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Addressing Policy, Practice, and Research That Matters
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IJECEE Special Issue Call for Abstracts

Sustainable Development Goals and Early Childhood Environmental Education: Awareness, Understanding, and Transformation

Victoria Carr

Sue Elliott

Eva Ärlemalm-Hagsér

Special Issue Editors

The 17 Sustainable Development Goals¹ and their 169 associated and integrated targets adopted by all members of the United Nations in 2015 have received scant attention in the early childhood sector, particularly within the United States of America. Yet, while the scope of the SDGs may be daunting, their interconnectedness with early childhood appears obvious as the goals are targeted to facilitate human equity and well-being, plus societal aspirations alongside minimization of environmental impacts. More specifically, early childhood environmental education may be where SDGs can be distilled into theoretical, transformational, and relational practices that serve as models for lifelong learning. Pathways that transform socio-environmental-economic systems begin early and as the Earth is at a critical tipping point for loss of biodiversity and climate change, it is essential that progress toward these goals be accelerated. Therefore, this special issue of IJECEE aims to increase awareness of the SDGs through a collection of articles that may include position papers, field reports, research papers, and evaluation studies that address the SDGs and how they may be embedded within environmental education. Lessons learned from global efforts may promote our collective awareness and understandings of the SDGs and their implementation in early childhood environmental education. Examples of manuscript topics related to the SDGs and environmental education might include (but are not limited to) the following:

- Advocacy
- Approaches to learning
- Child agency
- Children's perspectives
- Children's rights
- Climate action
- Critique of SDGs
- Cultural and local approaches to implementing SDGs
- Curriculum or curriculum analyses and SDGs
- Educator professional learning

Family involvement
Global partnerships
Health and Nutrition
Inclusive and equitable learning opportunities
Peace education
Pedagogy
Policy-making
Poverty
Research methodologies
School, center, or program-wide initiatives
Theoretical perspectives
Values and/or world views

Procedures

Email your abstract or manuscript proposal to IJECEE.SDG@gmail.com by October 1, 2020. Invitations for full manuscripts will be sent by November 1, 2020. Manuscripts selected for inclusion in the special issue will be due January 30, 2021. For additional author guidelines, please visit the journal's website: <https://naturalstart.org/research/ijecee>

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¹ For more information about Sustainable Development Goals, see https://unfoundation.org/what-we-do/issues/sustainable-development-goals/?gclid=EAlaIQobChMI1r7AgerW6AIVCf_jBx3FmQ0CEAAYASAAEgLUg_D_BwE

Supporting School Readiness Naturally: Exploring Executive Function Growth in Nature Preschools

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Submitted June 30, 2019; accepted February 14, 2020

ABSTRACT

This study utilized the Minnesota Executive Function Scale to quantitatively explore the influence of nature preschools on executive function skills, which are a critical component of school readiness. Executive function skills are malleable skills that allow goal setting and follow through, skills that determine success in school and beyond. Four nature and two non-nature preschools participated in the study. These six preschools shared a child-centered, play-based approach toward supporting holistic development across the domains. The primary difference between the nature and non-nature preschools was in the proportion of the day spent outdoors and the location of the outdoor play time (in nature v. in maintained outdoor settings). Results suggest significant executive function skill growth among the nature preschool participants; this growth was similar to that observed in the non-nature preschool participants. Additionally, children across the nature and non-nature preschools had growth in executive function skills that exceeded what would be expected in typically developing children. Implications for further research are discussed.

Keywords: executive function skills, nature preschool, school readiness

Splashing in puddles, creating confections out of mud, and experiencing the natural world with all of one's senses are experiences that are rapidly diminishing from childhood. Concerned early childhood educators have designed nature-based programs that allow young children to experience the freedom and wonder of the outdoors. The number of nature preschools operating in the United States is at an all-time high and steadily growing, with a 66% increase in nature preschools and forest kindergartens between the years of 2016 and 2017 (NAAEE, 2017). However, nature preschools have yet to be embraced as mainstream. There is often a tendency in the United States to position child development as a race and children as something that need to be "readied" for school, a movement that has "academified" early learning in order to support the standards-based accountability movement in K-12 schools. For example, the U.S. Department of Education's Office of Early Learning (2017) has several key initiatives underway. One focuses on early literacy, emphasizing effective reading instruction to ensure students read on grade level by third grade. Another set of initiatives focuses on screening and assessment, with guidance for comprehensive early learning assessments and recommendations to help educators effectively use data to monitor students' academic progress and evaluate instructional practices. In the landscape of early learning, nature preschools evolved as a counter movement to viewing development as a race. Further research is needed to promote the transfer of the pockets of implementation into mainstream, routine use.

Due to concerns regarding the ability of nature preschools to prepare children academically for Kindergarten, a concern that has limited widespread acceptance of nature preschools, this study explored nature preschoolers'

growth of executive functions skills, as they are a critical component of school readiness. Executive function (EF) skills are the attention-regulation skills that allow conscious and goal-oriented planning. The subset of skills involved includes working memory, cognitive flexibility and inhibitory control. These skills are highly predictive of academic achievement (Ackerman & Friedman-Krauss, 2017; Zelazo, Blair & Willoughby, 2016; Moreno, Schwayder, & Friedman, 2016). While executive function skill development is essential to a preschooler's future academic success, the development of these skills coupled with a love for nature could also support the next generation in their effort to achieve sustainability goals. The purpose of this study was to compare the growth in executive function skill development over the course of a school year between children attending nature preschools and children attending non-nature preschools.

REVIEW OF LITERATURE

Nature preschools offer high-quality early childhood curriculums that put nature at the heart of the program and use children's interests and seasonal changes to guide daily experiences in nature (NAAEE, 2017). Nature preschools typically differ from traditional or non-nature preschools in several ways. Nature preschoolers often spend more than half of their class time outdoors, in settings that range from maintained natural playscapes to hundreds of acres of wild natural space (Larimore, 2011; Sobel, 2014). Forest schools are sometimes misconstrued as synonymous with nature preschools as the philosophies of the two are similar. Nature preschool programs are typically defined as licensed programs that include indoor classroom space where nature has been infused, whereas a forest school may have no indoor space at all, or provide something very minimal such as a yurt for severe weather (Sobel, 2014; Larimore, 2016). The nature preschool setting and philosophy encourages more child-directed decision making and risk-taking than a non-nature preschool typically does. Further, a nature preschool class period is predominantly devoted to free or guided play as opposed to teacher-led instruction. This last component is not unique to nature preschool; many preschool programs implement free play in their curriculum both indoors as well as outdoors. However, the combination of daily and sustained time periods of free play in *natural* outdoor spaces is unique to nature preschools.

Executive function (EF) skills are the attention-regulation skills that allow conscious planning and the ability to work towards goals. Based on the findings of recent brain imaging studies, executive function skills are comprised of a set of subskills: working memory, cognitive flexibility, and inhibitory control (Zelazo, Blair & Willoughby, 2016). Working memory involves keeping some piece of information in mind while (usually) manipulating it in some way, for example remembering to raise your hand and wait to be called on before giving an answer. Cognitive flexibility involves thinking about something from multiple perspectives, for example, considering someone else's point of view in a disagreement. Inhibitory control is the process of consciously suppressing attention (and subsequent response) to a stimulus, for example, focusing on the teacher when peers are causing distractions (Zelazo et al., 2016; Ackerman & Friedman-Krauss, 2017).

Executive function skills are critical, as they are the foundation for learning, follow through, and goal achievement. Executive function skills support higher-level cognitive processes, such as goal-directed problem solving, and are directly related to self-regulation (Marcovitch, Jacques, Boseovski & Zelazo, 2008). Along with the reflective processes that underlie them, executive function skills allow for more engaged, active, and reflective forms of learning (Marcovitch, et al., 2008). These skills are separate from IQ, and a better predictor of academic outcome than IQ. IQ is a construct that is considered to be more "fixed" while executive function skills can be taught, learned and developed (Executive Functioning Assessments, 2017). Over the past decade, executive function skills have emerged as critical predictors of developing positive approaches to learning and therefore school readiness (socially and academically), as well as academic performance at school entry and long-term (Barker et al., 2014; Vitiello and Greenfield, 2017). In a 2013 study, executive function skills were shown to significantly contribute to emergent literacy, mathematical, and orthographic (e.g. word recognition, phonological awareness) knowledge (Shaul and Schwartz, 2013). Further, greater executive function skills in children are shown to be associated with higher involvement in learning opportunities and social learning interactions, and less occurrences of disruptive behaviors in a school setting. These were related to making greater gains in pre-literacy and mathematics (Nesbitt, Farran, and Fuhs, 2015).

Suboptimal circumstances may play a role in executive function development. Studies have shown a relationship between socioeconomic status and executive functioning in childhood, where children from lower SES households also showed lower EF functioning (Lawson, Hook & Farah, 2017). Prenatal and child health issues can also negatively affect the development of EF skills (Ackerman & Friedman-Krauss, 2017). Research suggests that children with low levels of executive function skills grow to have poorer health, social, and economic outcomes when they reach adulthood (Moffitt et al., 2011).

Brain development during early childhood occurs at an unprecedented rate, and the development of executive function skills is no exception. Executive function skills are housed in the prefrontal cortex; the malleability of this area of the brain is heightened in early childhood and once again in early adolescence. Heightened malleability during these time periods of life means that experiences have a more powerful impact on the wiring of the brain than during other periods of the lifespan. This elevated level of malleability underscores the importance and influence of experiences at these times (Center on the Developing Child, 2011).

Much of the work investigating experiences that support executive function skills has involved adult-led, targeted training or interventions, where children practice a particular executive function skill while the adult provides guidance and feedback (Barker, et al. 2014). These appear to be successful in fostering externally-driven executive function, with children making improvements in their ability to carry out the goal-directed behavior when instructed on what behavior to do and when (Holmes, Gathercole & Dunning, 2009). Longer-term interventions also have been implemented within preschools through curriculum designed to practice these skills through games and activities, scaffolded activities integrated into the daily routine, and even comprehensive, full day curriculum programs, such as *Tools of the Mind* (Diamond, Barnett, Thomas & Munro, 2007). Diamond and Lee (2011) suggest more holistic approaches that address emotional, social, and physical development alongside executive function skills are likely more effective than interventions solely focused on executive function skills. More recent research has uncovered a relationship between self-directed executive functioning and amount of time spent in structured activities. Barker, et al. (2014) found that when young children's daily schedule had less structure, they had higher levels of executive functioning, even when controlling for age, verbal ability, and household income. Recent research by White et al. (2017) suggests a relationship between symbolic skills and executive functioning, with tentative implications for pretend role-play as a means for supporting executive function skill development through helping children learn to adopt a new way of thinking about a task or problem at hand.

Play is the vehicle of learning in early childhood, and thus having a focus on play is fundamental to any curriculum that is developmentally appropriate for preschool (Brussoni, Olsen, Pike & Sleet, 2012). Nature play (freely chosen, unstructured, and open-ended playful interactions with and in nature) is a feature of nature preschools. Nature play provides children with open-ended unstructured time, and thus much of children's time in nature preschools is spent in unstructured rather than structured activities. Further, nature preschools typically view children as capable decision-makers and encourage autonomy, especially through allowing them to lead play and learning rather than the teacher's direct instruction using the majority of the class time. Studies have shown that when influential adults, such as parents, allow children to have agency and control over some decisions, executive function skills can thrive (Meuwissen and Carlson, 2015). Thus, these aspects – amount of unstructured time and opportunities to be autonomous decision-makers through child-initiated, free play – may also be supporting executive function skill development.

The composite effect of a play-based curriculum in a natural environment may positively influence executive function development in nature preschool participants, grounded in the unique experiences participants are afforded through interactions with and in nature. A space devoid of typical plastic toys and metal playground equipment yet replete with natural loose parts organically encourages imaginative, pretend play (Banning and Sullivan, 2011). Imaginative play often involves the components of executive function; a child must remember the storyline they are imagining, switch their mindset when others take on characters or objects take on new purposes, and inhibit the reflex to behave in their typical manner (Moreno et al., 2016). In addition to the abundance of loose parts, natural settings afford diverse and expansive opportunities for young children to take appropriate risks, set their own goals, problem-solve, and choose roles and activities that produce feelings of competence. While child-initiated play in an indoor setting or on a playground might allow for some of this, it seems possible that the

opportunities for these experiences are even greater in nature, as the boundaries, variety, and holistic challenges are likely to be more authentic and extensive.

Carr, Brown, Schlembach & Kochanowski (2017) investigated the influence of nature playscape affordances on children's executive function skills by identifying examples of goal-directed and focused problem-solving during children's free play in nature playscapes. Through their research, they found evidence of inhibitory control, flexibility, working memory, as well as initiation, planning and organization, and monitoring, speculating that well-designed nature playscapes, with the opportunities for problem-solving, risk-taking, and using natural loose parts, encourage and potentially even enhance executive function skills. Thus, it may be that outdoor natural environments are actually more conducive than indoor environments to the kind of play that supports the development of executive function skills.

METHODOLOGY

Research Purpose and Overarching Design

The exploratory study at hand investigated executive function skill growth in children attending nature preschools. It was speculated, building upon Carr's (2017) research, that nature preschoolers would not only grow in their executive function skills, but that the growth would exceed that seen in non-nature preschool participants, due to the affordances of natural settings as places for unstructured play. Three research questions were addressed in this study:

- 1) Do executive function skills significantly increase from the beginning to the end of the school year in participants attending a nature preschool?
- 2) Is the growth in executive function skills seen in nature preschools participants over the course of the school year greater than the growth seen in non-nature preschool participants?
- 3) Is the executive function growth seen in nature preschool participants different than growth expected from typical, cognitive maturation?

This exploratory study was undertaken during the 2017-2018 academic year using a pretest-posttest non-randomized comparison group design. Four nature preschools in northern Minnesota, U.S., served as the treatment group, and two non-nature preschools in northern Minnesota, U.S., served as the comparison group. At each of these four nature preschools, there was a lead teacher who had been at that particular nature preschool since its inception. A child-directed approach was used at all four of these nature preschools to support development and learning across the domains, with the majority of time spent outdoors in nature play, regardless of weather conditions (approximately four to five hours daily of play in and with nature for the full day programs, and for half-day preschoolers, two to three hours). All four utilized a combination of natural settings for nature play, including unmaintained ("wild") natural settings, natural spaces that were minimally managed for nature play, and natural playscapes designed specifically for nature play. Each had indoor areas that were used minimally throughout the day; one-half to two hours were spent indoors, with the majority of that time in free play, and approximately 30 minutes of that time in teacher-led, playful learning experiences. There was a total of 78 participants from these four nature preschools, and participants had a mean age of 58 months.

While the intent was to include four non-nature preschools in the control group, it was difficult to find non-nature preschools who were willing to participate. The two non-nature preschools were selected based on their willingness to participate, and due to being located in a similar geographic location, having a similar tuition structure, and being of a similar demographic make-up. One of the non-nature preschools was administered by the local university, and the other was affiliated with a local parochial elementary school. Both non-nature preschools had experienced and stable teachers, with a responsive care-giving style. The guiding philosophy at both non-nature preschools emphasized child-directed play for supporting cognitive, social, emotional, and physical development, with the majority of time spent indoors in free or loosely guided play (four to five hours), with about one hour daily of teacher-led playful learning. Children at both non-nature preschools had one to two hours of daily outdoor playtime (weather permitting) in a maintained outdoor space that contained playground equipment. Tuition for the non-

nature preschools was similar to the costs associated with the nature preschools (with none of the 6 preschools receiving public or governmental funding), and therefore it was assumed that participants across the nature and non-nature preschools were relatively similar in terms of economic background, as well as similar in terms of age. Participants were also similar in terms of gender. In the nature preschools, 45% of the participants were female and 55% were male. In the non-nature preschools, 48% were female and 52% were male. There was little ethnic and racial diversity across non-nature preschools, with the majority of participants being Caucasian, which was similar to the nature preschools. (Permission to collect data on ethnicity and racial backgrounds was not sought, due to the lack of variation among participants). There was a total of 44 participants in the two control preschool programs, with a mean age of 57 months. Data regarding gender has been incorporated into Table 2.

Thus, participants across the preschools shared similar demographic characteristics and experienced caring and responsive teachers and a child-centered, play-based, developmentally-appropriate preschool program that aimed to support holistic development across the domains. The primary difference between the nature and non-nature preschools was in the proportion of the day spent outdoors and the location of the outdoor play time (in nature v. in maintained outdoor setting). These shared characteristics allowed for exploring the potential influence of sustained *nature* play (child-initiated play that takes place in and with nature) on executive function skills, beyond what one might expect to see from a high quality, play-based non-nature preschool program. These shared characteristics allowed for testing the hypothesis of unstructured play in natural outdoor environments being more conducive to executive function skill development.

Instrument

The instrument used was the Minnesota Executive Function Scale (MEFS), a tool developed in 2014 that measures executive function in young children through adults. The tool was based upon the Dimensional Change Card Sort, a measurement tool that has been used in hundreds of executive function studies (Carlson and Zelazo, 2016). The tool was created by the same researchers that created the NIH Toolbox, an executive function assessment available as a medical app “not intended for use outside of clinical application.” The MEFS was chosen for its uniqueness in that it can be used with children as young as two years old and takes only an average of four minutes to administer. Due to the range of data suggesting the convergence of EF skills in early childhood, the MEFS produces an executive function skills total score, rather than three distinct scores for the domains of cognitive flexibility, inhibitory control, and working memory (Zelazo et al., 2016; Executive Functioning Performance Tests, Assessments Apps, 2017; Steenbergen-Hu, Olszewski-Kubilius, & Calvert, 2017). Participants’ scores can be compared to current norms of EF development based on age of participant.

While relatively new, the MEFS has shown to be reliable and valid as a measurement tool. Test-retest reliability of the instrument is 0.93. The iPad program directs the measurement, so the administrator does not introduce subjectivity into MEFS scores. Validity has been established in several ways. First, the MEFS is significantly correlated with other commonly used research measures of EF (such as the NIH Toolbox Battery of EF Measures often used for clinical purposes). The MEFS does not show a strong correlation with IQ, suggesting it is measuring EF rather than intelligence (Executive Functioning Performance Tests, 2017).

Procedures

Prior to administering the pretest, Institutional Review Board approval was obtained and consent forms were distributed to guardians of the children enrolled in the six participating preschools. Children with parental consent for participation were included in the data collection. Pre-test data was collected September 2017 and post-test data was collected in late April of the same school year.

The researcher was trained by the test publisher, Reflection Sciences, to use the MEFS and subsequently administered the MEFS using an iPad. The program comes in the form of an app, which must be downloaded on a regular size tablet. The MEFS starts each individual on the testing level corresponding with his or her age. Participants are required to sort (by dragging) virtual cards on the iPad screen to virtual boxes according to certain rules. Executive function is employed when the child must keep current sorting directions in mind, flexibly switch sorting

behavior when instructions are changed, and inhibit the reflex of sorting in the same way as previously. Each child will advance to the next level if the current level is passed, and he or she will continue advancing until failure of a full level. If a child fails his or her starting level, the program will automatically switch to an easier level until current level of functioning is reached. Each participant’s performance is scored automatically and compiled into an Individual Score Report.

Testing occurred by the researcher taking each participant aside separately, to a spot that was within view and earshot of the participant’s teacher, but that was out of the way of the other children and as minimally distracting as possible. The researcher invited the child to sit next to her with the iPad on a table or other surface directly in front of the child. Testing happened at different points of the day, and participants were tested indoors or outdoors based on the current location of their class. The researcher selected the child’s pre-loaded profile (containing ID number, age, and gender) on the MEFS app. The researcher then proceeded to select a starting level preselected by the MEFS app based on each participant’s age. The researcher then read each line that appeared on the screen and demonstrated the card sorting tasks on the activity as trained by Reflection Sciences. When it was the participant’s turn to sort cards, the researcher did not indicate which box it should be sorted into, nor were any verbal or nonverbal praise cues given during test trials. If a child said they did not want to play anymore, they were urged by the researcher to play a bit longer, as suggested by Reflection Sciences. As the MEFS takes only an average of 4 minutes to administer and is quite engaging being on an iPad and narrated by the researcher, this issue arose infrequently over the course of testing. Every participant was willing to complete the entire activity once they began.

