Exploring Access to Nature Play in Urban Parks: Resilience, Sustainability, and Early Childhood

Thomas Beery
Kristianstad University, Faculty of Education, 291 39 Kristianstad, Sweden; thomas.beery@hkr.se

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Abstract: Nature play is an important component of the development of resilience in early childhood. Nature play is also an element of urban sustainability through a consideration of access to urban nature. From the foundation of access to nature play as a part of both resilience and sustainability considerations, a mixed-method case study was initiated. Spatial analysis, survey outreach, and focus group methodology have been combined to consider whether city parkland provides access for preschools to incorporate nature play, and, further, whether other barriers may exist to limit or prevent the use of city parks for nature play by preschool programs. The results indicate the existence of quality proximate access, but other factors creating barriers for broader application of nature play exist. The results also illustrate the critical role of public access to public parks as part of urban sustainability and the development of resilience in young children. The implications for the use of city parkland for nature play are presented.

Keywords: access; nature play; proximity; city parks; resilience; sustainability

1. Introduction

Given the uncertain and rapidly changing times, including the potential for overwhelming system disturbances such as biodiversity loss, climate change, natural disasters, war, and terror, the field of early childhood education has increasingly considered the development of resilience [1–3] and sustainability [4–6]. Sustainability is often defined as meeting present needs without compromising future generations’ ability to meet their needs [7]. The origins of sustainable development emphasize the core goals of protecting and maintaining natural and cultural resources for the future while mitigating undesirable change [8]. The aspect of mitigating unwelcome change is where the concept of sustainability intersects with resilience [9]. Resilience is based on the consideration of disruption [10] and is often defined by scale [11]. For example, the ability of a system to bounce back from adversity is one way that resilience has been described [12]. The Stockholm Resilience Center defines resilience as “the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop” [13]. Drawing on both sustainability and resilience, a useful way to describe socio-ecological resilience is the flexibility that allows for systems to maintain function despite disruption [14], and, further, to adapt to disruption while creating new opportunities [15]. Intertwining sustainability and resilience allows us to consider protecting and conserving along with adapting [16,17], for example, to consider the role of urban green space, and specifically public urban parks, to help us protect, conserve, and adapt.

Simultaneously, and related to the noted system disturbance concerns, environmental educators are alarmed by a documented disconnection from nature, both physical proximate access and connection in affective, cognitive, and physical terms [18–20]. This trend appears to present a serious disruption in early childhood. Just what these disruptions may mean for healthy development, environmental understanding, pro-environmental behaviors, and individual resilience in the face of adversity are essential questions for environmental education. Research shows us that access to
nature is a component of sustainability [21], and access to nature for nature play is a useful sustainability indicator as well as a potentially important part of the development of individual resilience [22,23].

This current study emphasizes a need to combine the consideration of resilience and sustainability as they relate to early childhood experience. The research presented in this article uses the importance of childhood resilience as a motivation for a deeper consideration of access to nature play. This article presents a mixed-methods case study exploring preschool educational program access and barriers to nature play in one community (Duluth, Minnesota). Spatial analysis, survey outreach, and focus group methodology are combined to consider whether designated city parkland provides proximate access for preschools to incorporate nature play. Moreover, the research presented in this article attempts to answer whether other barriers exist to limit or prevent preschool use of nature play in city parks.

2. Background

This section will provide background information for the concepts of resilience, sustainability, nature play and the study site location, Duluth, Minnesota.

2.1. Resilience

Resilience in young children with a focus upon an individual’s adaptive capacities is the foundation for the inquiry. A simple definition of resilience in this context is “positive adaptation in the context of risk or adversity” [24]. A list of the factors associated with the development of resilience in young people includes effective parenting, close relationships with other capable adults, close friends, problem-solving skills, self-control, emotional regulation, and self-efficacy [24]. In efforts to demystify the meaning, resilience is referred to as the ability of a system to bounce back from adversity [12]. Perhaps more useful, however, is the idea of a system’s flexibility, in this case, a child’s flexibility, to bounce forward from adversity to new and improved states [12]. Just how we support this flexibility is an environmental education question of growing concern [25].

2.2. Sustainability

Another environmental education question of importance is how we include young learners in questions of sustainability. The 17 Sustainable Development Goals (SDGs) of the United Nations’ Agenda 2030 [26] provide a great deal of guidance and inspiration for educational efforts at multiple levels, primarily through a consideration of SDG targets. However, in this study, the focus is on children’s opportunity for a nature experience in the form of nature play as a foundational element in education for sustainability [22]. For very young learners, access and proximity are critical aspects for first-hand experiences, mostly through play. Ernst and Burcak [23] highlighted the potential contribution of nature play in the context of education for sustainability in their study of nature preschools. And while there are many possible sustainability indicators for young learners [27], we operationalize sustainability in this study through the idea of access and proximity to nature play.

