teaching (Kynigos and Argyris 2004). This signals an opportunity for professional developments relating to using natural outdoor settings to include time for early childhood educators to consider their beliefs and practices together, self-identifying where there is a dichotomy. This also signals a need for future research to examine beliefs and practices in conjunction with one another, differentiating between their espoused theory (their beliefs) and their theory in use. Argyris and Schon (1974) found that a teacher's theory in use is what actually influences his or her teaching actions; this further emphasizes the need for supporting early childhood educators' actual use of natural outdoor settings in ways beyond efforts to change their beliefs regarding these settings.

Wilcox-Herzog (2002) suggests the inconclusive and complex relationship between the two may be due to other potential influences on the link between beliefs and practices, such as situational factors like opportunities or constraints. Stipek and Byler (1997) suggest teachers 'are not always free to implement a program that is entirely consistent with their own beliefs' (308). This seems to be true for beliefs regarding natural outdoor settings and actual use of these settings. Thus, Clark and Peterson's Model of Thought and Action (1986), which reflects an interplay of thoughts, actions, and constraints and opportunities, was used in this study and may be useful in future research as well. In particular, future research might incorporate

not only perceived barriers but strength of perceived barriers to isolate which barriers make using natural settings difficult and which prevent the use of natural settings altogether. In addition, future research might investigate the role of opportunities, exploring what early childhood educators' perceptions of opportunities for natural outdoor settings and how those opportunities have been or could be supported.

Conclusion

There are several important limitations to note when considering the findings from this study. A primary limitation to the study is the way in which use of natural settings was measured (by self-reported v. observed/actual use). As noted in Chakravarthi (2009), there may be discrepancies in teachers' self-reported and observed practices. A second limitation is the relatively small sample from a region of the state that is fairly homogenous in terms of ethnicity, which may limit the generalizability of these findings, particularly in light of literature that suggests culture may influence nature relatedness (Buijs, Elands, and Langers 2009), and in light of some beliefs relating to teaching stemming from teachers' backgrounds and culture (Mansour 2009). Future research might explore a broader sample, geographically and ethnically and/or culturally, to improve generalizability of findings, as well as to investigate the role of culture on beliefs and practices relating to natural outdoor settings in early childhood education. Further, the city from which this data were collected, while known for its green space, has an uneven distribution of green space. Parks in particular are located along streams and along a geographic ridgeline in the city, and often have adjacent neighborhood areas with residents of higher socio-economic status. Actual access to natural outdoor settings was not measured in this study, nor was respondents asked to indicate the location of their childcare center. Thus, it is unclear how this uneven distribution of green space may have influenced respondents regarding lack of walking access to green space, as well as how this uneven distribution of green space may affect use. Because of the importance of perceived difficulty in using natural settings and the identified barrier of lack of walking access and/or transportation to natural outdoor settings, future research should incorporate questions to control for access (and perceived access) to natural areas/green space and potentially socio-economic status of children served, as this variable might be related to barriers such as appropriate outdoor clothing as well as walking access to natural outdoor settings identified in Ernst (2012).

In light of the growing recognition of the need to reconnect children and nature (Wilson 2012), combined with the recognition that experiences during the first six years of children's lives have a profound influence on their future development and lifelong health, learning, and behavior (McCain and Mustard 1999), early childhood environmental education has the potential to make a significant impact on the development of young children and a significant contribution to a sustainable society. Despite the limitations, this study can inform efforts to support the use of natural outdoor settings with young children, as well as guide future research relating to use of natural outdoor settings in early childhood education. Early childhood educators' beliefs regarding the difficulty of using natural outdoor settings is a key insight and integral in guiding future research and professional development efforts. While there may be many areas that need attention and effort in order to make experiences in natural outdoor settings more routine in early childhood education, it seems efforts

to make using these settings seem more feasible to early childhood educators would be a good starting place and a wise investment.