RESULTS

General linear modelling (test of within-subjects effects) was used to investigate if there was significant growth in nature preschoolers’ executive function skills from beginning to end of school year, using age, gender, and prior participation as covariates in the model (Research Question 1). Results suggest significant executive function skill growth ($F(1,74) = 45.51, p < .001$) in the nature preschool participants across the school year, with a large treatment effect ($\eta^2 = .38$). Unadjusted pretest and posttest means, as well as the adjusted posttest mean (taking into consideration age, gender, and whether they had attended the preschool the previous year) are reported in Table 1.

Table 1

Comparison of Pretest and Posttest Executive Function Means and Standard Deviations and Adjusted Posttest Means for Nature and Non-Nature Preschools

	Pretest M (SD)	Posttest M (SD)	Adjusted Posttest M (Std. Error) ¹
Nature	41.78 (14.89)	51.46 (14.57)	50.86 (1.29)
Non-Nature	38.54 (14.40)	48.66 (14.99)	49.72 (1.73)

¹ Adjusted for the covariates of pretest, age, gender, and prior participation

Research Question 2 addressed whether there was more growth in EF seen in nature preschoolers over the school year than non-nature preschoolers. General linear modelling (univariate analysis of covariance) was used to investigate the difference between the nature preschool and non-nature preschool participants’ posttest level of executive function skills, when controlling for pretest level, age, gender, and prior participation (did nature preschoolers have higher posttest levels of executive function skills than non-nature preschoolers, after controlling for pretest, age, gender, and prior participation). Duration of participation (full day v. half day; partial week v. full week) was not used as a covariate, due to multicollinearity with the levels of the treatment variable (great degree of overlap in information represented in the levels of the treatment – the individual preschool programs – and duration of participation). Because the only preschool with half-day participation was a nature preschool, and the only full day, every day preschool was a non-nature preschool, the analysis would be a conservative estimate of growth in nature preschoolers relative to their non-nature counterparts. Unadjusted pretest and posttest means, as

well as the adjusted posttest means, are reported in Table 1. The results of the analysis of covariance suggests a significant model, $F(5) = 18.13$, $p < .001$, with age and pretest being the significant variables in the model ($p < .01$ and $p < .001$ respectively). The pairwise comparison of adjusted posttest means indicated a mean difference of 1.14 points (Standard Error of 2.18) and no significant difference between the nature and non-nature participant posttest levels, after adjusting for age, gender, prior participation, and pretest level ($F(1) = .28$, $p = .60$, $\eta p^2 < .01$). This suggests nature preschool participants did not have higher posttest levels of executive function skills than non-nature preschool participants; there was similar growth in executive function skills during the school year for participants in the nature preschools and non-nature preschools.

Table 2. Comparison of Pretest and Posttest Executive Function Means and Standard Deviations and Adjusted Posttests Means by Preschool Site

	Pretest M (SD)	Posttest M (SD)	Age at Posttest	Adjusted Posttest M (Std. Error) ¹
Nature Preschool A ²	41.52 (20.64)	54.42 (17.60)	58.10 months	53.64 (2.60)
Nature Preschool B ³	34.27 (14.92)	43.80 (14.59)	53.53 months	48.37 (2.99)
Nature Preschool C ⁴	46.52 (10.92)	55.40 (14.06)	62.20 months	51.13 (2.56)
Nature Preschool D ⁵	41.74 (10.59)	49.37 (9.21)	55.37 months	49.54 (2.64)
Non-Nature Preschool E ⁶	38.81 (16.75)	43.69 (16.81)	52.75 months	46.64 (2.99)
Non-Nature Preschool F ⁷	38.39 (13.19)	51.50 (13.34)	59.14 months	51.60 (2.34)

¹ Adjusted for the covariates of pretest, age, gender, and prior participation; ² 48% of participants Male; ³ 53% Male; ⁴ 64% Male; ⁵ 52% Male; ⁶ 50% Male; ⁷ 53% Male.

To further explore whether or not growth differed between nature and non-nature preschool participants, adjusted posttest means (posttests means when controlling for age, gender, and prior participation) from individual preschools were compared using general liner modelling (univariate analysis of covariance). The between-subjects factor was preschool, and the covariates were age, gender, and prior participation. While the model was significant ($F(9) = 10.43$, $p < .001$, the between-subjects factor (the six preschools) was not a significant variable in the model ($p = .60$); however, as in the previous analysis, both age and pretest level were significant variables ($p = .03$, and $p < .001$ respectively). Follow-up pairwise comparisons yielded similar findings, with no significant pairwise comparisons among any of the preschools. These results suggest there were no significant differences among the posttest means across the six preschools, when controlling for age, gender, and prior participation; none of individual preschools appear to be more or less effective than any of the others in terms of supporting executive skill development. See Table 2 for the means, standard deviations, and adjusted posttest means.

Research Question 3 asked if the executive function growth seen in nature preschool participants different than growth expected from typical, cognitive maturation. To address this question, pretest and posttest means of nature preschool participants were also compared with the data published by Reflection Sciences (2017) of average executive function scores for typically developing children, stemming from a national sample of 14,143 children. The average increase in executive function skills over a 7 month period for children at a similar age as those in this pilot study (average of 50 months at the pretest administration) is about four to five points. Children in the nature preschools (and also in the non-nature preschools as well) had an increase in executive function skills of about 10 points, thus exceeding what would be expected due to cognitive maturation in typically developing children. Participants in the nature preschool had a pretest level of about 42 points, which is slightly higher than the national norm for this age (40 points); however, nature preschool participants had a posttest level of about 52 points, compared to the national norm of 45 points (what would be expected for children who are 57 months in age) This suggests they were close to the normative level of executive function at the start of the preschool year, but by the end of the school year, were higher than what would be expected for typically developing children of a similar age.

DISCUSSION

The hypothesis for this study, in essence, was that nature play affords opportunities for the development of executive function skills. Like the findings from Carr et al. (2017), children in nature preschools demonstrated

executive function skills; further, the results from this study at hand suggest significant growth in their executive function skills over the course of a nature-play focused school year. While this growth did not exceed that seen in non-nature preschools, the results suggest that nature play does not appear to hinder executive function growth. And with executive function skills as a predictor of school readiness and academic performance, these exploratory results then suggest children who attend nature preschools will be as ready as their peers who attended non-nature preschools (and more ready than the average, typically-developing child, as children in both the nature and non-nature preschools had growth that exceeded what would be expected). But beyond being ready for school, the children who attended nature preschools also will likely be entering Kindergarten with higher levels of creative thinking (Wojciehowski & Ernst, 2018), curiosity (Ernst & Burcak, in press), total protective factors that can be drawn upon in adversity (Ernst, Johnson, & Burcak, 2019), as well as with the other physical, environmental, social-emotional and cognitive benefits that have been found to have associations with time spent in nature as children. Caution, though, is needed in interpretation and generalizations, as the participants in this study were primarily Caucasian and from a higher socio-economic background. Thus, further research investigating the influence of nature play on executive growth in a larger, more diverse sample is needed toward understanding the relationship between nature play and executive function skills.

The findings from this study indicated both nature and non-nature preschoolers grew in executive function skills beyond what would be expected from typical cognitive maturation. Because socio-economic status is correlated with executive function skills, it seemed possible that this higher level of growth might be explained by the higher average socio-economic status among the study participants, relative to the reported test norms. However, the study participants were only slightly higher (2 points) than what would be expected at the time of the pretest, yet were 7 points higher by the time of the posttest; this makes it less likely for socio-economic differences to be the sole or primary factor explaining the growth observed in this study. Because there was significant growth in both the nature and non-nature preschool participants, it seems plausible that what might account for this greater than expected growth is their preschool participation.

One prominent shared characteristic between the nature and non-nature preschools is the number of hours spent in unstructured free or loosely guided, child-initiated play. The preschools in this study provided about four to five hours daily of unstructured play for the children who attended full day. The difference was in the location of the play, with the nature preschools utilizing primarily outdoor natural settings, and the non-nature preschools using primarily indoor settings, with about one of the playtime hours outdoors, but in a non-nature setting. Based on the research linking the amount of structured activities inversely related to executive function skills (Barker et al., 2014), it seems then that it is not simply preschool attendance, but more likely the influence of the significant portion of the preschool day spent in unstructured play; unstructured play in both indoor and outdoor settings likely support executive function skill growth. Unstructured play provides ample opportunities for imaginative play, as well as opportunities for children to develop a sense of autonomy, as the play is child-initiated as opposed to teacher-directed. Given the research suggesting imaginative play supports executive skill development, and specifically pretend role-play as a symbolic activity that activates executive function skills (Carlson, 2018), it seems then that perhaps it is not the location of play that was influential on executive function skill development, but the unstructured nature of the play and the longer periods of time provided for unstructured play that allows for play to deepen. It is important to note, though, this is speculation stemming from the results in conjunction with the literature, as opposed to a relationship that was empirically tested; thus, further research is needed to test this new hypothesis in a larger, more diverse sample using a research design that allows for more rigorously testing of and isolating the influence of unstructured playtime on executive function skills.

Another shared characteristic is the focus on holistic development (development across the domains). While this wasn't the focus for the study, and thus not investigated in terms of how this translated into practice, supporting holistic development was part of the philosophies of the participating preschools and was described by the teachers as being their aim and/or focus. Potentially this focus on development across the domains, as opposed to a primary focus on early academics, was influential, in light of Diamond and Lee's research (2011) on the effectiveness of holistic approaches and in light of early childhood neuroscience indicating the highly interrelated nature of the brain and the intertwined nature of cognitive, emotional, social, and language development in the early years (see, for example, *Early Childhood Neurodevelopment*, by the Australian Early Childhood Mental Health Initiative, 2014). A

philosophical focus on holistic development across domains, translated into practice through the provision of unstructured play, could likely be underlying the executive function growth seen in this study at hand, given neuroscience findings that suggest learning through play facilitates the development and activation of interconnected brain processes in children, thereby supporting their capacity to learn (Liu et al., 2017). Similarly, neuroscience research supports the potential influence of a warm and responsive care-giving style of caregivers in healthy brain development (Liu et al., 2017). This caregiving style was experienced by children across all of the participating preschools in the study, and thus may have been influential on executive function skill development.

While more research is needed to better understand for whom and under what conditions unstructured play and specifically nature play can be used to support executive function skill development, these results are encouraging. Through nature preschool participation, children appear to be growing in their skills of cognitive flexibility, inhibitory control, and working memory. Not only will these skills contribute to school readiness and academic performance, studies also suggest they are related to lifelong health, and even likeliness of criminal behavior and financial status (Moffit et al., 2011; Zelazo et al., 2016). Thus, their relevance exceeds far beyond the backdrop for this study of concerns regarding school readiness. And in terms of relevance to environmental education, these executive function skills can be drawn upon in time in the context of environmental behaviors and environmental problem-solving and decision-making.

Overall, these findings add evidence to the growing literature base suggesting the benefits of nature preschools. Nature preschool participants in this study developed executive function skills at the same rate as high quality, non-nature preschools, thereby helping address and alleviate parents' hesitations regarding nature preschools and school readiness. Further, climbing trees, playing in the snow, building forts, and stomping in mud puddles are arguably more developmentally appropriate and healthier forms of interventions in support of executive function development than targeted trainings and curriculum-focused, directed instruction. Further, as these children are outside in nature, they are likely growing in their affective connection to the natural world (Ewert, Place, & Sibthorp, 2005; Moore, 2014). With these deepened connections to the natural world alongside their ability to plan and execute goal-oriented behaviors, the findings from this study provide another opportunity for thinking about young children's contributions to a more sustainable future.

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Beyond Traditional School Readiness: How Nature Preschools Help Prepare Children for Academic Success

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ABSTRACT

Increasing demands of accountability and academic readiness across U.S. preschools are often accompanied by decreased play and time outdoors during the school day. The nature preschool movement, grounded in a desire to foster connection to the natural world while also supporting important developmental processes and school readiness, counteracts this trend by simultaneously emphasizing outdoor play and preparing children for success in kindergarten and beyond. This study utilized the *Penn Interactive Peer Play Scale* and *Preschool Learning Behaviors Scale* to quantitatively explore the influence of nature preschools on peer play interactions and learning behavior, both of which contribute to young children's academic readiness. Results indicated that nature preschools may be having a significant positive influence on peer play behaviors in both the preschool and home setting, as well as on all dimensions of learning behaviors. Implications for further research and practice are discussed.

Keywords: nature play, nature preschool, peer play behaviors, learning behaviors, school readiness

Early childhood is a critical time period for developing a sense of respect and an ethic of care for the natural environment (Iozzi, 1989). Positive interactions with and in nature also are integral to the health and development of young children (Dankiw et al., 2020). Within this growing body of literature; however, there has been little empirical work regarding the effect of time in nature on the development of young children in terms of preparing them for successful entry into kindergarten, nor in terms of their readiness for academic learning. In light of the strong emphasis in the U.S. on academics and accountability at the preschool level, coupled with a decline in time for play and outdoor exploration, there is a need for additional research grounding the nature-play approach.

One area of particular importance is school readiness, specifically in the transition from preschool to kindergarten. This transition is heavily reliant on a variety of aspects of development that move beyond basic academic skills to also include aspects of social-emotional learning (SEL), approaches to learning, and development of physical and motor skills, all of which combined are predictive of later academic and social success (Claessens et al., 2009; Ladd & Price, 1987; NAEYC, 1996; Snow, 2006). It seems likely that the use of the local outdoor environment and the emphasis on unstructured play that characterizes nature preschools may have a positive influence on children's school readiness when school readiness is defined more broadly through a lens of holistic development, with a focus on a child's readiness to learn, interact, and engage in positive learning behaviors.

REVIEW OF LITERATURE

Defining School Readiness

In the U.S., ensuring young children are ready for successful school experiences is a national and state educational priority. The National Education Goals Panel (NEGP) indicated five dimensions of learning and development for young children that have shaped and continue to guide thinking regarding school readiness: cognition and general knowledge; language development; approaches to learning; social and emotional development; and physical well-being and motor development (NEGP, 1995). In 2002, the Good Start, Grow Smart initiative encouraged states to develop early learning guidelines for language and early literacy development that were aligned with state education standards for public schools (U.S. White House, 2002). Since then, early learning standards, also referred to as early learning guidelines, have been developed for all U.S. states and territories, and the majority of these early learning standards have been aligned with standards for early grades (Barnett et al., 2012).

Early learning standards help prepare and support children as they transition between learning environments, providing the continuity needed for successful transition to and performance in Kindergarten and the elementary years (IOM & NRC, 2015). Not only do these standards provide teachers with guidance for instruction that supports young children in meeting these expectations, early learning standards also shape expectations for educator competencies and quality standards for programs and schools, as well as policies needed to support those standards and expectations (IOM & NRC, 2015). However, some early childhood educators continue to express concern that early learning standards are not comprehensive and do not fully represent the diversity of development and learning in the early years. Additionally, there is concern that the aim of ensuring that children in the aggregate meet the standards comes at the expense of supporting children's individual learning and growth along developmental trajectories (Kagan & Scott-Little, 2004). Similar to concerns regarding learning standards in the elementary grades, there are also concerns regarding the potential narrowing of curriculum and instruction to focus on the literacy and language guidelines emphasized in the 2002 initiative.

In spite of these concerns, the National Association for the Education of Young Children (NAEYC) maintains that early learning standards can contribute to comprehensive and high quality early learning and care as long as they emphasize significant, developmentally appropriate content and outcomes, develop through informed and inclusive processes, are implemented and assessed in ethical and developmentally appropriate ways, and are accompanied by strong supports for programs and families (NAEYC-NAECS/SDE, 2002). Head Start, an early childhood program that is publicly funded under the U.S. Department of Health and Human Services, also continues to use early learning outcomes as one measure of program success. These outcomes include the same five domains outlined in 1995 by the NEGP, signifying an ongoing theoretical consensus about the importance of all five dimensions of learning and development (Head Start: Early Childhood Learning and Knowledge Center, 2020). However, many programs continue to focus a disproportionate amount of time on the cognition and general knowledge domain, with an emphasis on acquisition of academic skills and knowledge (Jones & Boufard, 2012; Katz, 2015; Shoshani & Aviv, 2012).

One explanation for this gap between research and practice lies in the link between funding and progress indicators, many of which are content-knowledge and academic in nature. Although enrollment numbers in the U.S. have held relatively steady for the last ten years with approximately one-third of four-year-olds enrolled in publicly funded preschool programs, the push for an increase in state-funded prekindergarten programs continues to grow, bringing with it numerous implications for both students and teachers (Kagan & Kauerz, 2007; Friedman-Krauss et al., 2018; Takanishi & Kauerz, 2008; The National Institute for Early Education Research, 2018). In state-funded early childhood programs, funding is directly linked to demonstrating proficiency in early learning standards as well as improved data reporting (U.S. Department of Education, 2015). Other types of funding through external organizations and grants also tend to require some form of data reporting. This focus on data may narrow the scope of teaching because curriculum alignment tends to skew towards those academic subjects that are tested or reported, rather than the development and learning across all domains (Pedulla, 2003).

However, as practitioners know, the transition from preschool to kindergarten is ripe with numerous changes, not all of which can be recorded through academic assessment. These changes include shifts in teacher relationships, increased behavioral and social expectations, and the increased importance of social-emotional learning skills (Rimm-Kaufman & Pianata, 2000). Furthermore, all domains of children's learning are important and interrelated. Recent neurobiological understandings of early brain development suggest it is critical for early encounters to provide a wide range of experiences that provoke, stimulate, and support children's innate intellectual dispositions (Katz, 2015). These include learning opportunities for preschool-aged children that involve more than academic skills and also further self-regulation, initiative, and sustained synchronous interaction with others (Blair, 2002). Other findings have underscored the importance of social and emotional development with respect to the implications these skills have on school readiness, particularly in the context of positive learning behaviors (Duckworth et al., 2007; Shoshani & Slone, 2017). Thus, learning opportunities for preschool-aged children should offer opportunities to develop self-regulation, initiative, and peer interaction in addition to academic skills (Blair, 2002).

While these findings are notable, educators also need functional examples and solutions for program implementation. A pervasive achievement gap, increasing national and state mandates for a school readiness focus in early childhood education, and increasing standards-based education at an early age have combined to increase the need for practical, evidence-based practices for early childhood educators. Consequently, it is increasingly relevant to examine the impact of existing, integrated frameworks of early childhood education that may influence children's school readiness.

Nature preschools emphasize the importance of young children's direct experiences with nature as a catalyst for connecting with the natural environment in ways that promote physical, social, and cognitive development. This exploration often occurs through unstructured nature play which contributes to childhood development in a myriad of ways including increased creativity (Wojciehowski & Ernst, 2018), development of scientific reasoning and discovery skills (Carter, 2016; McClain & Vandermaas-Peeler, 2016), awareness of self in relation to the external environment (McClain & Vandermaas-Peeler, 2016), and increased resilience and self-regulation (Ernst et al., 2018). One recent study showed that in regard to kindergarten readiness, children in a nature-based preschool program were as prepared as those in a high quality, traditional preschool program (Cordiano, 2019).

However, additional empirical research is needed to link the impact of nature preschools on school readiness. As previously outlined, most educators, including nature preschool administrators and teachers, continue to feel the pressures of using data to demonstrate their students' academic readiness. This pressure for data further underscores the necessity of empirical research that demonstrates the myriad of benefits of nature preschools. Within the current context of increasing standardization and focus on academic content, children consequently have fewer opportunities for play and connection with nature (Louv, 2008). Thus, in light of the importance of these factors in preparing young children for school, this study aims to illuminate the impact of nature preschools on two key components: peer play interactions (a component of social-emotional learning) and learning behaviors (a component of approaches to learning).

Peer Play

Peer play interactions are a component of social-emotional learning. For young children, competence in social-emotional learning has been shown to prepare them for cognitively demanding tasks (Perry et al., 2011), support school readiness or "readiness to learn" (Denham, 2006), and predict early childhood academic success (Denham et al., 2012). Children who have developed social learning demonstrate sensitivity to the needs of their peers, while also meeting their own social interaction goals (Howes & James, 2002). During early childhood, play is a primary mechanism for the development of social skills and peer relationships (Gallagher, 1993; Ginsburg, 2007). Thus, peer play behaviors often function as an indicator of social competence and, as noted above, are a critical factor in children's school readiness.