2.3. Nature Play

Play is an experience that children actively shape, and that includes enjoyment and choice [28]. The meaning of the play is context-dependent [29]; thus, a more in-depth look at what nature play entails is warranted. First, a quick consideration of the idea of “nature”. A broad and inclusive idea of nature, defined as “an organic environment where the majority of ecosystem processes are present (e.g., birth, death, reproduction, relationships between species). This list includes the spectrum of habitats from wilderness areas to farms and gardens” [30,19]. This particular definition is useful as it spans a spectrum of outdoor spaces from the largely nonhuman to the heavily human; in the case of this research, we operationalize nature as the largely undeveloped or unmanaged parts of urban parks. More important for this study, however, is not this definition, but rather what these places afford for children, what kind of interactions with the physical and living elements of nature that
these places provide. Drawing upon the work of the Children and Nature Network, nature play is defined as outdoor free play in natural areas that is imaginative, constructive, sensory-rich, and cooperative [31]. Moreover, the Natural Start organization describes nature play “sites” as providing elemental nature to interact with, things like rocks, dirt, trees, bugs, flowers, mud, and water [32]. Nature play sites must also allow for the manipulation of these items; children must be free to dig, collect, climb, build, and hide. For this study, the idea of nature play combines both the joyful and self-directed experience of children in nature sites that allow for interaction with the elements of the site. The definition of nature play is very similar to the description of early childhood connectedness to nature from a recent study, e.g., freely chosen personal choice, bodily movement in nature, exploration of nature phenomena, place exploration, and free play [33]. While not the same, the potential relationship between nature play and early childhood connectedness to nature appears to be significant.

Note, while many early childhood education facilities in a global north context may have space inclusive of some of the characteristics described in the definition of nature play, there is a concern that highly managed sites may prevent some of the benefits provided by nature play [34]. Therefore, this study has a focus on city parks’ ability to provide the rich nature play opportunity as described above in the description of nature play as inclusive of elemental nature for interaction, things like rocks, dirt, trees, bugs, flowers, mud, and water [32].

2.4. Nature, Play, Resilience, and Sustainability

The Child and Nature Network, drawing upon a report from the American Academy of Pediatrics, describe nature play as an essential component of resilience [35]. A growing body of research literature exists to support a connection between nature experience, play, and resilience, for example, Hordyk, Dulude, and Shem [36] noted the power of nature to provide children with emotional nourishment. Adams and Savahl [37] found nature to be critical to the subjective well-being of children and described natural spaces as buffers against stress, promoting the development of resilience competencies.

Research has identified specific resilience factors that are supported by organized early childhood nature experience. For example, Elliot et al. [38] noted that nature kindergarten settings foster community as they offer opportunities for young learners to negotiate roles, collaborate, employ teamwork, and develop social skills. In a similar setting, the role of green schoolyards to support children’s resilience was described by Chawla et al. [25], who noted the development of protective factors, such as escaping stress, developing focus, building competence, and forming supportive social groups.

Executive function development aligns with the strategies and approaches used in nature play educational settings [39,40] and is supported by opportunities and guidance that encourage choice and child autonomy [41,42]. The “loose parts” aspect of nature play settings allow for executive functioning to be developed as children play, experiment, problem-solve, and innovate with the natural materials at hand [43,44]. Further, play helps children construct an identity and support autonomy and agency [28,29]. While the focus of the current study is early childhood, exposure to natural environments for play has been described as a protective factor for older children as well, for example, subjective and psychological well-being [38,45].

Numerous studies have emphasized the relationship between proximity/access to nature and elements of resilience in reference to the importance of green space. For example, the importance of access to nearby nature to provide children with a buffer against life stress was noted by Wells and Evans [46]. Corraliza, Collado, and Bethelmy [47] suggest that nature bolsters children’s resilience, providing children with more contact with nature to cope better with adversity than those who do not have regular access. Flouri, Midouhas, and Joshi [48] found that access to green space predicted emotional resilience for children aged 3–5. Richardson et al. [49] concluded that natural neighborhood space might reduce social, emotional, and behavioral difficulties for 4 to 6-year-olds. A recent study has looked at a related question of a prolonged presence of green space through childhood and across the life-course; this Danish study used health and demographic data and
concluded that growing up near green space is associated with up to a 55 percent lower risk of mental health disorders in adulthood, independent from effects of other known risk factors [50].

Fjørtoft [51] highlights another aspect of resilience, the potential connections between nature play, and physical health. Fjørtoft notes that children are provided with a natural landscape in which to play, resulting in a significant increase in motor fitness. The quasi-experimental study found significant differences between the two groups regarding balance and coordination, favoring the nature play group. Relatedly, Roemmich et al. [52] found that neighborhoods with increased proximity between homes and a higher proportion of park area are associated with greater physical activity in young children. Wolch et al. [53] found a reduced risk of obesity for children with proximate access to urban parks.