Notes on contributor

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References

- Aguirre, J., and N. Speer. 2000. "Examining the Relationship Between Beliefs and Goals in Teacher Practice." *Journal of Mathematical Behavior* 18 (3): 327–356.
- Ajzen, I. 1996. "The Social Psychology of Decision Making." In *Social Psychology: Handbook of Basic Principles*, edited by E. Higgins and A. Kruglanski, 297–328. New York: Guilford.
- Argyris, C., and D. Schon. 1974. *Theory in Practice: Increasing Professional Effectiveness*. San Francisco: Jossey-Bass.
- Armstrong, T. 2006. *The Best Schools: How Human Development Research Should Inform Educational Practice*. Alexandria, VA: Association for Supervision and Curriculum Development.
- 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: 127–133.
- Bartlett, S. 1997. "No Place to Play: Implications for the Interaction of Parents and Children." *Journal of Children and Poverty* 3: 37–48.
- Bingimlas, K., and M. Hanrahan. 2010. "The Relationship Between Teachers' Beliefs and Their Practice: How the Literature Can Inform Science Education Reformers and Researchers." In *Contemporary Science Education Research: International Perspectives*, edited by M. F. Tasar and G. Cakmakei, 415–422. Ankara: Pegem Akademi.
- 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* 91: 1–11. 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.
- Chakravarthi, S., B. Hatfield, and L. Hestenes. 2009. "Preschool Teachers' Beliefs of Outdoor Plan and Outdoor Environments: Preliminary Psychometric Properties and Implications for Practice." Presentation at the American Educational Research Association Annual Meeting, San Diego, CA.
- Charles, C. 2009. "The Ecology of Hope: Natural Guides to Building a Children and Nature Movement." *Journal of Science Education and Technology* 16: 467–475.
- Charlesworth, R., C. Hart, D. Burts, R. Thomasson, J. Mosley, and P. Fleege. 1993. "Measuring the Developmental Appropriateness of Kindergarten Teachers' Beliefs and Practices." *Early Childhood Research Quarterly* 8 (3): 255–276.
- Chase, R., J. Arnold, L. Schauben, and B. Shardlow. 2005, November. *Childcare Use in Minnesota: 2004 Statewide Household Child Care Survey*. St. Paul, MN: Wilder Research.
- Clark, C., and P. Peterson. 1986. "Teachers' Thought Processes." In *Handbook of Research and Teaching*, edited by M. Wittrock, 255–296. New York: Macmillan.
- Crim, C., B. Desjean-Perrotta, and C. Moseley. 2008, Fall. "Partnerships Gone Wild Preparing Teachers of Young Children to Teach about the Natural World." *Childhood Education*: 6–12.
- Davies, M. 1996. "Outdoors: An Important Context for Young children's Development." *Early Child Development and Care* 115: 37–49.