A meta-analysis of the impact of play indicated its ability to help children develop interpersonal skills and increase problem-solving capacity (Fisher, 1992). Through the repeated social interactions that occur during peer play,

children have the opportunity to develop a variety of skills and competencies that contribute to their ability to build and maintain future peer interactions and relate to the world around them (Coplan & Arbreaux, 2009; Fisher, 1992; Frost & Sunderlin, 1985). In fact, the United Nations High Commission for Human Rights deemed play so important that it is recognized as an inextricable right of every child (Office of the United Nations High Commissioner for Human Rights, 1989). Thus, this ability to successfully relate with peers is not only an essential and developmentally salient competency that influences both academic and social success in kindergarten and beyond (Cicchetti 1990; Eggum-Wilkins et al., 2014; Ladd, 1990; Ladd & Price, 1987; Ladd et al., 1988; Rimm-Kaufman & Pianata, 2000), but it is also a critical piece of the early childhood experience.

Higher levels of peer play skills at both the beginning and end of the year are associated with positive learning outcomes (Bulotsky-Shearer et al., 2012) and increases in peer play skills throughout the school year predict higher levels of kindergarten competence (Eggum-Wilkins et al., 2014). Conversely, poor peer relations indicate potential problems with school adjustment (Ladd et al., 1996), development of language skills (Cohen & Mendez, 2009), and lower literacy and math skills (Bulotsky-Shearer et al., 2012). Within this context, it appears as though emphasizing social-emotional learning, specifically peer play relations, in early childhood provides a critical foundation for the mastery of a range of skills that are important to academic achievement, as well as long term well-being and mental health (Campbell et al., 2016; Denham & Brown, 2010).

Promoting Positive Peer Play Behaviors

Although these skills are highly indicative of future success, many children enter school without well-developed social and emotional skills (Rimm-Kaufman et al., 2000). Isolated interventions, such as social-emotional learning curriculum, have shown limited success and often pit academic skills against social-emotional learning (Jones & Bouffard, 2012). Conversely, ongoing integration of social-emotional learning, when supported throughout all aspects of the child's day, may help to create the developmental framework needed to enhance young children's school readiness (Jones & Bouffard, 2012; Denham, 2006). Carter offered one example of this integration through her proposed nature-based social-emotional approach to support young children's development (2016). She argued that blending the components of environmental education, early childhood education, and social emotional development supports education that is good for both the child and the earth. Open-ended play in green spaces, like that seen in nature preschools, diversifies the range of opportunities for children to both formally and informally engage in a variety of learning opportunities (Dyment & Bell, 2008). As children wonder, wander, and play, they engage in many scientific processes that use overlapping skills with those needed for social and emotional learning (Carter, 2016; Gerde et al., 2013).

Chawla and colleagues noted that through nature play, children typically have the freedom to choose from a variety of play activities in which cooperation and social interaction are heavily embedded and thus this play may facilitate more supportive peer relationships (2014). In a review on the impacts of green school grounds on children's well-being, Bell and Dyment showed that time spent on natural school grounds impacts social health through the cooperative and creative play that often occurs in nature. They also identified additional physical and mental health benefits, specifically reduced stress and increased self-confidence (2008). More recent studies have also correlated young children's exposure to green space with greater socio-emotional competencies (Scott et al., 2018).

Additional research supports the positive impact of nature preschools on individual components that may impact positive peer play such as creativity (Wojciehowski & Ernst, 2018) and development of empathy (Lithoxidou et al., 2017). Given the existing evidence, it seems likely that children in nature preschools will exhibit positive peer play behaviors, thus indicating one aspect of the beneficial impact of these early childhood experiences on school readiness.

Learning Behaviors

The term learning behaviors refers to an overarching set of actions, behaviors, and dispositions that describe how a child engages in or responds to a learning situation (Dominguez et al., 2010). Rather than focusing on what students learn, these skills better describe how a child learns. These behaviors are considered keystone "learning-to-learn"

skills that tend to transfer to future learning contexts and support successful schooling and thus are foundational to school readiness (Barnett et al., 1996; McDermott, 1984). Subdomains, including task persistence, motivation, initiative, attentiveness, and openness to new challenge, have been shown to contribute uniquely to school achievement (Leigh, 1996). Research suggests that focusing on learning behaviors during early childhood may be especially beneficial, as preschool-aged children's behaviors are both malleable and formative at this time (Barnett et al., 1996; McDermott et al., 2002). Furthermore, in contrast to other possible influences on academic outcomes, such as motivation, learning behaviors include observable behaviors and responses, and thus are considered to be more "teachable" within the classroom context (Schaeffer & McDermott, 1999).

Learning behaviors typically increase over the school year and this change can be predicted by both children's individual behavioral adjustment (child-level variance) as well as differences in classroom quality (classroom-level variance) (Dominguez et al., 2010). These measured variances support the generally-held belief that learning behaviors can be shaped through various interventions. Helping children develop optimum levels of learning behaviors may help them succeed, and even stand out, academically (Schaeffer & McDermott, 1999). In contrast, children with poorer learning behaviors at the start of preschool have shown signs of greater maladjustment and absenteeism by the end of first grade (McDermott et al., 2016).

Promoting Positive Learning Behaviors

At the classroom level, process features such as behavior management and productive use of time predict some of the variance in children's learning behaviors over time (Dominguez et al., 2010; Mashburn et al., 2008). Although a 2010 study indicated that classroom-level differences accounted for 27% of the variance in learning behaviors, a follow-up study examined the impact of variation in classroom organization, emotional support, and instructional support and found only classroom organization to have a significant impact of learning behavior (Dominguez et al.). Furthermore, the effect size was small, which suggests the need for further studies that examine other potential factors of classroom quality that may impact learning behaviors.

When examined through the lens of child-level variance, shyness in particular appears to negatively influence baseline learning behavior scores (Dominguez et al., 2010). Because early childhood learning is often social and interactive, and shy children frequently have fewer close relationships with teachers and less social imitative with peers (Rydell et al., 2005), these findings suggest that shyer students may struggle to acquire some of the skills necessary for academic readiness. While this is just one illustration of the influence child-level variance may have on learning behaviors, it is a poignant example in the context of this study. In nature preschools, where children regularly interact with one another through creative play, children may be able overcome some of these social barriers, increase their social interactions, and develop self-confidence (Ginsburg, 2007), thus creating a "safer" space to develop positive learning behaviors. Play also comes naturally to most children and allows them to create their own world, or special place of play, where they can "explore and demystify some of the scary and unknown aspects of world" (Nitecki & Chung, 2016, p. 25).

Nature preschools "employ a child-led, play-based approach to teaching that adapts to children's interests, abilities, cultures, and environments" (Natural Start Alliance, 2019, p.11). Rather than separating "play" from "learning", nature preschools rely heavily on the notion that these two activities are deeply connected and are thus interwoven throughout the educational experience (Natural Start Alliance, 2019). This adaptable and interwoven framework for teaching and learning may help to address concerns about the limited efficacy of singular lessons and interventions. Similar to recommendations for integrating SEL into the curriculum rather than teaching it as isolated lessons, research suggests the early education would be most effective at helping children develop positive learning behaviors by integrating and scaffolding these skills within the ordinary curricula (Fantuzzo et al., 2011; McDermott et al., 2018). Emphasis should be placed on generalizable skills that children can use throughout transitional learning (McDermott et al., 2018). Nature preschool curricula typically emphasize key skills related to learning behaviors such as task persistence and exposure to new challenges and appropriate risk (Banning & Sullivan, 2011; Natural Start Alliance, 2019). Children are encouraged to learn through experience and interaction in a developmentally appropriate manner, which may further encourage development of learning behaviors.

Existing research suggests that exposure to exciting, creative, and novel learning experiences may also help children develop positive learning behaviors (Hyson, 2004). Nature offers a dynamic space for engagement and allows children to develop physical, emotional, and cognitive skills (Gerde et al., 2013). This dynamic aspect of nature-based play offers a plethora of opportunities for development of positive learning behaviors as children typically learn from trial and error, problem solving, critical thinking, and taking risks (Bundy et al., 2009; O'Brien, 2009). The variety of meaningful experiences helps children constantly construct new meanings with new information, which in turn helps them develop essential cognitive processing skills (Hurwitz, 2002). Thus, these benefits of novelty and exploration, which are central to nature preschools, suggest that children enrolled in such programs will display positive learning behaviors.

Interaction Between Peer Play and Learning Behaviors

Research has identified positive peer play as an important facet of positive classroom learning behaviors (Canella, 1993; Coolahan et al., 2000; Fantuzzo et al., 1998). Children who demonstrated positive play behaviors showed higher levels of classroom competence motivation, positive attitudes towards learning, and attention and persistence within the classroom. Conversely, when children showed higher levels of play disconnection, they also demonstrated indication of inattentiveness, lower competence motivation, and a more passive attitude towards learning (Coolahan et al., 2000). Additional research reveals that problem behaviors in the classroom negatively influence both positive peer play (Fantuzzo et al., 2003; Fantuzzo et al., 2005) as well as learning behaviors (Fantuzzo et al., 2005). One explanation for this relationship offers evidence suggesting that preschoolers who exhibit problem behaviors often miss out on social learning experiences, which in turn negatively impacts learning outcomes (Bulotsky-Shearer et al., 2012).

These findings suggest that by nurturing children's natural desire for connection with others (through nurturing peer play) then lifelong learning behaviors can be cultivated. This relationship warrants additional study as it may offer further support for the importance of incorporating play in early childhood education as a method of supporting positive learning behaviors and school readiness. Thus, because of the suggested correlation between peer social competence and learning behaviors, and because they speak to school readiness in a broader and arguably more meaningful way, the proposed study focuses on these two constructs.

METHODOLOGY

Research Purpose

This exploratory study investigated the hypothesis that nature preschools have a positive influence on young children's peer play interactions and learning behaviors. Specifically, the following research questions were addressed in this study:

- 1) Do nature preschoolers' learning behaviors and peer play behaviors significantly change from the beginning to the end of the school year, when controlling for age, gender, prior participation, and duration of participation?
- 2) If there is growth in nature preschoolers' learning behaviors and peer play behaviors, is that growth different from growth seen in non-nature preschoolers?
- 3) Is there a significant relationship between learning behaviors and peer play behaviors?

Design

The following exploratory study occurred during the 2018-2019 academic year using a pretest-posttest non-equivalent comparison group design. Four nature preschools in northern Minnesota, U.S. served as the treatment group and two non-nature preschools in northern Minnesota, U.S. served as the comparison group. The four nature (treatment) preschools applied a child-directed play philosophy and were led by caring and responsive teachers. Regardless of weather, the majority of the day was spent outdoors in nature play (defined for this study as child-initiated play that take place in and with nature). For children in the full day program, this schedule allowed for approximately four to five hours of daily nature play whereas the half-day children engaged in nature play for two

to three hours. Outdoor play occurred in a variety of nature settings including “wild” (unmaintained) natural space, minimally managed space, and natural playscapes designed specifically for nature play. The natural playscapes included “structures” such as stepping stones or stumps, digging areas, and a collection of loose natural parts for building and creating. Indoor spaces were used minimally for approximately one-half to two hours. This time was devoted primarily to free play; although, teachers typically led loosely structured, playful learning experiences for approximately 30 minutes each day. These four nature preschools had a combined total of 84 participants and the mean age of participants was four years and one month.

For this study design, two non-nature preschools served as a comparison or baseline group, rather than a true control group, due to fewer participants and the lack of random assignment. The comparison schools were selected based on willingness to participate as well as a similar geographic location, tuition structure, and demographic makeup in relation to the treatment schools. One of the non-nature preschools was affiliated with a local parochial elementary school while the other was affiliated with the local university. Experienced teachers demonstrated caring and responsive teaching and care-giving. Both schools emphasized a child-directed play philosophy in order to support children’s cognitive, social, emotional and physical development. The majority of play occurred indoors (four to five hours) with an additional one to two hours of outdoor playtime in a maintained outdoor space with typical playground equipment. Children also experienced approximately one hour of teacher-led learning. Similar to the nature preschools, there was little ethnic and racial diversity across the non-nature preschools. The majority of participants in both groups were Caucasian. Additionally, because both nature and non-nature preschools had similar tuition requirements, it was assumed that all participants were relatively similar in terms of economic background. The comparison group was comprised of a total of 24 participants, with a mean age of three years and ten months.

Based on these defining characteristics, participants across the preschools shared similar demographics and experienced developmentally-appropriate programs led by caring and responsive teachers. Child-centered, play-based pedagogy and practice aimed to support holistic development of children in all programs. The proportion of time spent outdoors and the location of outdoor play time, both key attributes of nature play, served as the main differentiation between the nature and non-nature preschools. Therefore, these components allowed for exploration of the potential influence of nature play on learning behaviors and peer play behaviors.

Instruments

There were two instruments used in this research study. The *Penn Interactive Peer Play Scale* (McWayne et al., 2007) is a 32-item teacher and parent rating scale, with versions for preschool children and kindergarten children. The parent version assesses play in the home and neighborhood; whereas, the teacher version assesses play at school. Three dimensions comprise the instrument:

- *Play interaction* (8 items, Chronbach’s alpha = .90): Assesses children’s play strengths, including comforting and helping other children, showing creativity in play, and encouraging and welcoming others in play;
- *Play disruption* (11 items, Chronbach’s alpha = .91): Assesses aggressive and antisocial behaviors that interfere with ongoing peer play interactions (a lower score on this dimension or a decrease over time is considered desirable); and
- *Play disconnection* (11 items, Chronbach’s alpha = .87): Assesses withdrawn behavior and nonparticipation in peer play (lower scores or decreases in this dimension are desirable).

Teachers and parents are asked to indicate the frequency of observable behaviors, with response options of “never,” “seldom,” “often,” or “always.” See McWayne, et al. (2007) for information on content and construct validity information, as well as for additional information on uses, administration, scoring, and interpretation.

The *Preschool Learning Behaviors Scale* (McDermott et al., 1996) assesses learning behaviors through teachers’ reporting the frequency of specific, observable behaviors that occur during preschool activities. Teachers may

choose “doesn’t apply,” “sometime applies,” or “most often applies.” Based on if the item has positive or negative wording, responses are scored zero, one, or two points. The assessment produces an overall score from the sum of 24 items (Cronbach’s alpha = .88); see McDermott, et al., 2013 for divergent and convergent validity information. The assessment also yields scores for three dimensions:

- *Competence motivation* (11 items, reliability = .85): Assesses children’s interest in and approach to learning-related activities;
- *Attention/persistence* (9 items, Chronbach’s alpha = .83): Assesses children’s skill in focusing and maintain attention; and
- *Attitudes* (7 items, Chronbach’s alpha = .75): Assesses children’s propensity to cooperate, accept help, and handle frustration.

Procedures

Institutional Review Board approval was obtained, and consent forms were distributed to guardians of the children enrolled in the six participating preschools. All children were invited to participate, and children with parental consent for participation were included in the data collection. Pre-test data was collected October 2018, as the instruments require data to be collected after teachers are sufficiently familiar with the children’s behaviors and interactions in order to rate and describe the specific, observable behaviors that comprise the items on the scales. Teachers completed both the Penn Interactive Peer Play Scale and the Preschool Learning Behaviors Scale for each child for whom parental consent was granted. Parents completed only the Penn Interactive Peer Play Scale, as the Preschool Learning Behaviors Scale is designed for use in classroom settings. These same instruments were administered as posttests in May 2019. Each assessment takes approximately 10-15 minutes per child to complete.

RESULTS

General linear modelling (tests of within-subjects effects) was used to investigate the first research question, which focused on change in nature preschoolers’ peer play and learning behaviors, when controlling for age, gender, prior participation, and duration of participation (part time or full time). Results suggest significant growth in the play interaction dimension of peer play, as well as a significant reduction of play disruption behaviors and play disconnection behaviors, for both school (teacher rating) and home/neighborhood (parent rating) settings. In addition, there was significant growth in learning behaviors (total score), as well as in the three learning behavior dimensions of competence motivation, attention/persistence, and attitudes. For all of these constructs, the partial eta-squared values suggested a large treatment effect size ($>.14$, per Levine & Hullet, 2002). See Table 1 for adjusted pretest and posttest means (controlling for age, gender, prior participation, and duration of participation), as well as the statistical results from the inferential tests of within-subjects effects.

To address the second research question, general linear modelling (tests of within-subjects effects) was used to investigate change in non-nature preschoolers’ learning and peer play behaviors, when controlling for age, gender, prior participation, and duration of participation (part time or full time). These analyses were oriented toward interpreting the results of the nature preschool participants, as the non-nature preschool results reflect what might be expected in terms of change from participation in high quality preschool and through developmental maturation. The only construct where significant change occurred among the non-nature preschool participants was play disconnection in the home/neighborhood setting (parent rating). Thus, the statistically significant change in learning behaviors and peer play behaviors among the nature preschool participants is not only statistically significant, but likely also practically significant, as similar growth was not seen in the comparison group of non-nature preschoolers (with the exception of the play disconnection dimension of peer play behaviors for the parent rating/home and neighborhood setting). See Table 2 for the statistical results from these analyses.

Table 1

Statistical Results for Nature Preschool Participants' Peer Play Behaviors and Learning Behaviors

	Adj. Pretest M (SE) ^a	Adj. Posttest M (SE) ^a	F (1,80)	p ^b	Partial η ²
Peer Play Behaviors					
Play Interaction (Teacher)	23.44(.31)	28.79 (.33)	169.73	<.001**	.68
Play Interaction (Parent)	25.77 (.30)	27.17 (.29)	15.03	<.001**	.16
Play Disruption (Teacher)	28.11 (.67)	20.24 (.48)	157.56	<.001**	.67
Play Disruption (Parent)	29.82 (.45)	27.93 (.57)	16.00	<.001**	.17
Play Disconnection (Teacher)	19.40 (.53)	12.64 (.33)	157.28	<.001**	.67
Play Disconnection (Parent)	17.75 (.37)	16.04 (.36)	18.15	<.001**	.19
Learning Behaviors					
Competence Motivation	16.73 (.45)	20.27 (.31)	59.65	<.001**	.43
Attention/Persistence	13.18 (.37)	16.62 (.29)	63.16	<.001**	.44
Attitudes	11.11 (.28)	12.71 (.22)	29.76	<.001**	.27
Learning Behaviors Total	36.53 (.83)	43.96 (.67)	64.22	<.001**	.45

^a Adjusted for the covariates of age, gender, prior participation, and duration of participation (part or full time)

^b* denotes significance at .05, ** denotes significance at .01

Table 2

Statistical Results for Non-Nature Preschool Participants' Peer Play Behaviors and Learning Behaviors

	Adj. Pretest M (SE) ^a	Adj. Posttest M (SE) ^a	F (1,20)	p ^b	Partial η ²
Peer Play Behaviors					
Play Interaction (Teacher)	24.88 (1.38)	26.81 (.91)	3.39	.09	.23
Play Interaction (Parent)	25.33 (.75)	26.20 (.77)	1.28	.29	.11
Play Disruption (Teacher)	25.19 (1.69)	23.88 (1.37)	.71	.42	.06
Play Disruption (Parent)	28.47 (1.20)	27.53 (1.26)	.85	.38	.08
Play Disconnection (Teacher)	15.88 (1.47)	14.75 (.89)	.95	.35	.08
Play Disconnection (Parent)	18.27 (1.27)	16.27 (.90)	5.84	.04*	.37
Learning Behaviors					
Competence Motivation	19.53 (.83)	2.06 (1.01)	.76	.40	.06
Attention/Persistence	15.94 (.78)	16.47 (.78)	.42	.53	.03
Attitudes	11.77 (.39)	12.24 (.57)	.67	.43	.05
Learning Behavior Total	41.77 (1.51)	43.41 (1.88)	1.35	.27	.10

^a Adjusted for the covariates of age, gender, prior participation, and duration of participation (part or full time)

^b* denotes significance at .05, ** denotes significance at .01

To further explore if the change in learning behaviors and peer play behaviors in the nature preschools was different from what might be expected through developmental maturation and/or participation in a high quality, non-nature preschool programming, univariate analyses of covariance (ANCOVAs) were conducted to investigate the difference between the nature preschool and non-nature preschool participants' posttest levels of each of the dimensions of learning and peer play behaviors, when controlling for pretest level, age, gender, and prior participation. Unadjusted pretest and posttest means, as well as the adjusted posttest means and the results from the ANCOVAs are reported in Table 3. The results of the ANCOVAs suggest nature preschoolers had significantly higher posttest levels of competence motivation and play interactions in the preschool setting and significantly lower posttest levels of play disruption and play disconnection in the preschool setting than the non-nature preschoolers, when adjusting for pretest levels as well as age, gender, prior participation, and part v. full-time participation. Collectively, the results from the within-subjects tests as well as these ANCOVAs suggest nature preschools may be having a significant positive influence on all dimensions of learning behaviors and peer play behaviors in both the preschool and home setting, with strongest evidence for influencing the competence motivation dimension of learning behaviors, as well

as the three peer play dimensions (increasing play interactions and decreasing play disruptions and disconnections) in the preschool setting.