All of these research examples support a relationship between the various elements of developmental resilience for young children and the critical sustainability indicator of proximity/access to nature. One final example, Ernst and Burçak, highlighted the potential contribution of nature play toward curiosity, creative thinking, and resilience in the context of education for sustainability in their study of nature preschools [23]. The next section will focus on nature play access in one community, using this connection as a foundation. Access will be considered via a focus on city park proximity and community support for nature play.

2.5. The Duluth Experience

The spatial design of a city can be a leading factor in how urban dwellers relate to the physical landscape [54,55]. Furthermore, specific measures of green space proximity are often used in evaluations of urban quality [56]. These aspects of spatial design make Duluth an interesting subject for an investigation into nature play for preschool children. Duluth is a relatively small city (population 86,000) in the US state of Minnesota. Duluth is located in the northeastern part of the state at the Western tip of Lake Superior, one of the North American Great Lakes. Duluth has an expanse of undeveloped green space (11,000 acres), including 6834 acres of parkland [57] (See Figure 1). In addition, Duluth is known for extensive trail-based recreation, including mountain biking, hiking, and cross-country ski trails, 16 designated trout streams, 17 miles of Lake Superior shoreline, and approximately 17 miles of St. Louis River shoreline (see Figure 1). These nature-based outdoor recreation resources contribute to Duluth’s growing identity as an outdoor recreation destination and are supported by such accolades as “Best Place to Live” by Outside Magazine [58].
Another aspect of Duluth in regards to an investigation into access to nature play for preschool children worth considering is the city’s general commitment to questions of sustainability. The whole notion of Duluth as a “best place to live” is based on the overlap between environmental quality, economic opportunity, and human well-being outcomes. Duluth uses outdoor recreation and access to nature as sustainability indicators. Consider the St. Louis River Corridor project, an $18 million effort to support outdoor recreation, economic opportunity, environmental quality, and tourism development along the St. Louis River in Duluth [59]. Another example is community engagement in sustainability questions like climate change; in 2017, a group of 50 local outdoor recreation professionals gathered in Duluth to consider the intersection between outdoor recreation and climate change [9]. The workshop generated awareness and climate action, later reflected in community climate conversations [60]. More recently, Duluth has shown a deep commitment to community sustainability through the establishment of a new position in the mayor’s office, a full-time sustainability officer for the city [61].

Moreover, one additional and critical reason to highlight Duluth as an interesting case study for preschool access to nature play is the growing nature play movement in the community over the past decade. In 2008, students at the University of Minnesota Duluth Environmental Education graduate program held a nature play symposium for the community, inclusive of a community survey. The implications from that survey outreach to parents and daycare providers included increasing access to natural spaces and an identified need to raise awareness of play’s value in natural settings [62]. The Duluth Nature Play Collaborative (DNPC) is another community asset for nature play. The DNPC is a loosely organized group of parents and early childhood professionals formed in 2013 to support the creation of several nature preschools in the area [63]. While there is no official membership, the DNPC has a mailing list of 60 people with monthly meetings and yearly gatherings. The collaborative describes itself as “a group of nature preschool teachers and other community members that seek to educate, inspire, connect, and advocate for nature play for young children in the Duluth area” [64]. One specific example of the DNPC efforts is community film screenings featuring nature play films, research, and discussion. At the autumn 2017 gathering, the question of who is being served by nature play opportunity in Duluth was considered. The discussion considered how issues of access can be explored from multiple perspectives, from physical geography to social
equity. From this community discussion, the idea of mapping preschool access to city parkland emerged.

3. Methods and Results

Duluth provides a useful case study to consider a real-life application of the question of preschool access to nature play. The use of a case study is based on the exploration of Duluth as a bounded system, using in-depth data collection and multiple sources of information [65]. Concrete, context-dependent knowledge was sought through spatial information, institutional knowledge, and individual experience to provide both detail and perspective to the single case study [66]. Underlying this research is a critical realist paradigm, i.e., an attempt to capture reality through broad critical examination [67]. The methodology combined various specific research methods to illuminate the phenomenon of interest, i.e., nature play in city parks. The spatial analysis was designed to address the initial research question of whether city parkland provides proximate access for nature play for Duluth preschool settings. The subsequent survey and focus group methods were used to consider the spatial analysis results. Also, the methods were used to address the second research question of what other barriers may exist to limit or prevent the use of city parks for nature play sites by preschool programs. The University of Minnesota Institutional Review Board reviewed and approved each step of the research process for ethical considerations.