- Elliott, S. 2010. "Children in the Natural World." In *Young Children and the Environment: Early Education for Sustainability*, edited by J. Davis, 43–75. Melbourne: Cambridge University Press.
- Ernst, J. 2009. "Influences on U.S. Middle School Teachers' Use of Environment-Based Education." *Environmental Education Research* 15 (1): 71–92.
- Ernst, J. 2012. "Early Childhood Nature Play: A Needs Assessment of Minnesota Licensed Childcare Providers." *Journal of Interpretation Research* 17 (1): 7–24.
- Ernst, J., and L. Tornabene. 2012. "Preservice Early Childhood Educators' Perceptions of Outdoor Settings as Learning Environments." *Environmental Education Research* 18 (3): 643–665.
- Espinosa, L. 2002, November. "High-quality Preschool: Why We Need It and What It Looks Like." *Preschool Policy Matters* 1: 1–11.
- Ewert, A., G. Place, and J. Sibthorp. 2005. "Early-life Outdoor Experiences and an Individual's Environmental Attitudes." *Leisure Science* 27: 225–239.
- 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 (2): 111–117.
- Fjortoft, I. 2004. "Landscapes as Playscape: The Effects of Natural Environments on Children's Play and Motor Development." *Children, Youth and Environments* 14 (2): 21–44.
- Fjortoft, I., and J. Sageie. 2000. "The Natural Environment as a Playground for Children." *Landscape and Urban Planning* 48 (1/2): 83–97.
- Gandini, L. 1998. "Educational and Caring Spaces." In *The Hundred Languages of Children: The Reggio Emilia Approach – Advanced Reflections*, edited by C. Edwards, L. Gandini and G. Foreman, 161–178. Greenwich, CT: Ablex.
- Gill, T. 2007. *No Fear: Growing Up in a Risk Adverse Society*. London: Calouste Gulbenkian Foundation.
- Haney, J., C. Czerniak, and A. Lumpe. 1996. "Teacher Beliefs and Intentions Regarding the Implementation of Science Education Reform Strands." *Journal of Research in Science Teaching* 33: 971–993.
- Hüttenmoser, M. 1995. "Children and Their Living Surroundings: Empirical Investigations into the Significance of Living Surroundings for the Everyday Life and Development of Children." *Children's Environments* 12: 403–413.
- Iozzi, L. 1989. "What Research Says to the Educator: Part Two: Environmental Education and the Affective Domain." *Journal of Environmental Education* 20 (4): 6–13.
- Keeler, R. 2008. *Natural Playscapes: Creating Outdoor Play Environments for the Soul*. Redmond, WA: Exchange Press.
- Korpela, K. 2002. "Children's Environments." In *Handbook of Environmental Psychology*, edited by R. B. Bechtel and A. Churchman, 363–373. New York: Wiley.
- Kynigos, C., and M. Argyris. 2004. "Teacher Beliefs and Practices Formed during an Innovation with Computer-based Exploratory Mathematics in the Classroom." *Teachers and Teaching* 10 (3): 247–273.
- Laughlin, L. 2010. *Who's Minding the Kids? Child Care Arrangements: Spring 2005/Summer 2006*. Current Population Reports, P70–121. Washington, DC: U.S. Census Bureau.
- Lester, S., and M. Maudsley. 2007. *Play, Naturally: A Review of Children's Natural Play*. London: National Children's Bureau.
- Louv, R. 2005. *Last Child in the Woods: Saving Our Children from Nature-deficit Disorder*. New York: Algonquin Books.
- Mansour, N. 2009. "Science Teachers' Beliefs and Practices: Issues, Implications and Research Agenda." *International Journal of Environmental & Science Education* 4 (1): 25–48.
- McCain, M., and J. Mustard. 1999. *Early Years Study: Reversing the Real Brain Drain*. Toronto, ON: Publications Ontario.
- McCain, M. J. Mustard, and K. McCuaig. 2011. *Early Years Study 3: Making Decisions, Taking Action*. Toronto: Margaret & Wallace McCain Family Foundation.
- McMullen, M. 1997. "The Effects of Early Childhood Teacher Education on Self-perception and Beliefs about Developmentally Appropriate Practices." Paper presented at the IAEYC Conference, Indianapolis, IN.