Table 3

Comparison of Change in Peer Play Behaviors and Learning Behaviors for Nature and Non-Nature Preschool Participants

	Nature Adjusted Posttest M (SE) ^a	Non-Nature Adjusted Posttest M (SE) ^a	F (df) ^b	p ^c	Partial η ²
Peer Play Behaviors					
Play Interaction (T) ^d	28.82 (.32)	26.13 (.63)	(1, 101) = 14.20	<.001**	.12
Play Interaction (P) ^e	27.15 (.28)	26.92 (.58)	(1,97) = .13	.72	<.01
Play Disruption (T) ^f	20.06 (.48)	25.22 (.95)	(1,101) = 23.32	.001**	.19
Play Disruption (P) ^f	27.85 (.45)	28.45 (.94)	(1, 97) = .33	.57	< .01
Play Disconnection (T) ^f	12.44 (.32)	15.17 (.65)	(1,100) = 13.54	<.001**	.12
Play Disconnection (P) ^f	16.06 (.33)	16.03 (.69)	(1,97) = .002	.97	<.001
Learning Behaviors					
Competence Motivation	20.41 (.33)	18.66 (.65)	(1,103) = 5.66	.02*	.05
Attention/Persistence	16.66 (.30)	16.13 (.59)	(1,103) = .69	.41	.01
Attitudes	12.74 (.22)	12.22 (.42)	(1,103) = 4.77	.27	.01
Learning Behaviors Total	44.16 (.68)	41.76 (1.34)	(1,103) = 2.50	.12	.02

^a Adjusted for the covariates of pretest, age, gender, prior participation, and duration of participation (part or full time)

^b F value for between subjects factor of treatment v. control

^c * Denotes significance at .05, ** denotes significance at .01

^d T = Teacher Report

^e P = Parent Report

^f Lower values are more desirable than higher values

To address the third research question regarding if there are significant relationships among the dimensions of learning behaviors and the dimensions of peer play behaviors, Pearson correlational analyses were conducted with posttest levels of each dimension of the two constructs. See Table 4 for the results of these correlational analyses. The results suggest significant relationships between competence motivation dimension of learning behaviors and the play interaction dimension ($r = .24, p = .01$) and the play disconnection dimension ($r = -.25, p < .01$) of peer play behaviors in the preschool setting. There was also a significant relationship between the attitudes dimension of learning behaviors and the play disruption dimension of peer play behaviors in the preschool setting ($r = -.22, p = .03$). These results suggest that higher levels of competence motivation are associated with higher levels of play interaction and lower levels of play disconnection. Similarly, higher levels of (more positive) learning-related attitudes are associated with lower levels of play disruption behaviors.

DISCUSSION

Successful transition from preschool to kindergarten relies on a variety of skills that contribute to “school readiness” (Head Start: Early Childhood Learning and Knowledge Center, 2020; NAEYC, 1996). Although many programs emphasize the academic components, a growing body of research suggests that skills such as social-emotional learning and learning behaviors also greatly impact a child’s successful transition as well as future academic performance (Campbell et al., 2016; Denham & Brown, 2010; Shaeffer & McDermott, 1999). Young children’s development is also positively impacted by positive experiences with and in nature (Dankiw et al., 2020; O’Brien, 2009; Scott et al., 2018). This study sought to offer empirical evidence regarding the effect of time in nature on the development of children in terms of two components of school readiness: peer play interactions and learning behaviors.

Table 4
 Results of the Correlational Analyses of the Posttest Levels of Peer Play Behaviors and Learning Behaviors

	1	2	3	4	5	6	7	8
1. Comp Motivation	—							
2. Attn Persistence	.76, <.001**	—						
3. Attitudes	.60, <.001**	.83, <.001**	—					
4. Play Intxn (T ^a)	.24, .01**	.11, .26	-.07, .47	—				
5. Play Intxn (P ^b)	-.01, .91	-.05, .60	.02, .86	.15, .14	—			
6. Play Disruption (T)	-.01, .88	-.16, .10	-.22, .03*	-.32, <.001**	.06, .57	—		
7. Play Disruption (P)	-.01, .97	.01, .94	-.05, .64	-.14, .18	-.31, <.01**	.42, <.001**	—	
8. Play Disconn (T)	-.25, <.01**	-.01, .31	-.04, .70	-.48, <.001**	-.23, .03	-.30, <.01**	.15, .13	—
9. Play Disconn (P)	-.11, .27	.11, .25	.13, .18	.22, .03	-.53, <.001	.09, .37	.48, <.001**	.36, <.001**

Note. Pearson Correlation Values and Two-Tailed Significance Level

^a T = Teacher Report

^b P = Parent Report

* Denotes significance at .05, ** denotes significance at .01

The results of this study suggest the potential for nature preschools to positively impact peer play interactions as well as learning behaviors. The significant change in both constructs over the course of the school year cannot be explained by maturation alone, as these same changes were not seen in the non-nature group of preschoolers (with the exception of the play disconnection dimension of peer play behaviors for the parent rating of the home/neighborhood setting). This variance may suggest that play in nature could be more conducive to supporting desirable play interactions as well as reducing non-desirable play behaviors (disruption and disconnection). Based on the characteristics of nature-play, where children routinely engage in open-ended, creative, social play it is not surprising that children develop desirable play interactions. As children choose from a variety of outdoor play activities, they engage in many cognitive processes that use skills that overlap with those needed for social and emotional learning (Carter, 2016; Chawla, 2014; Gerde et al., 2013).

Additionally, the natural setting may be more conducive than the indoor setting in regard to developing competence motivation learning behaviors. Studies have shown that classroom quality impacts students' learning behaviors; however, a study of the variation in classroom organization, emotional support, and instructional support identified that only classroom organization accounted for a small portion of the variance (Dominguez et al., 2010). Classroom quality consists of two components: *structural features* such as teacher training and teacher-student ratios and *process features* which include use of developmentally appropriate activities, effective use of the instructional day, and teacher sensitivity (Dominguez et al., 2010). In the current study, many of the common structural and process features of the classroom were similar. Participants in both the treatment and control groups learned through child-centered, play-based, and developmentally appropriate programs led by caring and responsive teachers. All children spent the majority of time in play; however, the main difference between groups resided in the location of that play.

These findings suggest that play location may be an overlooked aspect of classroom quality that contributes to the development of both peer play and learning behaviors. Regular experiences in nature typically involve exploration of diverse and ever-changing landscapes and thus may encourage children to engage in a large variety of both formal and informal learning behaviors (Dyment & Bell, 2008). This diversity may contribute to a wider array of learning and play opportunities than those found in a more traditional preschool (Coridano et al., 2019; Danks, 2010). Studies examining the quality of outdoor environments have shown that children playing in environments with lower quality or fewer natural components are often associated with repetitive play and less constructive and imaginative play (DeBord et al., 2005; Hesteness et al., 2007). In contrast, the loose parts and natural elements characteristic of natural playscapes have shown to help children develop their ability to problem solve, cooperate, and make observations (Ku et al., 2013).

Additionally, the component of freedom of choice, or autonomy, may offer insight as to why the location of play matters. Although one could argue that all play offers some aspects of freedom, research suggests that play in nature offers more free-choice than play that is confined by artificial, man-made boundaries (i.e. blacktop, manufactured play equipment) (Chawla et al., 2014). Play in a dynamic, outdoor environment may help to create a learning environment that allows for child-driven risk taking and learning through trial and error (Bundy et al., 2009). When children have a sense of choice and autonomy over their decisions, whether in play or in the classroom, they typically demonstrate greater motivation, adjustment, and long-term interest in subjects (Krapp, 2005; Ryan et al., 1985). The freedom to explore, make mistakes, and learn, which is cultivated through nature preschools, perhaps allows children to create a safe space where they can develop their natural instincts free of artificial boundaries and constraints.

The results of this study suggest that higher levels of learning-related attitudes (more positive) are associated with lower levels of play disruption behaviors. Likewise, higher levels of competence motivation are associated with higher levels of play interaction and lower levels of play disconnection. These results suggest a relationship; while not a causal one, there exists the possibility that developing positive play interactions may also have a positive impact on learning behaviors. Thus, this study's findings of a correlation between positive play and positive learning behaviors warrants further study, as better understanding this relationship continues to strengthen our collective understanding of the importance of play.

Implications for Practice and Policy

These findings suggest that nature preschools positively impact two components of school readiness, peer play interactions and learning behaviors, and thus offer early childhood educators a programmatic example (nature preschools) through which they can help prepare children for the transition to kindergarten. These findings are significant because a successful transition to kindergarten has long term effects on students' motivation and engagement in school (Denham et al., 2012).

Furthermore, the findings offer evidence for the importance of ample unstructured time spent playing outside. As researchers and practitioners continue to voice concerns that the shift towards accountability comes at the expense of other valuable experiences such as developing a love for learning, outdoor activity, collaborative problem solving and social emotional learning (Koretz, 2017; Ritchie et al., 2007), it is increasingly important to demonstrate the efficacy of these other "non-academic" components of school. This study offers such support as it demonstrates the value of unstructured play experiences in helping children transition to kindergarten. Combined with existing research highlighting the importance of nature play, the current study results may help to encourage increased support of nature play and nature preschools from families, educators, and administrators.

Limitations

Interpretation of the results of this study must be considered with an understanding of limitations and threats to validity. It is important to recognize that the sample size of the nature preschool participants was larger relative to the sample size for the non-nature preschool participants, which decreased the internal validity of the study.

Additionally, external validity is limited, as the participants in this study were primarily Caucasian and from a higher socio-economic background. The small sample size and homogenous makeup of the study participants make it necessary to use caution when speculating about correlations, impacts, and influence. Accordingly, further research should aim to reduce these limitations by utilizing a larger sample size and a more equivalent control group in order to more fully assert nature preschools' influence on children's peer play and learning behaviors. Another important direction for further research includes working towards deeper understanding of what aspects of the nature preschool experience are most influential in achieving these positive outcomes relating to peer play and learning behaviors.

Conclusions

Even with these limitations and a need for further research in mind, the results of this study offer promising evidence for the impact of nature preschools. Richard Louv suggests that, "Playtime – especially unstructured, imaginative, exploratory play – is increasingly recognized as an essential component of wholesome child development" (2008, p. 48). The findings from this study offer additional support that the unstructured outdoor playtime that occurs in nature preschools may also help children develop critical school readiness skills. These findings help expand our understanding of the complexity of skills that contribute to school readiness and offer further support for the importance of time in outdoor free play and learning during early childhood.

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Balancing Outdoor Learning and Play: Adult Perspectives of Teacher Roles and Practice in an Outdoor Classroom

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ABSTRACT

Recognizing the inherent value in outdoor play and learning for young children, we focused upon the practices and perspectives of adults at an early childhood center as the outdoor play areas were transformed into outdoor classrooms. A salient finding emerging from the data exhibited a gap between constructivist child-led theories of play and learning and the changing needs for greater adult-led learning in the altered outdoor environment. Disparate attitudes towards greater adult intervention in children's play existed between parents, teachers, and administrators, as children and staff transitioned and acclimated to the new outdoor classroom. Using ethnographically grounded data collection, researchers interpret these findings to suggest that while teachers maintain a strong preference for child-led learning, the changing outdoor space requires increased adult-led activities and intentional environmental education goals and training.

Keywords: adult perspectives, child-led play, emergent curriculum, environmental education, outdoor classroom, teacher roles, theory and practice

Outdoor play is an essential ingredient in many early childhood education settings and if we were to close our eyes, many of us could imagine an outdoor space complete with concrete, swings, slides, and chain-link fencing. We can imagine what the children's play might be like in these spaces, as well as imagine the actions of teachers who accompany students out of doors. But, what if the outdoor spaces are transformed, turned into an outdoor classroom with logs for stacking and balancing, stones, sensory tables, and garden plots? How would children acclimate to the new environment and, central to this work, how do adult perspectives and practice change relative to learning and playing in the outdoors? These are the primary questions that ground our study of an early childhood center in the Midwest of the United States. By designing a research project around both adult perspectives and children's experiences, we hoped to holistically understand the outdoor learning that was taking place at the center as it transitioned from a traditional playground to an outdoor classroom. In this paper, we focus upon the intersection of seemingly competing ideas of how play and subsequently, learning, should be oriented in outdoor environments. Specifically, this work is an inquiry into how adults perceive their role in outdoor learning with young children and how this relates to their teaching practice. Embedded within this discourse are various theoretical claims detailing how children should play and, additionally, how the changing landscape fosters changes in pedagogy and practice.

Through extensive fieldwork in which we collected data over the course of the entire outdoor classroom project, we perceived an interesting tension between theory and practice, a "pedagogical gap," as typified by Cutter-Mackenzie and Edwards (2013). These researchers suggested that this gap arises when two different approaches to

environmental education in early childhood settings occurs. Describing these two approaches, Cutter-Mackenzie and Edwards (2013) explain an interesting dynamic between the inherently experiential learning found within open-ended, free-play, and the knowledge and values orientation of more structured environmental education. Examining the emerging themes arising from the voices of adults at the center, we became interested in this intersection of structured play oriented towards environmental education, that being teacher-led, and the strongly felt theoretical commitment to constructivist learning in which children's experiences lead the way.

LITERATURE REVIEW

Perspectives of Outdoor Learning for Children

There is general recognition within educational discourse that outdoor experiences are valuable. As such, researchers are increasingly focusing upon the centrality of early childhood education to foster positive environmental values and attitudes (Cutter-Mackenzie & Edwards, 2013; Herrington & Studtmann, 1998; Malone & Tranter, 2003; Merewether, 2015; White, 2004). Additionally, school grounds have been identified as one of the very few places where children can play freely in natural environments with peers, and subsequently, their importance as sites for engaged learning has greater resonance today (Moore & Wong, 1997; Tranter & Malone, 2004).

Yet, among educators, there has been little time or conversation concerning the planning and preparation for outdoor learning (Davies, 1996; Davis & Waite, 2004; Louv, 2008; Renick, 2009). Research suggests that there is a prevailing belief that outdoor learning requires less time and attention in planning than indoor learning (Davies, 1996; Renick, 2009) and that when children are outside this becomes a time for teachers to take a break and solely ensure that children are safely supervised (Davies, 1997; Renick, 2009). Merewether (2015) argues against this trend in declaring that "outdoor spaces in such settings are not just places to let off steam or relax, they are places for learning, so the need for these environments to facilitate learning is vital" (p. 104). In this regard, children's experiences are dependent upon the outdoor environment, the types of space a school provides for them, and the adults who experience the outdoors with them (Kiewra & Veselack, 2016; Moore & Wong, 1997). Engaging and effective outdoor learning therefore requires certain types of outdoor space and, importantly, particular attitudes and practices of adults (Emilsen & Koch, 2010; Moser & Martinsen, 2010) and higher levels of direct engagement of teachers with children (Chakravarthi, 2009).

This strand of research belies the persistent consensus among educators that child-led, open-ended play, exploration and discovery are often seen as instrumental for children's cognitive development (White et al., 2007). Taken together, our findings resonate with the broader literature concerning children's classroom-based play and associated teacher roles and attitudes. Understandably, considerable attention has been paid to teacher attitudes and experiences in outdoor learning environments across the literature. Less often have parent perspectives been examined, and typically, when they have it has concerned perceptions of risk and safety (Little, 2013) or views of the importance of outdoor experiences for their children (Bohling, Saarela, & Miller, 2013). Importantly, research has also focused upon a lack of communication between parents and teachers concerning outdoor play (Jayasuriya et al., 2016), something that correlates in the present study. The divergent perceptions of adults examined here reflect philosophical and pedagogical divides, which position the essential importance of constructivist, child-led learning against the effectiveness of teacher involvement in facilitating and scaffolding learning (Fesseha & Pyle, 2016).

Pedagogical v. Open-ended Play

There is an inherent tension within early childhood education and outdoor experiences between contradictory adult goals for either open-ended (free) play or pedagogical play for children. This discourse is well represented in the literature and including interesting critiques of open-ended play along cognitive as well as cultural lines of argument (Cutter-Mackenzie & Edwards, 2013). Much of this tension arises out of conflicting goals of what outdoor experiences are for; getting energy out and gross motor development or more cognitive and emotional development, including the inculcation of environmental values. Davis, Rea, and Waite (2006) sums this up in their estimation that "for some early years practitioners, provision of outdoor learning may simply be seen as a removal

of barriers to children moving freely between inside and outside the classroom but not as a qualitatively different form of learning” (p. 4). The alternative to this is a movement towards more intentional pedagogical engagement for teachers and a balancing of child-led play on the one hand and what Cutter-Mackenzie & Edwards (2013) call “pedagogical play” on the other hand. Importantly, this blending of constructivist theories of open-ended play with more intentional teacher-led learning resonates with our research concerning teacher perspectives of outdoor learning.

In describing this need of intentionality within environmental education, Cutter-Mackenzie (2007) urges a “delicate pedagogical balance of knowledge, values, and action,” (p. 196) as educators provide children with outdoor experiences and specific knowledge of the environment, blending child-led and teacher-led experiences. To this end, pedagogical play fosters multiple varieties of educational activities intentionally developed to provide children with significant opportunities to develop awareness and understanding of their world (Cutter-Mackenzie & Edwards, 2013; Woods, 2010). Tranter and Malone (2004) suggest that effective pedagogy maintains a balance of structured and unstructured play and activities that best suit environmental education. Teacher-led and unguided activities are both seen as developmentally appropriate ways for educators to foster pedagogical, cognitive, emotional, and physical benefits for children in outdoor environments (Cutter-Mackenzie & Edwards, 2013; Tranter & Malone, 2004; Woods, 2010). Understanding this dynamic requires both an exploration of adult intentions and practice concerning learning outcomes and the actual experiences of children in outdoor spaces.

Experiential education is one predominant theme within environmental education pedagogy, although there is recognition that experience untethered from knowledge acquisition can limit the development of positive environmental attitudes and behaviors (Cutter-Mackenzie & Edwards, 2013). While experience is an essential component of positive environmental attitudes later in life, it alone does not necessarily foster desired environmental attitudes (Kollmuss & Agyeman, 2002). This is the essential groundwork that we work within as we attempt to understand the crucial interface of experience and knowledge that lie at the heart of outdoor learning (Cutter-Mackenzie & Edwards, 2013) and fostering positive environmental values and awareness.

We have been led by a curiosity in how changing outdoor environments impact both adult perspectives of pedagogy and children’s experiences of play. To this end, we have been motivated by an attentiveness to examine the intersection of unstructured open-ended play of children, and adult structured and intentional facilitation of learning essential to environmental education. To understand this dynamic, we have examined the discourse of teachers, their practice and interactions with children, and children’s own experiences in the outdoor classroom.

METHODOLOGY

We began this research project at the initial stages of the early childhood center’s transition from a traditional playground to an outdoor classroom. Thus, we became privy to the various discussions and ideas relative to this large-scale structural and programmatic change from diverse adult perspectives. As such, we learned a great deal about the goals, expectations, and concerns among adults involved in the center as the traditional playground was replaced with a Nature Explore Certified Outdoor Classroom. This change brought to bear intriguing discussions concerning questions of what the outdoor space should look like, how it should be used, and how curriculum might change. The Nature Explore website describes certified classrooms as “dynamic, nature-based play and learning spaces” which are “nature-rich” and are both “well-designed” and committed to “staff development and family involvement” (Nature Explore Website, 2019). Kiewra and Veselack (2016) explain that natural outdoor classrooms should “stimulate children’s creativity and enhance learning opportunities” through open-ended, natural materials and the freedom to choose their play (p. 71).

Witnessing this transition to an outdoor classroom provided a unique opportunity to examine how this particular early childhood center balances the tension between teacher-led and structured (pedagogical) and child-led and unstructured (free or open) play in a dedicated and intentional outdoor learning environment. Collecting data before, during, and after the change of the outdoor environment has yielded an account of how constructivist, child-led learning theories intersect with an evolving and more intentional, pedagogical practice among teachers. The

dynamics of change have accrued as adults and children have acclimated to the outdoor classroom and represent an intriguing tension between competing goals for children's play and outdoor learning.

Throughout the research project we have used a flexible qualitative design that allowed us to alter data collection methods throughout the duration of the project and to be attentive to the social context in which we were working. Within this flexible design we have followed the guidance of anthropologist Harry Wolcott (1999) in organizing an ethnographic case study, employing ethnographic data collection methods and techniques to explore deeply one particular educational setting. Our study centered on the perceptions of adults and experiences of children, as their outdoor play environment transitioned from a traditional playground with the requisite swings and plastic features to an outdoor classroom, full of small spaces and natural materials.

Setting

The early childhood center sits on the campus of a major state university, serves as a site for pre-service teacher practicums and internships, and has five classrooms with approximately 150 children and 10 full-time, certified teachers and two administrators. The center fosters a culture of emergent learning and child-led free play and this is consistent in both indoor and outdoor learning. Thus, there is a tremendous amount of freedom for children in the center to follow their own interests and construct their own knowledge and experiences.

The goals of the administrators and teachers at the early childhood center are grounded in a constructivist theoretical framework, which guides the emergent curriculum they utilize. Taken from the center's Parent Guide (2019), *emergent curriculum* is "based on the philosophy that each child learns best when early childhood educators' focus is on being responsive to children's individual interests to create learning experiences that are meaningful" (p. 4). The Parent's Guide further explains that "learning experiences should be child-initiated, rather than something initiated only by the teacher" and that "to create an emergent curriculum learning experience, teachers closely observe children at play to discover what they are interested in at this time" (p. 4). With children leading the way and teachers observing children to find their interest the general consensus is that greater learning opportunities are fostered ((Bohling, Saarela, & Miller, 2010). Finally, this concept of emergent curriculum is directly linked to a play-based philosophy, in which, as the Parent's Guide states, "the teachers understand the value and the benefits to the children of play" (p. 4). These particular perspectives correlate with the general strategies typified by emergent curriculum goals; such as teachers being facilitators of learning while being responsive to children's interests, developing relationships and meaningful learning experiences through child-led play-based learning (Cassidy et al., 2003).

These conceptualizations of emergent curriculum and play remained consistent for indoor and outdoor learning as we examined the changing outdoor space and subsequent engagement of children and adults. This commitment to child-led and constructivist learning found strong resonance in the discourse around emergent curriculum and unstructured child-led outdoor experiences, and proved to be a vital element of our research findings.

Data Collection

We conducted our research in two phases with the transition of space being a natural line of demarcation. Thus, phase one took place prior to the installation of the outdoor classroom and data collection included a parent questionnaire, teacher and administrator interviews, and observations of children and teachers in the outdoor playground. Phase two ensued subsequent to the many alterations in the physical environment of the outdoor space and again included a parent questionnaire, teacher and administrator interviews, and observations of children and teachers. To these forms of data collection, we added focus group interviews with small numbers of children, child-led tours, and gave the children the opportunity to create drawings of the space. We were intent to understand how adult perceptions and practice and children's experiences evolved as the space was altered. Yet, we were keen to do this in a holistic way, bringing together different ideas, perceptions, and experiences to understand the space in totality. Thus, our design has allowed us to triangulate interviews with observations and artifacts akin to Wolcott's (1999) trilogy of data collection; experiencing, enquiring, and examining.

Data Analysis

Data analysis began with open coding of questionnaires, interviews, and observations. From these open codes we constructed a master code list and using this list returned to the data to reread for accuracy and further code reduction. Within this master code list, we examined for correlations and created categories of affiliated codes. We subsequently examined the categories for overlapping relationships to generate overarching themes that emerged from the data and to develop our findings.

While our data collection methods garnered a tremendous diversity and depth of data, herein we kept our focus on persistent and evolving adult perspectives of the outdoor space and children's experiences. Subsequently, we drew primarily from the parent surveys and the teacher and administrator interviews, as these sources of data best articulate adult views and the larger discourse concerning play and learning. The second phase of data collection was conducted one year into the outdoor classroom being installed, and allowed teachers to acclimate to the new outdoor space and thereby more fully articulate their perspectives on the changes taken place.

FINDINGS

The two principle findings we examine in this work reflect persistent adult perspectives and the evolving outdoor practice of teachers in the intervening year since the installation of the outdoor classroom. The first finding concerns a consistent tension between parent and teacher perspectives and goals for outdoor learning and play. We highlighted this dynamic previously in this journal (Hunter, Graves, & Bodensteiner, 2017) when exploring adult perspectives prior to the installation of the outdoor classroom. Subsequent to transitioning to the outdoor classroom we have found a continuance of this tension. Thus, while parents stressed their support of intentionally oriented, teacher-led outdoor curriculum, teachers persisted in their perspective that time spent outside should be child-led and free of imposed structure. Interestingly, what is often conveyed through adult discourse looks considerably different in practice. To this end, the second finding focuses on adult perspectives concerning the practice of teachers in the outdoor classroom and in this, we found a significant difference in how engagement, interactions, and structure are perceived. Hence, while adult perspectives have remained consistent when concerning free and structured play throughout the installation of the outdoor classroom, there is a recognized and observable shift in the engagement of teachers and, importantly, how teachers structure and plan for outdoor play and learning. Even upon reflection, teachers are quick to point out that their practice has changed, although there is significant variability among teachers in how they view intentional environmental education goals.

As we exhibit below, the discourse of the teachers remains resolutely oriented towards unstructured, child-led learning, and yet, their perspectives concerning the experiences and interactions of children and teachers have changed significantly with the changing outdoor environment, evolving towards more intentional planning. This has resulted in an imposition of ad hoc structuring of activities embedded within an emergent curriculum. The findings below are oriented around two salient themes, one being that teachers perceive themselves to be guides to learning and the second having to do with balancing outdoor play and emergent curriculum.

Guides to Learning: Conceptualizing Teacher Roles in Outdoor Learning

This first finding provides data that details the ways that adults speak of outdoor play and the role teacher-led learning is perceived at the early childhood center. As stated above, the teachers at the center maintained a consistent perspective concerning their role in the outdoor learning of children regardless of the type of outdoor setting. These perspectives have remained constant throughout the research study and the transition to an outdoor classroom. The most salient aspect of these shared perspectives is that teachers should act as a guide and facilitator in the outdoor environment. As a facilitator, Jessica described her role as teacher to "be a quiet observer, and just kind of watch their little brains tick". This idea is supported by a second teacher, Rebecca, who stated,

I just facilitate if they're getting, you know, if they're using the equipment the wrong way, or if somebody's acting inappropriate with a piece of wood, if they're throwing it or that stuff where it

could cause injury. But mostly we just stand back and let it happen, let the play, I should say, happen and the interaction with each other.

Rebecca continued by saying “we’re just more of a guide to help them.” In these statements we see the common idea that teachers see their role primarily as one of monitoring and guiding the behavior of children. This is strongly echoed throughout the teacher interviews, and supplemented by an insistence among the teachers that children should lead the way in constructing their own learning and meaning and teachers should provide a supplemental role.

A prime example of this awareness comes from Sarah, who, in describing current practice said, I’m one of those people who just lets them have their time. I’m not gonna direct you how to play. Usually I’m trying to be the facilitator, but stepping back just to make sure that I want them to first have the experience.

Sarah continued this line of reasoning by describing the concept of exploring in this way:

Exploring in my mind is when they [children] go out on their own and they look for something themselves. Then it turns into the hands-on and creative learning, and it’s more of them being more independent. Them making their own choices and beginning to go into an area that they haven’t even tried before. Something new, that’s a new learning experience.

Exploration in this sense originates as a form of independent learning and stresses child-led, constructivist frameworks. What remains unspoken here is the extent, to which teachers engage or direct the learning and what form of pedagogy is best suited to foster this notion of exploration. Jessica bridges the two notions of behavior monitoring and deeper interaction in describing the role of teachers by stating that

mediation is another big one, if there is a conflict, conflict mediation. As far as engaging them with their play, just a lot of questions” such as “What are you doing? How are you using that? Oh, what else could you do with that? Or, that’s such a creative idea. What else could you? Just lots of prompting questions, thinking questions, getting them thinking about what they’re doing, and really thinking about the materials they’re using.

This level of engagement is echoed by one administrator, who, in describing unstructured play explained,

you still need the teacher there using that language to say, “Tell me what you’re building? How did you choose to use that,” or, “You’re having a struggle with this. How can we problem solve this and make it work? Here’s what you’re telling me you want,” versus just completely unstructured play, where you open the gate and you say, “Go have a great time,” and you as the teacher sit back and make sure everyone is safe. (Kate)

In Kate’s statement above, we have both the recognition that independent free play is vital to learning, but is also dependent upon teacher interactions. Here too, we can see some tension in how the administrator envisions interactions in the outdoor classroom and the ways teachers describe their role as primarily facilitators of safety as expressed above.

Other tensions persist throughout the transition to the outdoor classroom: primarily between the teacher perspectives exhibited above and parent expectations and perspectives emerging from the surveys concerning teachers’ roles. A predominant theme within the parent surveys was a desire for more structured learning to take advantage of the outdoor classroom. Below are four representative samples of different parent responses to the question of what their goals were for the new outdoor classroom and teachers’ roles in the new space.

Fully incorporating the playground in the curriculum. i.e., making it a place where teaching/learning actually happens.

Getting structured about the learning when the tendency has been to use the playground as free time for kids and adults alike.

Making learning moments outside.

I would like for the teachers to invest in outdoor curriculum.

We can see in these responses that there is significant concern for using the outdoor classroom in intentional and structured ways. This would entail a shift from the practices of teachers who embed a purely emergent curriculum into the outdoor activities. While free play was still considered an important factor in their child's day among parents, those surveyed relayed a strong orientation towards teachers embedding outdoor education curriculum within the activities in the outdoor classroom. This is significant when compared to the above perspectives of teachers and highlights the seemingly disparate attitudes concerning adult roles in the outdoor classroom. As will be shown in the second finding, the data highlights interesting overlap in how these expressed goals align with parent perceptions of practice in the outdoor classroom since the transition.

Administrators seem to toggle between these differing views concerning teachers' roles. Danielle and Kate, both administrators interviewed, stressed that structured and unstructured play were similarly vital to effective child-led and emergent curriculum. This may be indicative of the culture of the center being one orbiting around emergent curriculum and this would position the teacher in a more auxiliary or facilitating role. To this end, Danielle emphasized that she likes

to give children the opportunity to have child-led, child-directed play, so more unstructured. But I do like to have a plan in place so that particularly for children who don't engage. So, I think there's a time and place for that. I tend to lean toward unstructured with supervision and guidance.

However, she underscored that even though child-led play is key,

it's important to be mindful of what really you're there to do, and it's to be with children not only to supervise but to engage with them, particularly at those key moments where they find something that's really striking or interesting to them, and to figure out how you can help them learn more about whatever they're doing.

Kate echoed this view in stipulating that, "for me, good structured play and good unstructured play are both child-led," continuing that child-directed play should be "unstructured from the aspect of not having a specific goal in mind. The only structure is that, 'This is the material I'm putting here. What are you gonna build?'" Kids can choose" (Kate). These concepts of structured and unstructured are an essential awareness for studying staff perspectives and roles at the center and underlying theoretically constructivist ideals. However, this discourse begets the question as to the implications for not having specific goals in mind concerning the outdoor classroom. Would a stronger sense of curricular cohesion and long-term environmental education goals suit this new environment?

Thus, we have a de-centering of teachers in these explanations concerning the outdoor classroom and children's play. This perception of child-led play and learning is consistent throughout the research project as staff at the center consistently stressed a peripheral role for teachers, both before and after the transition, while the consensus among parents is for the space to be intentionally used as an outdoor classroom. This highlights a recurrent tension among adult goals and perspectives of how the outdoor classroom should be used.

Having explored these perceptions among educators regarding teacher roles in the outdoor classroom, we turn now to the second finding concerning how structured curriculum is regarded in the new space and how adults view the intersection of emergent, child-led curriculum with more intentionally directed play and learning.

Finding Balance: Structuring Outdoor Play within Emergent Curriculum

While teachers consistently spoke to the need for less structured and less teacher-led learning, in practice they engage more with children in the new space, effectively creating ad hoc structured activities. The general sense among teachers is that curriculum oriented towards the outdoor classroom requires more and varied forms of intentional planning, but that both the space and the experience of children directs these lessons. Within this finding, we will explore three interrelated concepts expressed by teachers: *planning for play*, *spontaneous teaching*, and *training*. Synthesizing these perceptions seems consistent with the embedding of emergent curriculum as articulated by Kate below.

We use an emergent curriculum, so we're following the interests of the children...our philosophy of the emergent curriculum completely meshes with the outdoor classroom...I think our new outdoor space really allows for that. That's kinda the goal of where we're at, of there are some structured things out there, and there are some unstructured things.

Teachers similarly described a changing dynamic in the outdoor classroom, one that requires more preparation and a sense of how to balance free and pedagogical play, although it is generally viewed as a work in progress. Both administrators spoke to the continuing transition to the new space, as explained by Kate in suggesting "I think that the engagement of the teachers, the use of that outdoor space as a true learning space, we're still learning about, and we're still grasping what all of our options truly are."

Yet, this transition to the outdoor classroom has taken time for adjustment and recognition of different needs for children and adults. Considering this transition to the outdoor classroom, Danielle indicated that

we're learning the balance because before, really, truly, it was just unstructured play. And I think we're in what I would call a transition time. So each classroom is supposed to plan for a week of a structured activity to place out there that's available for children to do. So, kind of as a team, I think we're trying to learn how to balance that.

In similar fashion, Kate described a community dynamic at work among teachers,

building off of each other, talking to each other, using that opportunity when they're out there, talking about what was happening in the classroom, and someone saying, "Well, we can do this, or this." Because that space lends itself to community, I'm seeing that community within the teachers.

In describing community, Kate is exploring a concept of adaptation to the new space and how best practice might look in this space. In her statement is a sense of the staff working together to find the best path forward, yet, Danielle, in contrasting before and after engagement of teachers, illuminated,

in the big picture, I would say I don't see a big change. I would hope for a bigger change. I know we're almost at two years; I would say we're still learning. So, I would say that teachers most often stand and supervise and watch and listen rather than engage. I don't think that's necessarily wrong. I think there's a time and a place for engaging and a time and a place to just observe and let kids be kids. I think there needs to be some balance with that.

From the administrative viewpoint then, there is a concern for finding the right balance in outdoor learning, something that sits at the intersection of free, unstructured play, and intentional, pedagogical play.

Parents, likewise, related a desire for balancing different forms of play. However, while parents describe goals that link to more intentional, pedagogical play, their perspectives of the learning in the outdoor classroom suggest that they see more free play than not. In describing the desire for the outdoor classroom to be incorporated more fully into the curriculum, one parent stressed that

I am not sure this is happening now and can see how teachers would need to invest time both during the day and for prep to create opportunities for learning. But doing so and not taking just pure recess time away.

This is a shared perspective and concern among parents as supported by the two separate statements below:

I don't get the sense that there are lessons being taught out there. What I see is that they are free playing on the playground, which is good, but I don't get the sense that there are set lessons being taught.

I thought that there would be a lot of directed learning about the materials and natural surroundings. My sense, though, is that its still pretty much all free play. That's fine, of course, but it does make me wonder to what extent the teachers are taking advantage of the teachable moments that occur out there.

Significantly, these statements suggest that parents desire using the space more intentionally and that this requires a higher degree of curricular planning and a movement away from purely free play, or at the least a recognition that there should be a difference between recess/free play and developing lessons and “opportunities for learning.” This further suggests the need for increased teacher intervention in the learning process to lead children towards particular learning goals and to bridge a potential pedagogical gap.

This is not meant to critique the teachers for their practice being embedded within an emergent curriculum orientation, rather, this finding suggests that adults have significantly different perspectives and attitudes of what constitutes learning and play and that changes that are occurring are a natural outcome of a change in environment. Contextually, these parental views of intentional curriculum planning are important, yet how does this work within practice? Below, we explore teacher perspectives concerning how curriculum planning ensues in the outdoor classroom, related specifically to planning, spontaneity of teaching, and training.

Planning for play. Teacher responses exhibit recognition that environmental education may require a stronger sense of intentional planning and pedagogical investment in the play of children. Teachers frequently spoke of planning in the new space, a very different discourse than before the transition, when the playground was simply a space for recess and teacher down time. Within the teacher reflections presented below there are several explanations of the ways that intentional planning for the outdoor classroom has changed. Although, there are apparent inconsistencies in how much planning teachers are actively doing, a variability that training may offset. In the following statements, there is the appreciation that the space itself demands increased attention to planning and intentional pedagogical engagement among teachers. Contrasting her experiences before and after the transition, Jessica identified that “now, there's more in-depth planning” and further, that

when we do have something really going on in the outdoor classroom that is fun and exciting, there is definitely a lot more planning that goes along, and with the gardens and everything, growing the plants, and once the plants start to grow, constantly watching those and checking. That goes into our outdoor lesson plans as well.

Activities such as gardening, using hammer and nails, and water play require a higher amount of intentionality to be successful and teachers consistently spoke of these projects being more heavily planned.

Ella provided a complimentary perspective comparing before and after when she related that, “I am actually planning things for outside. You know, because in the past it was, ok, well, I am going to take out this toy and that was all that was required of us.” This statement is augmented with Michelle’s statement below.

oh, my goodness. It is definitely a lot more planning on our part. I don't think I am using it how I want to yet. I would like to be able to use it more, but I just think we need more materials out

there, to be able to use it effectively. I think I am more mindful. I know that I need to prepare more, I guess and more conscious of how I use it than what I was before.

Both administrators similarly spoke of the increased need for planning. Danielle in describing her own experience, articulated that "I've had to learn to think more about planning for the playground," while Kate stressed that she observes "there's a lot more purposeful planning of what's going on." In these statements is embedded the perceived need for more intentional curriculum and preparation, something akin to what parents have described. However, while teachers consistently spoke of the need for increased planning, there was also an undercurrent suggestive of the fact that the outdoor environment fosters more spontaneous forms of pedagogy.

Spontaneous teaching. There is a significant discourse among teachers suggesting that the space itself creates conditions for spontaneous curricular planning and that teachers are often responding to the outdoor environment in their practice. Some of these perspectives run counter to those above relative to more intensive planning. Regarding this, Jessica explained,

I like to let the outdoor classroom kind of lead it into something. There's less planning, sometimes, but then as I see something emerging, there's more planning involved, and like, 'Okay, now where can we take this that's happening?' Once something emerges, there's more planning that goes along with it, but until something is spurred, it really goes along with more our emergent curriculum.

Jessica's experience with this emergent form of curricular planning reinforces the variability of outdoor lessons being dependent upon ambient conditions and what children are noticing. Thus, according to this teacher's experience, regardless of the play being child or teacher-led, the outdoor environment dictates to a large degree what happens on a daily basis. Ella articulated this dynamic by stressing the informal ways she engages with the outdoor classroom.

I know that we're supposed to be planning for that time just as much we do in the classroom. But I feel like sometimes it's hard enough just to plan for the classroom, or finding the time to plan for the classroom, that that sort of follows. Not that we don't do stuff out there, but it's not formally planned. Not formally planned out, necessarily, but not that we don't do anything. We use the space but we just don't always have it already thought out. I didn't even think that I was gonna open the water table until I walked outside today.

In her statement are several very important considerations that impede outdoor education planning, such as limitations of time and lack of formal ways of approaching outdoor education. Lack of formal instruction was also seen arising out of perceptions concerning the outdoors in general. Even while stating that she engaged in more planning for outdoor lessons, Michelle clarified that outdoor lessons are

more informal than in the classroom. Because in the classroom I'll do circle time and then I'll explain you know if I have an activity, what it is. But I feel like the stuff outside and just how it is, you're not going to get anywhere by making it formal usually. Like it needs to be more informal, just because of how it is outside. Especially when there are other classrooms out there. You can't, I mean, to try to manage all that, it is just easier to plan for it to be informal.

Within this estimation, the outdoor classroom creates the limiting factor for more intentional curriculum and lesson planning and the best way forward is to limit structured planning.