- McMullen, M. 1999. "Characteristics of Teachers Who Talk the DAP Talk and Walk the DAP Walk." *Journal of Research in Childhood Education* 13 (2): 216–230.
- Miller, D., K. Tichota, and J. White. 2009. *Young Children Learn through Authentic Play in a Nature Explore Classroom*. Lincoln, NE: Dimensions Foundation.
- Moore, R. 1986. *Childhood's Domain: Play and Place in Child Development*. London: Croom Helm.
- Moore, R. 1996. "Compact Nature: The Role of Playing and Learning Gardens on Children's Lives." *Journal of Therapeutic Horticulture* 8: 72–82.
- Moore, R., and C. Cooper-Marcus. 2008. "Healthy Planet, Healthy Children: Designing Nature into the Daily Spaces of Childhood." In *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life*, edited by S. Kellert, J. Heerwagen and M. Mador, 153–203. Hoboken, NJ: Wiley.
- NAEYC (National Association for the Education of Young Children). 2008. *Overview of the NAEYC Early Childhood Program Standards*. Accessed April 18, 2013. www.naeyc.org/academy.
- National Resource Center for Health and Safety in Child Care and Early Education. 2011. *State Childcare Licensure Regulations*. Accessed October 10, 2012. <http://nrckids.org/STATES/states.htm>.
- 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: 715–740.
- Pajares, F. 1992. "Teachers' Beliefs and Educational Research: Cleaning Up a Messy Construct." *Review of Educational Research* 62: 307–332.
- Phenice, L., and R. Griffiore. 2003. "Young Children and the Natural World." *Contemporary Issues in Early Childhood* 4 (2): 167–178.
- Quinn, R., and M. Wilson. 1997. "Writing in the Mathematics Classroom: Teacher Beliefs and Practices." *The Clearing House* 71 (1): 14–21.
- Renick, S. 2009. "Exploring Early Childhood Teachers' Beliefs and Practices about Preschool Outdoor Play: A Case Study." Unpublished doctoral dissertation, Texas Women's University, Denton.
- Richardson, V. 1994. *Teacher Change and the Staff Development Process*. New York: Teachers College.
- 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.
- Sebba, R. 1991. "The Landscapes of Childhood." *Environment and Behavior* 23 (4): 395–422.
- Shonkoff, J., and D. Phillips, eds. 2000. *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, DC: National Academy Press.
- Smylie, M. 1988. "The Enhancement Function of Staff Development: Organizational and Psychological Antecedents to Individual Teacher Change." *American Educational Research Journal* 25 (1): 1–30.
- Sobel, D. 2008. *Childhood and Nature: Design Principles for Educators*. Portland, ME: Stenhouse.
- Spokek, B. 1987. "Thought Processes Underlying Preschool Teachers' Classroom Decisions." *Early Child Development and Care* 29 (2): 197–208.
- Stipek, D., and P. Byler. 1997. "Early Childhood Education Teachers: Do They Practice What They Preach?" *Early Childhood Research Quarterly* 12: 305–325.
- Strickland, D., and S. Riley-Ayers. 2006, April. "Early Literacy: Policy and Practice in the Preschool Years." *Preschool Policy Brief* 10: 1–12.
- Tandon, P., C. Zhou, and D. Christakis. 2012. "Frequency of Parent-supervised Outdoor Play of U.S. Preschool-aged Children." *Archives of Pediatrics and Adolescent Medicine* 166 (8): 707–712.
- Tilbury, D. 1994. "The Critical Learning Years for Environmental Education." In *Environmental Education at the Early Childhood Level*, edited by R. A. Wilson, 11–13. Washington, DC: North American Association for Environmental Education.

- US Department of Education. 2012. Race to the Top: Early Learning Challenge. Accessed April 1, 2013. <http://www2.ed.gov/programs/racetothetop-district/>.
- Wells, N. 2000. "At Home with Nature: Effects of "Greenness" on Children's Cognitive Functioning." *Environment and Behavior* 33: 775–795.
- Wells, N., and G. Evans. 2003. "Nearby Nature: A Buffer of Life Stress Among Rural Children." *Environment and Behavior* 35 (3): 311–330.
- Wilcox-Herzog, A. 2002. "Is There a Link Between Teachers' Beliefs and Behaviors?" *Early Education and Development* 13 (1): 81–106.
- Wilson, R. 1996. *Starting Early: Environmental Education during the Early Childhood Years*. ERIC Digest, ED 402147. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education.
- Wilson, R. 2012. *Nature and Young Children: Encouraging Creative Play and Learning in Natural Environments*. London: Routledge.

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