Echoing this view, Jessica explained that, "I may not always have a lesson plan. It may just be like, 'Oh yeah, today I'm gonna get out some music and movement,' and we'll dance around the playground, and have a good time, and that'll be that." Spontaneity in teaching came up under various guises in our discussions with teachers across the data and the quote below offers an insightful way of considering this process. When describing child engagement in the outdoors, Rebecca, illustrated that

if they see something outside, we might have a magnifying glass, and if they see a bug, oh, let's see if we can find some more. It's more spontaneous teaching, like, oh, let's do this, let's see if we can see where it's coming from. It's just more exploration outside.

Taken together we can see how the concepts of *informal*, *exploration*, and *spontaneous* become synonymous and are clearly seen as an appropriate way to engage in outdoor environments. Lack of formal planning amplifies the notion that outdoor education requires less attentive engagement among teachers on a day-to-day basis and the default becomes less pedagogical play and more spontaneity. As we explain below this relates to the persistent need for environmental education training.

Training for outdoor education. All of this begs the question of whether the outdoor classroom is indeed being used to its fullest capacity, and what it might take to get to this level of engagement. While there is general agreement that teachers are more engaged, and observational data supports this, there is less agreement in the specifics of instruction and pedagogy appropriate for the outdoor space. There is further consensus that outdoor learning requires different methods than indoor lessons and that teachers are still transitioning to the new space. This transition is evidenced in the acknowledgement that there is considerable variability in how teachers approach the outdoor classroom and intentional use of the space for environmental education.

Danielle conceded that she finds outdoor learning “more difficult, not necessarily in the planning but in the implementing,” and that teachers were eager to “know more about how to incorporate the nature study side of the outdoor classroom. We are good at taking what we have inside outdoors, but what are some of those specific things that you can have outdoors?” While teachers are keen to learn, Danielle’s statement reflects her concerns that the outdoor classroom is not being used to full advantage, that there exists a gap in pedagogical expertise. This is evident in how Sarah describes her preparations for outdoor learning.

Well, they [Nature Explore] do have a whole booklet of different ideas of things you could do outside and things that enhance nature things. Like how they grow, and ask questions that you can provide and build upon. But I tend to like to go off what they [children] notice.

Sarah’s statement orients towards constructivist frames of reference, but the default to engage only what children notice may be a limiting factor pedagogically, steering away from intentional forms of learning and fostering environmental values. Relying solely upon child-led experiences can further negate the holistic and intentional design elements in the outdoor classroom, an issue revolving around how teachers themselves value the outdoor environment.

In highlighting this tension, there is recognition that without specific goals for outdoor learning, there may be limited value placed upon the outdoor classroom, and this is inherently an issue of fostering this awareness in teachers. Outdoor lessons, Kate suggested,

help them [teachers] see the value of the outdoor classroom because if you just go out and you use the sand toys, and the trikes and the balls that are out there every day, even for teachers, you can lose that purpose of what it's about. If there's something specific out there, there's a reason it was put out, and that helps them to see the value.

Purpose here suggests more intentional planning and use, something training can encourage. Jessica provided a description of the dynamics in the outdoor classroom suggestive that understanding purpose is essential to taking full advantage of it.

We had a whole lesson that just was surrounded by picking the plants, just that one aspect of the gardening. My kids were always really mad when the other kids picked the plants, but it's not as high on some of the other teachers' priority list to do some of those outdoor things. They prefer to do more of the letter recognition and those kinds of things, which are also super-important. When we're outdoors in that outdoor space, we need to utilize that time as not just a mental break,

but as continued learning, and experiencing all the science, and biology, and stuff that comes along with it.

This is perhaps the clearest statement concerning a need for a different orientation towards curriculum planning relative to indoor and outdoor spaces and implicitly a call for training for staff at the center.

Considerable attention is given to teachers who bring inside curricular ideas into the outdoor classroom. Yet, little attention has been given to the need of additional training for outdoor environments, or towards that end, an awareness that there is inherently anything different about teaching in these different spaces, let alone, how to intentionally instruct environmental education-oriented lessons. Thus, while children and adults are benefitting from the outdoor classroom and new experiences, there is a persistent tension evident in how to engender greater engagement.

DISCUSSION

We believe that this dynamic between adult perspectives is evidence of a tension between the disparate goals of intentional versus emergent curriculum, of child-led versus teacher-led learning. Both forms of curriculum beget structured play, although the former begins with the goals of adults and the later originates with the experiences of children. As both children and adults are acclimating to the new outdoor space, we are actually observing a blurring of intentional and emergent curriculum, a blending of child-led and teacher-led engagement. This often took the form of what was termed *spontaneous teaching*, the genesis of which can be found at the intersection of children's experiences and the outdoor environment. The following discussion, while being grounded in the particular context of this project has broader applications to outdoor learning environments and the roles and practices of adults in these settings.

There are indeed benefits of spontaneous teaching as described by the teachers and this resonates with the emergent curriculum orientation at the center. This also fits within the theoretical lens of constructivist learning at the heart of the program. Taking advantage of the interests of children and the ambient outdoor conditions on any given day provides flexibility and less dependence on prescribed lessons oriented towards adult goals. Allowing children to lead, while observing their play and exploration can be an effective pedagogical strategy that fosters greater learning (Bohling, Saarela, & Miller, 2010). However, the downside of this is that there is not a cohesive, environmental education orientation across the classes as attested to by some teachers. This inconsistency in how the space is used is a direct reflection of how various teachers think about planning for the outdoor environment. Limitations such as time, formal outdoor awareness and training, and the outdoors itself all factor into this lack of cohesion, as do teachers' own personal memories of unstructured childhood play and the benefits perceived of this kind of experience (Author citation). A greater degree of communication among all involved concerning goals, values, and pedagogical strategies is necessary for the success and long-term sustainability of a project such as this.

The interesting paradox is that while the space itself fosters spontaneous self-exploration there is an amplified perspective that more intentional curriculum and pedagogical play is needed to fully use the space to its potential. This is reflective of the diverse adult perspectives exhibited above; parent, administrator, teacher. The enduring tension sits at the intersection of balancing child-led, emergent curriculum and the increased need for structured lessons and planning particularly oriented towards environmental education. And it is here, that we find the "pedagogical gap" explored by Cutter-Mackenzie and Edwards (2013). Interestingly, this gap is recognized among teachers, who are cognizant that while they obviate towards constructivist, child-led play, the space itself is driving changes in practice towards more intentional pedagogical learning.

Essential to the outdoor learning for the children at the center is a deeply experiential ideal held among adults. There is consensus among the adults there that learning should be hands on and oriented towards what children are directly experiencing. This resonates with the larger literature within environmental education pedagogy, though experience alone may not lead to positive environmental awareness or attitudes (Cutter-Mackenzie & Edwards, 2013; Kollmuss & Agyeman, 2002).

To be sure, children's experiences in the outdoors are tethered to the types of environments they have access to and the experiences, awareness, and actions of adults with whom they share the outdoors (Kiewra & Veselack, 2016; Moore & Wong, 1997). While our study highlights that children acclimated to the new outdoor classroom quickly and this led to a host of changes in engagement for children and adults, lingering questions exist as to how to take greater advantage of the outdoor resources. Without intentional pedagogic and curricular shifts, including higher levels of direct engagement with teachers, children may miss out on transformative outdoor learning (Chakravarthi, 2009; Emilsen & Koch, 2010; Moser & Martinsen, 2010). In this case, children's experiences are not solely dependent upon the space itself, but, importantly, from the ways in which adults help shape and nurture particular experiences in the outdoor classroom.

Parents desire more intentional planning while the discourse of teachers is strongly situated within the perspective of teachers being observers. Yet, the space dictates changes in experience and practice. Outdoor learning is happening to be sure, but this more often takes shape as an extension of natural curiosity among the children as they interact with the ambient environment in the form of pinecones, seashells, logs, tree cookies, dirt, plants, and water.

Intentional environmental education, with its incumbent sense of values and knowledge (Cutter-Mackenzie & Edwards, 2013) has not played a central role in the interactions that we were privy to, even though, in the focus group, several teachers expressed the desire to be more intentional and structured in their practice and have been working on curriculum for the outdoors; a structuring that aligns with parent expectations and goals. As can be seen in the various perspectives highlighted in this work, the changing outdoor space has led to interesting changes in practice and intentions among teachers without a coordinated effort at professional or curricular development.

As to the question of the outdoor classroom being realized in pedagogy, practice, and experience, the general sense is that it has not. This is evident in the responses of parents and the recognition of staff concerning children's experiences in the outdoor classroom and is due to several factors; chief among these being lack of cohesive training in environmental education. Teachers are finding that the outdoor classroom fosters child-led free exploration, something akin to the constructivist orientation of the center, and simultaneously, requires more pedagogical intent to direct learning. In effect, a balance of theoretical frameworks and effective practice.

Because the outdoor classroom is vastly different from the habits of a traditional playground, teachers haven't had time or training to create dedicated curriculum oriented towards environmental education. Rather, they are adapting to the space and how children are reacting to the outdoors in ad hoc fashion and thus the curriculum emerges out of the direct experiences outside without long-range curricular goals. In this still new, still evolving outdoor classroom there is a blurring of pedagogical and free play as the engagement between children and teachers increases in response to the outdoor environment.

The inherent tension is made more complex in that there are significant inconsistencies in how teachers think about planning for the outdoor environment and what role they play in structuring activities for children. The discourse of teachers has not shifted from before the transition to the outdoor classroom; they hold to the notion that children should lead and teachers should facilitate. However, their practice has shifted dramatically, evolving from more passive observing and behavior management to an actively engaged interaction and recognition that more in-depth and intentional planning is necessary, moving beyond simply taking inside work outdoors. In this is acknowledgment that the outdoor environment has its own demands and requires a different form of awareness and planning. What we find particularly interesting is how the outdoor space has transformed behavior and interactions, without an intentional, cohesive, and comprehensive attempt from adults.

Implications and Recommendations

While this study focuses upon one early childhood center, the findings offer broad applications for the practice of outdoor learning and the development of outdoor classrooms. Essential to successful project development and outdoor learning is clear communication across all participants, professional development and training for staff, and intentionality in the design of outdoor spaces, their use, and the balancing of child-led and teacher-led learning.

An underlying implication of our study is whether the space is effectively being used as an outdoor classroom and what is necessary to balance the outdoor learning of children. This is an important consideration for all groups hoping to create outdoor learning environments. To be successful in this requires a higher level of intentionality and training for teachers to use the space to make “learning moments happen,” as one parent suggests. Teachers speak of experiencing both increased engagement and increased planning resulting from the altered outdoor environment. The implication of this is that the outdoor space creates the necessary conditions for increased engagement, yet there remains a need for educators to intentionally develop learning opportunities for children to take advantage of what outdoor classrooms have to offer. With increased intentionality and environmental education training the outdoor space may be utilized to greater advantage for children and adults. To engage in this might lead the center towards greater balance between child-led and teacher-led learning and pivot away from ad hoc reacting to the outdoors towards a more cohesive, outdoor education curriculum best suited for the outdoor classroom.

Children need time for free exploration, while teachers need to feel supported in their attempts to meet children’s needs. Greater attention to long term goals of environmental education could go a long way in finding the balance between child-led and teacher-led engagement. Cutter-Mackenzie and Edwards (2013) write of the need for a “pedagogical balance” between experiences, knowledge, and values that allows various forms of outdoor learning. Both child-led and teacher-led activities are necessary for creating the conditions by which educators can encourage holistic learning in the outdoors (Cutter-Mackenzie & Edwards, 2013; Tranter & Malone, 2004; Woods, 2010). Our findings are evidence of this dynamic and speak to the need for intentionality among adults to balance child-led and teacher-led learning. In this regard, we view intentionality as a way of guiding interactions and effective use of space rather than simply forcing all lessons to be teacher-led and structured. Thus, there is a heightened need for intentionality among adults to better balance these different forms of learning. This requires, though, more discussion and interaction among administrators, teachers, and parents at the center to communicate goals and best practice for learning in the outdoors. The 2013 case study by Bohling, Saarela & Miller concerning parental involvement in an outdoor classroom offers important lessons that resonate here. Of particular import is their finding that “meaningful parent involvement is built on providing layers of information” and that staff development and training and parent education “regarding the benefits of outdoor play for children’s learning and development” (2013, 38) are all necessary for program success and sustainability.

Recommendations for Practice

Cognizant of the contextualized findings explored here, and working towards achieving balance between different forms of engagement and learning, and in fully realizing the potential for outdoor classrooms, we recommend the following:

- Professional development for teachers and staff in outdoor learning environments and environmental education. The development of awareness of best practices in outdoor learning and competencies in leading children in environmentally oriented lessons would provide resources and awareness in how to effectively engage children in the outdoor classroom.
- Development of long-term goals for environmental and outdoor education. Intentionality is essential in providing clear guidance for optimizing the space and ensuring balance of experiences, knowledge, and values orientations.
- Consistent discussions among the school community so that all (children and adults) have the ability to share ideas and suggestions for outdoor learning and how to best use the outdoor classroom. This could take the form of an advisory committee of staff and parents who shepherd the outdoor classroom, consider practical elements of maintenance and growth, and the subsequent learning of children and adults.
- Providing more time outdoors. This would allow for achieving balance in learning with time devoted to more structured environmental lessons at the direction of teachers and time devoted to child-led and free play.

Opportunities for Future Study

- How do teachers perceive professional development/training relative to outdoor classrooms and environmental education and subsequent practice?
One of our suggestions is for more intentional professional development for teachers as a way to foster greater environmental literacy and engagement. A study along these lines would allow examination of impacts and outcomes of professional development opportunities relative to outdoor learning and whether this type of training is effective.
- What are children's experiences with and perspectives of child-led and teacher-led activities in outdoor classrooms?
The present study explores adult perspectives, but children's voices are missing here. Of great interest would be to account for the ways children are aware of and respond to various types of activities in outdoor learning environments to better prepare practitioners.
- How does amount of time outdoors impact children and adult interactions and learning?
Allowing more time outdoors may be one way of balancing child-led and teacher-led activities and foster deeper connections across all activities. This would be beneficial in designing outdoor learning environments and determining timeframes and schedules for outdoor experiences.

CONCLUSION

In exploring the outdoor classroom at this early childhood center, we have been privy to a dynamic intersection of theory and practice and a host of changes in the ways children and adults are engaging with the outdoors. The salient findings presented here provide access into the variety of adult viewpoints of outdoor learning and teacher roles and interesting tensions between diverse perspectives and goals. It is remarkable to reflect upon the transformative effect the changes from a traditional playground to an outdoor classroom have fostered in the experiences and interactions for both children and adults. Outdoor learning is happening to be sure. Children and adults are engaged in ways they were not in the traditional playground, and they interact in responsive ways to the environment around them. This in itself is illustrative of the power of our environment and outdoor spaces to engender positive change.

Likewise, our investigation speaks to an essential discourse within early childhood outdoor and environmental learning; how to encourage both child-led learning, and more teacher-led and structured environmental lessons. Teachers at the center are universally committed to an emergent and child-led curriculum. This orientation is rooted in a constructivist theoretical model of learning, but finds itself intertwined with the practical realities of engaging children with the outdoors. While hewing to this theoretical frame, teachers are finding the outdoor classroom requires more structured lessons to be truly effective. In this we find a pedagogical gap between the constructivist theory embedded in emergent curriculum and teachers' changing practice, as children and adults adapt to the new outdoor environment.

Teachers are acclimating to the space and are developing lessons suited to outdoor learning, though this has been a more spontaneous, ad hoc expression and response. How much more powerful could this learning be with increased intentionality and professional development? Recognizing that teaching and learning in the outdoors offers unique challenges and opportunities different from indoor learning may go a long way in developing highly impactful practices that balance the various needs and goals of all involved. With greater intentionality, the child-led, emergent curriculum that is highly experiential can be balanced with the essential knowledge, awareness, and values orientation encouraged by more structured environmental education.

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Fathers' Roles, Attitudes, and Practices Regarding Tree Climbing

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ABSTRACT

Gull, Levenson Goldstein, and Rosengarten (2018) examined the benefits and risks associated with tree climbing on child development and resiliency in regards to parental perspectives; however, it lacked a clear male perspective. The recommendations from that study mentioned that 93% of the responses originally came from mothers; hence, the need to look specifically at fathers' views on tree climbing. A follow-up mixed method survey instrument was administered to fathers of children aged 3-13 that climb trees, examining background information, rules and restrictions on tree climbing, injuries, and fathers' attitudes on allowing children to climb trees. As with the initial study, the results suggest few injuries. However, fathers do have different concerns, perspectives, and rules associated with their children climbing trees. The data concluded fathers perceive tree climbing as providing children with the ability to have fun and improve dexterity, physical strength, risk negotiation, spatial awareness, and self-confidence. Fathers of tree climbers from this study recognize and accept the risk of tree climbing, knowing the risks and potential injuries are growing experiences for their children.

Keywords: childhood tree climbing, outdoor risky play, resiliency, fathers' perspectives

Gull, Levenson Goldstein, and Rosengarten (2018) conducted a mixed method study with parents of children aged 3-13 that climb trees. The study examined the benefits and risks of tree climbing on child development and resiliency. The survey questioned parents' perspectives on the impact of tree climbing on their children, including potential injuries. The study reached 1602 parents; however, 93% of survey respondents were female. The results of the study concluded that children afforded the opportunity to climb trees grow socially, emotionally, physically, cognitively, and have increased resiliency. However, the study largely showed mothers' perspectives. Males' viewpoints could vary and provide additional insights into this important topic since fathers are often associated with rough and tumble play with their children (Fletcher, May, St. George, Morgan, & Lubans. 2011). Analyzing fathers' viewpoints on the benefits, behaviors, rules, restrictions, and injuries concluded tree climbing provides children with the ability to have fun and improve dexterity, physical strength, risk negotiation, spatial awareness, and self-confidence.

LITERATURE REVIEW

As in the original study, the authors focused on tree climbing as risk-taking play, investigating the benefits and risks. Additionally, the authors continued to examine policies that limit or even ban tree climbing activities. Research on child development and resiliency from a fathers' perspective was also examined in this comprehensive literature review.

Benefits of Play and Risk-Taking Play

Tree climbing and risky play are essential tools for children's growth and resiliency (Gorman, 2017). Play is an essential part of child development and children are most content when playing. Outdoor play promotes creativity, large motor development, environmental understanding, and skills for navigation (Brussoni, Olsen, Pike, & Sleet, 2012). Risk-taking play allows children to "know their own strengths, trust themselves, and take calculated risks" (Gorman, 2017, p. 1).

Risky play allows children to try out their physical limits, develop motor skills, and learn to circumvent and adapt activities (Brussoni et al., 2012). Sandseter (2007) wrote about a "balance between making sure our children are safe versus letting the children play in physically and emotionally stimulating and challenging environments" (p. 237). Brussoni et al. (2012) noted two important conclusions: (1) Children have a "natural propensity toward outdoor risky play" where children seem to understand and know their limits (p. 3139) and (2) "Keeping children safe involves letting them take and manage risks" (p. 3140).

"Children's need for play has been globally recognized as a basic childhood right" (Brussoni et al., 2012, p. 3142). In fact, Brussoni et al. stated:

Through play, children learn societal roles, norms, and values and develop physical and cognitive competencies, creativity, self-worth and efficacy. Play has been described as the work of children which helps them develop intrinsic interests, learn how to make decisions, problem-solve, exert self-control, follow rules, regulate emotions, and develop and maintain peer relationships. (2012, p. 3136)

Tree Climbing Injuries, Policies, and Restrictions

Gull et al. (2018) explored injury statistics on tree climbing and found no significant organizations collecting information specifically on tree climbing accidents. Information that could be found was related to agricultural workers (including children) climbing trees, hunters with tree stands, and professional tree trimmers. They noted many states have an Environmental Literacy Plan or Children's Outdoor Bill of Rights which includes tree climbing as a way to connect to nature; however, tree climbing restrictions in public parks of major cities, such as San Francisco, New York, and Portland curtail this childhood activity. With few injury statistics and a push for tree climbing as a right in childhood, the authors shared other approaches to bans on tree climbing, such as safety rules, using a benefit risk analysis, designating certain trees for climbing, or limiting heights climbed.

Organizations, state and city parks, schools, and parents limit tree climbing for many reasons. Safety of trees and children, liability concerns, and protected areas, such as nature preserves, contribute to tree climbing restrictions. Rules and regulations limiting tree climbing are often initiated to provide protection from lawsuits against property owners and organizations. Current law practices in the United States hold property owners responsible for tree climbing accidents on their property due to negligence in many jurisdictions. How associated laws are interpreted and applied leaves many arborists and property owners with confusion and questions (Mortimer & Kane, 2004). Tree climbing policies and injury prevention may play a key role in keeping children safe; however, the same limitations may not allow for the development of resiliency through risky play.

Fathers' Practices Regarding Risky Play

Many fathers walk a fine line during play between safety and risk. Fathers' decision-making characteristics and risk-taking attitudes incorporate the importance of healthy risk taking for child development. Often, "fathers take the 'encouragement from the ground' approach to keeping kids safe ('Don't put your weight on that!'), but the better approach, as in all things, is to model good behavior" (Marx, 2017, p. 1).

According to a 2011 study in the *Journal of Developmental & Behavioral Pediatrics*, "fathers made decisions about the appropriateness of activities, striking a balance between protecting their child and exposing them to risk and

new experiences” (Brussoni & Olsen, 2011, p. 1). Fathers encourage children to “explore, take chances, overcome obstacles, be braver” (Paquette, 2004, p. 199). Tree climbing requires parents to step back and allow children to explore without hovering and monitoring their every move.

Many researchers report fathers are better at letting kids take physical risks than mothers. Fletcher et al. (2011), concluded that fathers reported that risk taking play was needed as a part of learning and that there is an increase in confidence and competence. “Father–child play that is physical, vigorous and highly stimulating and that simulates fighting (rough-and-tumble play [RTP]) has been suggested as a key aspect of male parenting that is important for child development” (Fletcher et al., 2011, p. 131). Cabrera, Fitzgerald, Bradley, and Roggman (2014) noted, “Fathers engage in more rough-and-tumble play than mothers” (p. 338). Lamb (2010) reinforced that statement, stating, “Fathers specialize in play, whereas mothers specialize in caretaking and nurturance” (p. 3). Lamb’s study also concluded father-child interaction is often “boisterous, stimulating, emotionally arousing”, along with “paternal playfulness and relative novelty” (2010, p. 3). Tamis-LeMonda (2004) found the interaction of fathers and children leads to encouraging risk-taking, developing confidence, and building courage.

Paquette (2004) revealed fathers tend to knock the children off balance during play, which contributes to cognitive development and allows children to deal with the unexpected. During play, fathers make more problem-solving demands and also use unfamiliar words to allow the child to reformulate thinking.

Men seem to have the tendency to excite, surprise, and momentarily destabilize children; they also tend to encourage children to take risks, while at the same time ensuring the latter’s safety and security, thus permitting children to learn to be braver in unfamiliar situations as well as to stand up for themselves. (Paquette, 2004, p. 193)

Fathers’ attitudes and beliefs impact children’s risky play, including tree climbing. Tree climbing and nature play are often considered part of childhood; however, increasing limitations on these activities and scarce research specifically on childhood tree climbing warrants further investigation. The literature review focused on benefits of risky play, fathers’ roles in risky play with their children, and restrictions and limitations of tree climbing. Research questions for this study include:

1. How does recreational tree climbing in childhood impact resiliency and contribute to the benefits of nature play?
2. How do fathers influence tree climbing?

METHODOLOGY

Research Design

Fathers in the United States with children aged 3-13 whom they let climb trees were questioned, using a qualitative and quantitative 19-question survey about the benefits and risks of tree climbing and impact on child development and resiliency. The survey was anonymous and descriptive in nature. This mixed-method follow-up study was based on research by Gull, Levenson Goldstein, and Rosengarten (2018), examining parental perspectives of tree climbing in the United States. The questionnaire was disseminated to fathers to capture similar results to mirror the original study.

Selection of Participants

Participants for this study were solicited through a convenience sampling method in both Spring 2016 and Spring 2017 from personal and professional online groups that focus on fathers. The survey link was posted to online discussion forums, websites related to fathers, and social media outlets. The forums were open access, so permission for access was not required to share the survey link. Participants could also share the survey link with other potential respondents.

Instrumentation

The online survey consisted of 19 mixed method questions, using templates for a quality survey. Questions 1-4 limited the participants to the following criteria: father of child(ren) ages 3-13, lived in the United States and allowed their child(ren) to climb trees. Questions 5-8 collected demographic information regarding the father’s education level, state residency, and age(s) of their children. Question 9 asked about the children’s time outdoors. Question 10 investigated why fathers allow tree climbing and Question 11 questioned about the balance of risks and benefits of tree climbing. Question 12 queried the benefits of tree climbing. Questions 13, 14, and 15 allowed fathers to write in responses about their child’s development through tree climbing, guidelines for climbing, and limitations on climbing trees. Question 16 asked about injuries related to tree climbing. Questions 17 and 18 addressed the potential impact of climbing trees on child resiliency. The last question allowed for any other comments related to tree climbing.

DATA, RESULTS, AND FINDINGS

Responses were compiled from an online survey. Online analytical tools were used to aggregate and dissect information. Open-ended responses were coded and analyzed to form the findings with reflections on fathers’ perspectives on risky play concerning tree climbing.

Demographics

One hundred five fathers met the survey parameters of having children aged 3-13, allowing tree climbing, and living in the United States. Thirty-two states were represented with many responses from Midwest states. Forty-six percent of the fathers were 35 to 44 years of age and 32% were aged 25 to 34. Most fathers in the study were college educated with 27% having some college, 33% graduated from college, 14% finishing graduate school, and 8% doing post graduate studies. Sixty-one percent of fathers reported their children spent over 10 hours outside each week.

Finding 1: Benefits and Impact of Tree Climbing

Question 10 in the survey asked why fathers allow their children to climb trees. Responses included that it is a part of childhood (95%, 93 of the 98 responses), fun (93%, 91 of 98 responses), develops skills (78%, 76 of 98 responses), connects to nature (73%, 72 of 98 responses), and helps to negotiate risk (71%, 70 of 98 responses) (see Figure 1).

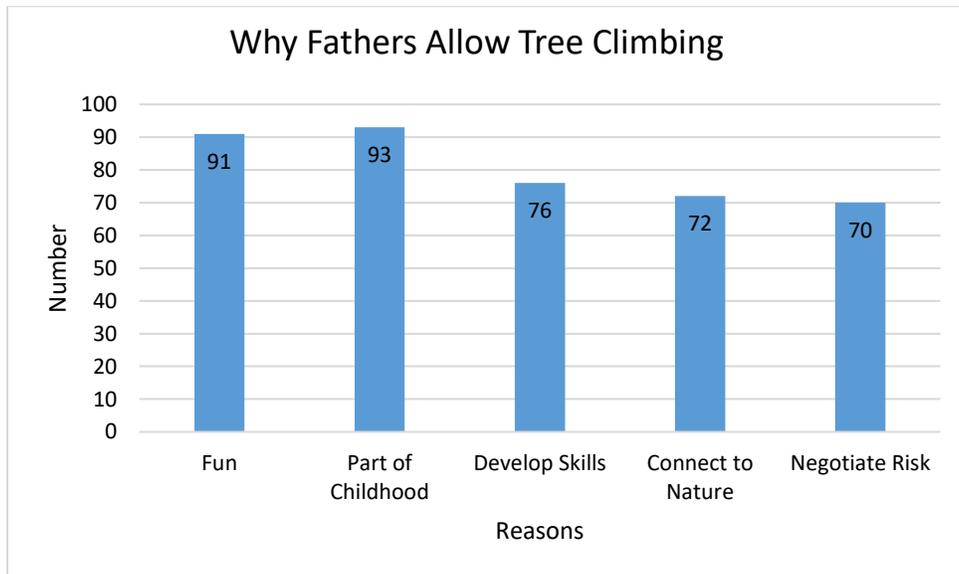


Figure 1. Why Fathers Allow Tree Climbing. This figure illustrates why fathers allow their children to climb trees.

In the Question 10 comment section, one father commented that his children were “unstoppable.” Another father wrote that his children were “seeing a new perspective.” A further comment included that climbing trees was “better than a fidget spinner or an iPad/game system.” Additional responses indicated that tree climbing “builds strength and confidence” and “builds body strength and awareness.”

In Question 11, 78% (76 of 98 responses) of fathers agreed or strongly agreed that the benefits of tree climbing outweigh the risks including potential injuries such as broken bones, concussions, or even fatality (see Figure 2).

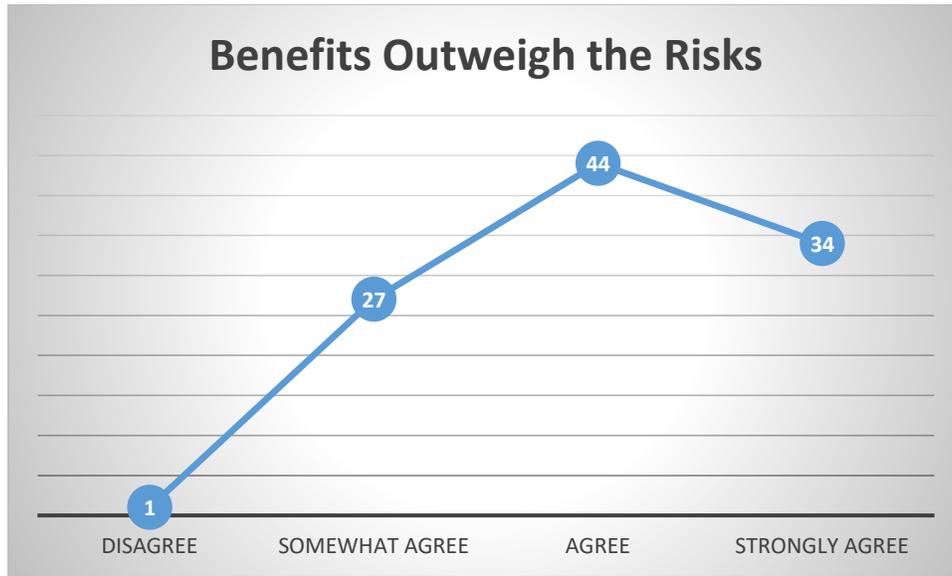


Figure 2. Benefits Outweigh the Risks. This figure indicates that the benefits of tree climbing outweigh the risks.

Question 12 looked at the impact of tree climbing on their children, listing ten potential benefits with response options ranging from no impact to high impact (see Figure 3). Over 60% (61 of 98 responses) of the fathers’ responses rated tree climbing as highly impacting dexterity and physical strength, risk negotiation, spatial awareness, and self-confidence. Social interaction rated lowest with 33% (32 of 98 responses) rating it with no to low impact.

In Question 13, fathers were asked how tree climbing helps their children grow (see Figure 4). The word cluster shows the words used more frequently in larger, bolder words, with physically, strength, nature, teaches, learn, risk, think, and builds confidence higher on the list of words



Figure 3. The Ways Tree Climbing Helps Children Grow. Parents commented by using the words in the word cloud.

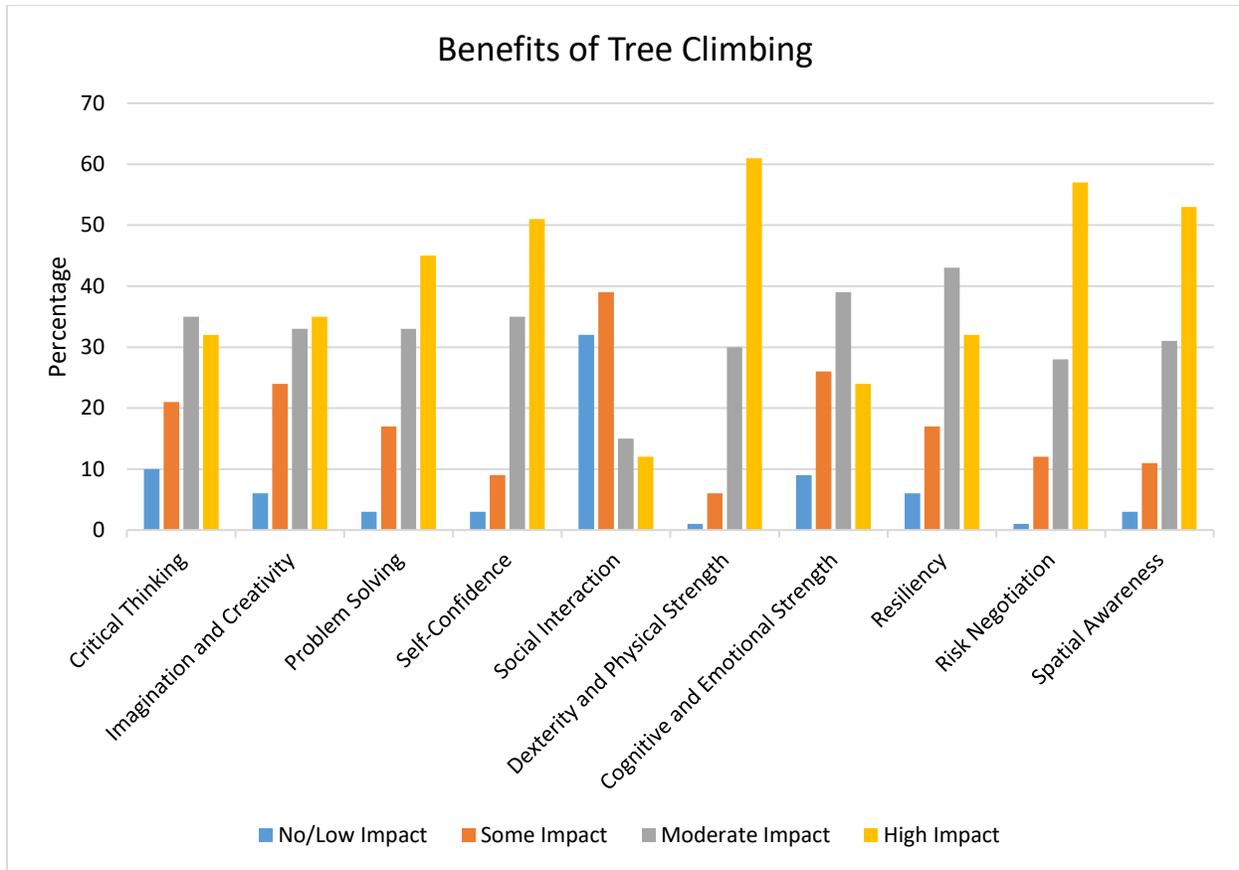


Figure 4. Benefits of Tree Climbing. This chart illustrates the perceived impact of tree climbing on ten attributes.

One father mentioned, “When you accomplish a goal that is hard you grow. Climbing a tree takes strength, planning, will and believe it or not thinking about one’s safety.” When looking at the aspect of challenge, one father said the children learn “I can do difficult things.” Another father wrote that tree climbing “Allows them to push their boundaries.” Other comments included the following:

“Climbing helps my child grow in confidence, risk assessment, physical strength and agility, problem solving; he learns what he is capable of, and can set his own goals. In imaginative play, a tree can become nearly anything- and a good climbing tree can encourage social interaction.”

“Climbing trees is an adventure for my girl. We live on a farm with no playmates nearby for her so she has only herself to rely on for fun. Climbing trees is huge for her- she is physically strong and very healthy. Trees are her forts, her houses, her tents, her sanctuary, her boats/ships, and whatever other structures she can conjure up.”

“Honestly I get nervous letting my kids climb trees because I am concerned that they could fall and get hurt. However, I have a greater fear of my children not being able to accomplish difficult thing [sic]. I have a greater fear that my kids would eather [sic] interract [sic] with a virtual world than the physical world around them. I would prefer my kid get a few scrapes [sic] knees than playing video games all day.”

“I have a child with high functioning Autism/Asperger’s. He is very cautious and doesn’t climb trees very high. He has had very limited tree climbing but I think he has used that perspective in writing stories.”

Finding 2: Rules and Restrictions

Fathers were asked about rules and restrictions they put on their children’s tree climbing in Question 14 (see Figure 5). Fathers used an approach expecting common sense for children most predominately (28%, 21 of 76 responses). Twenty percent (15 of 76 responses) mentioned a height restriction. Eighteen percent (14 of 76 responses) advocated for looking for a safe tree to climb.

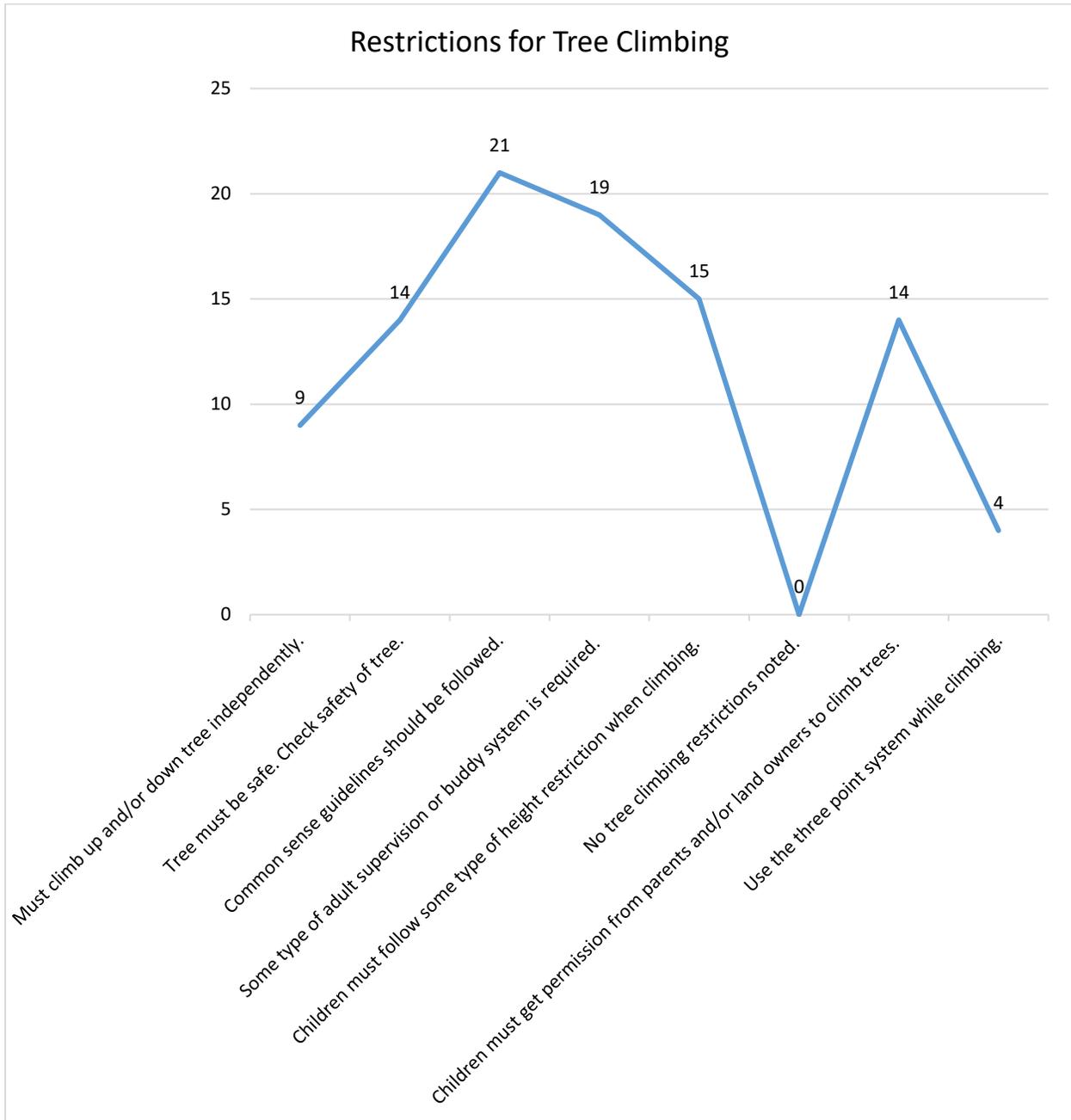


Figure 5. Restrictions for Tree Climbing. This figure describes parental tree climbing restrictions.

In Question 15, fathers encouraging common sense while tree climbing mentioned, “Be careful and pay attention” and “be mindful of your surroundings,” noting fewer restrictions as children age and show competence in tree climbing. Fathers often encourage getting permission to climb to show respect for the property and tree, as well as to avoid negative comments such as when “neighbors get mad.” Height restrictions range from “only go as high as you feel safe” to limiting the height in accordance to the age. Many fathers had variations of “If they got themselves up, they have to get themselves down.” Other fathers looked at protecting the tree, enforcing children to not “break the tree,” “don’t damage the tree,” and “be careful and respectful.” Along with respect for the tree, the child needs to assess that the tree is safe by using the three point climbing system, testing the strength of the branch before putting weight on it, and avoiding landscaping trees. Perspectives varied, as one father stated, “Right now they can only climb when I’m there to supervise. As their skill increases I will allow them to climb on their own. I teach them to maintain 3 points of contact with the tree at all times.” Another wrote, “We ask that our oldest not climb trees when in parks with other families. He is much better than most kids, and many parents are uncomfortable with their children following.”

Finding 3: Injuries from Tree Climbing

While injuries can happen as a result of tree climbing, no serious injuries were reported by fathers in this study (see Figure 6). In open responses, one father mentioned a sprained arm and a long, deep cut in his child. Eighty-three percent (65 of the 78 responses) of fathers who responded to this question mentioned their child(ren) had suffered a scraped knee, elbow or skin in Question 16. These common scrapes and bruises were mentioned in other responses on building resiliency and distinguishing minor issues from major injuries.

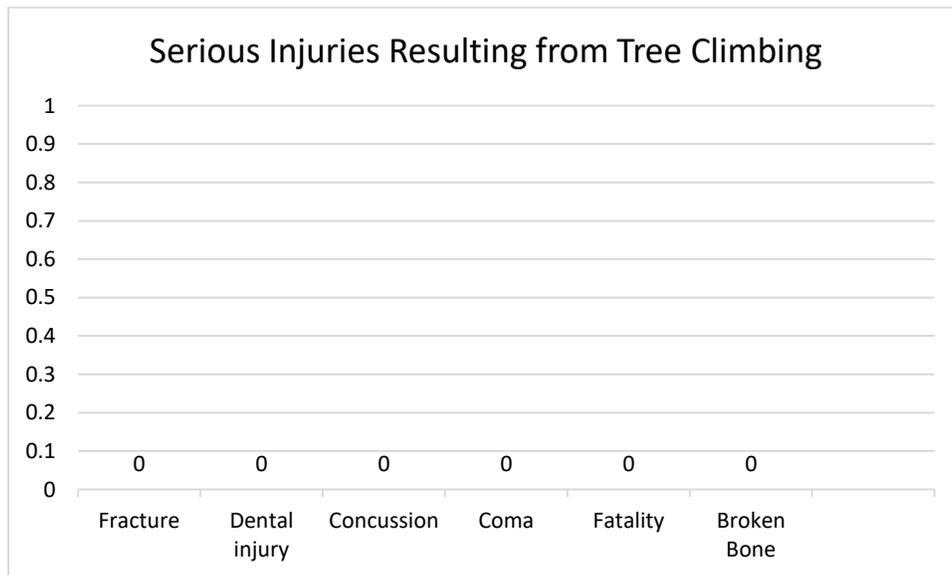


Figure 6. Injuries Resulting from Tree Climbing. This figure depicts serious injuries that result from tree climbing.

Finding 4: Tree Climbing and Resiliency

Tree climbing can impact children positively in many ways. Fathers were asked the effect tree climbing had on their children to adapt to uncertain situations, cope with challenges, and develop emotional tools to solve problems and make decisions. Question 17 in the survey looked at the ability to adapt in uncertain situations (see Figure 7). The data from the survey indicated that 80% of fathers (70 of the 88 responses) felt that tree climbing has some impact, moderate impact, or high impact on a child’s ability to adapt. In Question 18, the data from the survey indicated that 86% of fathers (76 of the 88 responses) reported that tree climbing has some impact, moderate impact, or high impact on facing and conquering new challenges (see Figure 7).

Tree climbing provides children with opportunities to develop emotional tools to solve problems and to make decisions. Of the fathers responding to this question, 80% (70 of the 88 responses) indicated that tree climbing has some, moderate, or high impact on critical thinking, perseverance, persistence, confidence, and decision making (see Figure 7).

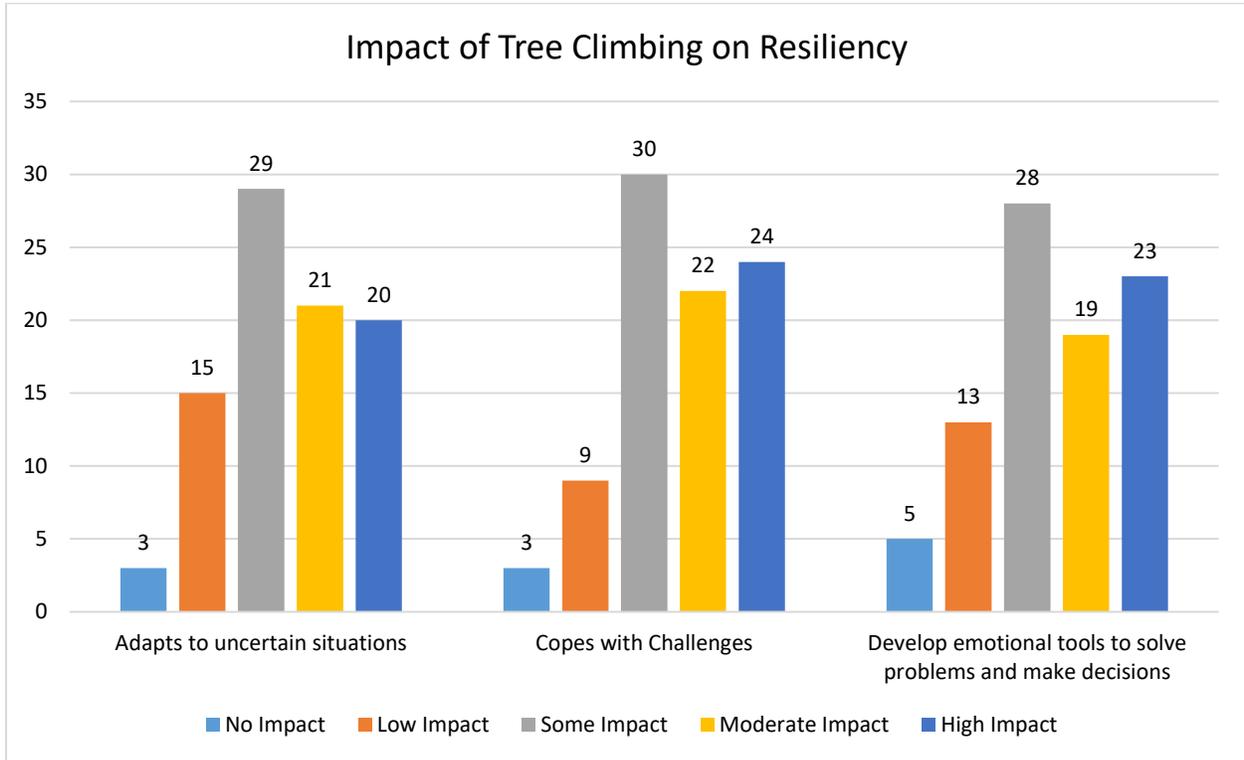


Figure 7. Impact of Tree Climbing on Resiliency. This figure demonstrates the effect of tree climbing on resiliency.

Open-ended responses in Question 18 by fathers suggested that tree climbing allows children to keep trying, figure things out, take measured risks, deal with frustrations, and build character traits such as courage, persevering, and confidence. Fathers reiterated their children learn about trying again, decision making, figuring things out, overcoming challenges, and learning from mistakes through climbing trees. Qualitative comments in regards to resiliency and tree climbing include:

“After a fall, he was afraid to get back in a tree but over time, he’s gone further than before.”

“My kids will get ‘stuck’ in a tree at times. They will start crying and not move. I’m able to climb up next to them and talk them through how to get down. This experience has thought [sic] them that when they are faced with a difficult challenge, if they stay calm they can figure it out or ask for help. This has transferred into all aspects of their lives.”

“If they ‘get stuck’ they have to stick it out and plan and execute how to get down. This transfers to other activities in that they are less frustrated when things don’t go as planned.”

“When they are challenged by falling or getting stuck, they become more resilient and have more motivation and desire to try again and succeed.”

“Climbing trees has become part of emotional coping and how they re-calibrate emotions. Kids [sic] happiest in woods and climbing.”

“If you aren’t successful, it toughens up your responses. It makes you realize you may have to try a few times before something works.”

“At times they’ve freaked out when they think they can’t do something, or think they’ve gone too high. They’ll ask for help, I’ll provide support while they finish the action themselves. They’re a lot calmer about it now.”

Many fathers reported children persevering, writing, “Doesn’t give up. Tries harder.” Others mentioned a “respect for the challenge” of tree climbing and continue working to master climbing a tree. Children are able to “deal with problems” and “not back down from difficult” situations through tree climbing. Seven fathers reported no effect or not being sure of an effect of tree climbing on resiliency.

DISCUSSION AND FURTHER RECOMMENDATIONS

This study assessed the benefits and risks of tree climbing on child development and resiliency across the United States from fathers’ perspectives, following Gull et al.’s (2018) recommendations to look at fathers’ perspectives. Since 93% of their original respondents were female, specifically understanding fathers’ attitudes toward the risks and benefits of tree climbing as a stand-alone study potentially provides more information and gender-based insights.

Based on the 105 fathers that completed the survey, the data concluded that tree climbing provides children with the ability to have fun while improving dexterity, physical strength, risk negotiation, spatial awareness, and self-confidence. Brussoni, Creighton, Olsen, and Oliffe (2013) noted, “Most men considered engaging children in risk as key to facilitating development and described strategies for protecting their children while engaging in risk” (p. 1). While fathers recognize the benefits of tree climbing, they also help their children negotiate the presented risk through encouraging common sense behaviors, putting height restrictions on the climbing, requiring supervision and/or permission, and checking for the safety of the tree. This reiterates Creighton, Brussoni, Oliffe, and Olsen’s (2017) study on fathers’ roles in risk suggesting that fathers “value risk taking over protection for self and child” (p. 8) while also looking at safety needs in protecting their children from injury mirroring the fathers’ tendencies to enjoy risk in their own lives.

Fathers noted dexterity and physical strength, risk negotiation, spatial awareness, and self-confidence as benefits of tree climbing. This confirms Brussoni et al.’s (2013) finding that men put emphasis on encouraging their children in risk-taking activities as they test physical abilities, promote confidence, self-esteem, and build character. In analyzing responses to Question 13 from Gull et al.’s (2018) study, the responses from fathers offers interesting comparisons in regards to parents’ perspectives on how tree climbing helps children grow. Gull et al.’s (2018) word cloud shows self-confidence, fun, problem solving, believe, and learn as dominant words from a predominantly female perspective. Figure 4 of this father-focused study shows words such as physically, strength, risk, grow, nature, and learn as dominant words in the corresponding figure, illustrating a stronger connection to physical growth and risk taking as ways tree climbing helps children grow.

When looking at park policies, instead of instituting complete bans on tree climbing, recreational facilities could use information on fathers to help appeal to the safety side of fathers. Brussoni, Olsen, Creighton, and Oliffe (2013) found that men were more in control of the children’s risk taking and recreation, while women are often responsible for the safety and injury prevention. Brussoni, Creighton, Olsen, and Oliffe (2013) suggest, “Injury prevention efforts might benefit from tapping into such contemporary father-child relationships, both in terms of acknowledging fathers as experts in their children’s well-being (much as we currently do with mothers) and providing fathers with tools to select appropriate strategies for protection” (p. 9). Appealing to fathers with appropriate tools in the way of suggestions on looking at safety of the tree and tree climbing and trusting fathers are seriously considering risks and benefits of tree climbing could be more beneficial than tree climbing bans.

Risky play, specifically tree climbing, has an important role in the well-being and satisfaction of children. Even though the results of the study conclude the tree climbing can result in minor injuries, such as a scraped knee, it is a relatively safe activity for children. Fathers of tree climbers recognize and accept the risk of tree climbing, knowing the risks and potential injuries are growing experiences for their children. In fact, Creighton et al. (2017) report “some fathers were more comfortable with the possibility of injury, believing that getting hurt could be a way to learn and a means to toughen up” (p. 10). Therefore, in these studies, the benefits of tree climbing make the potential risks worthwhile from fathers’ perspectives, mirroring the results of mothers’ views from Gull et al. (2018) for this demographic.

While interesting to look at fathers’ perspectives on the risks and benefits of tree climbing, the convenience sampling of the group following Gull et al.’s (2018) methodology, limited the diversity of perspectives shared. The fathers’ parenting styles and backgrounds potentially influenced findings. Although the survey was distributed online with open access, fathers that use social media, are active on nature play sites, and/or friends and family of those active in outdoor and nature activities, were aware of and completed the survey, potentially limiting larger diversity of responses. As noted in the demographics, the fathers sampled have high college attendance rates and children who typically spend over 10 hours outside each week (61%). A strength of the study is additional data on fathers’ perspectives on tree climbing, looking at the impact of tree climbing on resiliency, father-reported tree climbing injuries, and limitations on tree climbing. Perhaps this type of information can help normalize the perceived risk and fears of tree climbing, making it a more acceptable risk such as crossing streets or participating in organized sports. While there is potential for injury or accident in many childhood activities, society often chooses what is more acceptable in regards to risk and potential injury. With low injury rates reported in this study and no specific outside data gathering on tree climbing injuries, perhaps allowing the risk is needed, as fathers agreed in the study. As recreational areas and parks put restrictions on tree climbing, studies like this can help tree climbing be perceived as acceptable risks, such as crossing streets and organized sports, which often also happen in these same spaces.

Recommendations for Future Studies

There is still little information on recreational tree climbing of children in academic research. Gull, et al.’s (2018) suggestions of looking at regional differences or varied perspectives by ethnicity are still applicable. Focusing on more socially diverse groups that include differences in education, economics, physical abilities, political and religious beliefs, sexual orientation, and other attributes could be valuable. Gender roles are also somewhat changing. Looking at changing viewpoints from more adventurous mothers and more domestic fathers could be effective. Investigating tree climbing safety recommendations aimed with fathers in mind could help target fathers who take an active recreation role with their children. Understanding better the interaction between the liability of property owners and litigation could be enhanced by looking at court case rulings and the needs of insurance companies. Additionally, using a similar study to “understand lawyer, judge, public space provider, environmental educator, and insurance perspectives on the topic might be fruitful” (Gull et al., 2018, p. 23).

The sampling and methodology of this study could have been carried out in a more concise and controlled method to have more reliable data that might represent fathers’ perceptions more holistically. To have a more reliable study, defining the target participants, minimum sampling sizes, and sampling methodology could be improved. Qualitative research using focus groups, interviews, or observations could be used. Focus groups are valuable research tools that can capture information that will help to better tell the story on the research topic. Using a focus group could generate additional ideas, gather feedback, and encourage further discussion (Nagle and Williams, 2019). Quantitative retrospective research could be done looking more closely at potential data around injuries sustained from tree climbing.

Investigating parent fears and judgment of others for additional research is still warranted while also looking at actual serious injuries of tree climbing (Gull et al., 2018). In this particular fathers’ study, no serious injuries were noted. Confirming the typical low risk of serious injury while also recognizing the real potential of injury is prudent. Investigating how parents and society teach children to climb trees and negotiate risk in general, such as crossing the street, as well as society’s acceptance or rejection of perceived risk and liability could shed light on the limitations and restrictions of tree climbing. Additionally, better understanding the father’s role in attitudes of fear, safety, risk,

pushing boundaries, and accepting challenges can add more diverse information to the bigger picture of the risks and opportunities of children climbing trees.

CONCLUSION

Fathers of children aged 3-13 that climb trees were questioned to understand how tree climbing may impact children's growth and resiliency. Four main findings were assessed: risks and benefits of tree climbing, limitations on tree climbing, related injuries, and the connection of resiliency to tree climbing. Analyzing fathers' viewpoints on the benefits, behaviors, rules, restrictions, and injuries concluded that fathers in this study perceived that tree climbing provides children with the ability to have fun and improve dexterity, physical strength, risk negotiation, spatial awareness, and self-confidence. Risky play, specifically tree climbing, has an important role in the well-being and satisfaction of children. The study concluded the benefits of tree climbing make the potential risks worthwhile from fathers' perspectives.

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Book Review

Carla Gull

Book and Resource Review Editor

Children's Environmental Identity Development: Negotiating Inner and Outer Tensions in Natural World Socialization,

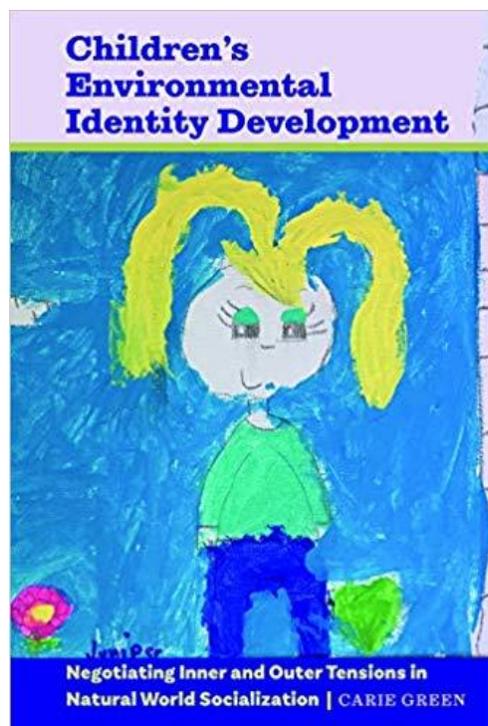
Authored by Carie Green, University of Alaska, Fairbanks

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Green, C. (2018). *Children's Environmental Identity Development: Negotiating Inner and Outer Tensions in Natural World Socialization*. New York: Peter Lang.

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In *Children's Environmental Identity Development*, Carie Green from University of Alaska Fairbanks helps educators, parents, and researchers enter the world of a child's growing connection to nature. Green sets



the stage by defining environmental identity and outlining the model of growth within this framework. She shares the foundational attributes of the Environmental Identity Development Model, building from trust to autonomy and then to competence in nature, as well as the polar expression of these stages. Simple line drawings and words help summarize and make the concepts visible. The text is interspersed with many examples that illustrate the theories and connections, making it very readable for anyone interested in connecting children to nature. The book is written through a researcher's eyes who allows children to be part of the research process as they collect and analyze data.

Green also focuses on environmental action versus environmental harm. She reminds us that it is not enough to allow children time to spend in nature, but also to help them become an integral part of caring for the living world and being change agents. She advocates that educators play an important role in this development as they may need to correct and redirect children with an emphasis on developing critical thinking and sustainability.

Green takes on the topic of research on, with and by children in a manner very accessible to the reader, sharing various research methods where children might take the lead, such as bookmaking, sensory tours, video-stimulated group discussion, artistic representations, drawing and painting, building a model, and role-playing. She stresses research with children should have a more playful vibe and include participation of the children, promoting agency. The role of the formal researcher in this type of research may move to supporter. Green walks the audience through making this shift in research as well as the relationships needed. This chapter is invaluable in helping educators and researchers involving children in the research.

Using examples, stories, and theory, Green seamlessly helps the reader see a holistic view of the progression of building an EID. Throughout the book, Green shares a variety of stories to illustrate the principles presented in the book. This invaluable insight into the progression of children's connection to nature promotes a more sustainable movement in early childhood education.

Other publications by Carie Green in IJEECE:

***A Sense of Autonomy in Young Children's Special Places* (2013)**

https://naturalstart.org/sites/default/files/journal/6.ijecee_first_issue_research_study_sense_of_autonomy_final.pdf

This earlier research by Carie Green explores how children connect with natural place settings and what educators need to consider in this journey as children develop a relationship with the natural world. She advocates for the need of open-ended environments and learning opportunities that allow children to maintain more control of their learnings and spaces.

***Four Methods for Engaging Young Children as Environmental Education Researchers* (2017)**

https://naturalstart.org/sites/default/files/journal/ijecee_5_1_green.pdf

This research article illustrates participatory research strategies when working with children in the outdoors, such as Book Making, Role Playing, Building a Model, and Art Making. Green shares methods, tips, and challenges of using these types of research and how they might be applied. Reflection with the children over their creations is a key consideration of the analysis of the participatory research.

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