3.1. Spatial Analysis Methods

A spatial analysis was conducted to map parkland and licensed preschool facilities in the city of Duluth. The street and park layers came from datasets which the Geospatial Analysis Center (GAC) acquired from the City of Duluth. Childcare facilities were first geocoded using the ArcGIS Business Analyst Server local service geocoder. The following criteria were used to select the childcare facilities to include in the network analysis:

- They must be located within the City of Duluth’s boundary (facilities with a Duluth address but located outside the city boundary were not included in the analysis);
- They must be licensed by the Minnesota Department of Human Services as either a “Child Care Center” or a “Family Child Care”.

Two measures to evaluate the walkable distance between Duluth preschools and city parks were employed: 400 m and 100 m. These designations were based on a review of previous related methods. The Trust for Public Land used a measure of 10 min walking distance between residence and park (defined as ½ mile or 800 m) for their public access criteria in their Park Score 2018 methodology [68]. Previous research involving the distance to green space for children and youth provides examples of 200 m and 400 m distances identified as providing walkable access from the residence to children under the age of 14 in a study of Newark, New Jersey, and under the age of 18 in a Los Angeles city park study [53,68]. These distances are comparable to the 300 m World Health Organization indicator for monitoring the implementation of the Parma Declaration to provide every child with access to green space for play and physical activity [69].

To determine which city parks were within walking distance of a Duluth childcare facility, a service area network analysis was performed using ArcMap 10.6. A service area is a network of accessible roads within a defined distance or travel time, around a specific location on a network. For this analysis, licensed childcare facilities within Duluth’s city limits were used as the location points, Duluth’s roads as the network, and a service area cutoff distance of 400 m, traveling away from a childcare facility, was defined. The output generated a network of 400 m long lines, traveling along the roads in all directions, away from each childcare facility. The same procedure using 100 m long lines was also conducted. Determining whether a childcare facility was within the 100 m or 400 m walking distance of a city park was based on whether its network intersected the boundary of a city park. However, because the road network and park layers rarely intersect, it was necessary to first create a buffer around the line networks, with a reasonable distance that allowed network lines adjacent or near a park to intersect the park’s boundary. Fifty meters was determined to be a
reasonable distance based upon consultation with the Geospatial Analysis Center at the University of Minnesota Duluth. Childcare facilities with buffered networks that intersected a park boundary were categorized as within walking distance of a park; all other childcare facilities were determined to be beyond a park’s walking distance.

Spatial Analysis Results

One hundred and forty-four childcare facilities met the criteria. Ninety-three childcare facilities were identified within the 400 m networks (See Figure 2). Twenty-eight facilities were identified within the 100 m network (See Figure 3).

Figure 2. The 144 childcare facilities in Duluth, Minnesota: 93 childcare facilities located within the 400 m network, 51 located outside of the 400 m network.
3.2. Survey Methods

Based on the spatial analysis results, an attempt to reach all 28 of the 100 m proximate childcare facilities via telephone was attempted. Contact was made with 18 of the 28 facilities and permission to email a survey to a representative was requested (at least six of the phone attempts were unsuccessful based on facility closures). A survey was then sent to the 18 established contacts. The email assured participant confidentiality, and reminders were sent to encourage participation [70]. The electronic survey consisted of 20 yes/no, multiple-choice, list, and open-ended questions. The question categories ranged from facility demographics to specific questions about outdoor space use for play and the use of the city park identified within 100 m of the facility; each survey included a map of the site-specific 100 m park as reference for the survey questions.

3.2.1. Survey Results

Of the 18 surveys sent, 15 were completed. The survey demographic responses indicate that the sample represents programs serving 330 children. The results suggest that the children represented spend an average of 8 h in care daily. The results also represent facilities with a total of 37 full-time professionals. The survey questions exploring questions of the preschool facilities, access to nature play and proximate park space, and level of support for the use of nature play sites are provided in the next sub-sections.

Site Facility Questions

When asked about facilities, all respondents indicated that there was an outdoor area as part of their preschool facility; when asked for more details regarding the site, respondents described various site types. Thirteen respondents noted playground equipment, and seven sites described a play area as “nature” (some facilities having multiple play settings). Results show that these various sites are used daily at most facilities, three participants reported a 2–4 times per week outdoor site use, and 12 participants indicated that the outdoor sites were used daily.

Nature Play and Proximate Park Space Questions

Beyond the facilities, participants were asked about the use of the 100 m park space for outdoor play, ten reported using the parkland, and eight of the ten reported using it as a nature play site. When asked about nature play in general, as to the frequency of opportunity, on and offsite (including the 100 m parkland), 11 participants indicated that children had nature play access at least once per week. On the low end, three participants reported that the children had access less than once per month, and on the high end, four participants noted daily access to nature play sites. When explicitly asked about the use of the 100 m park site, several barriers were identified. While no respondents identified a lack of interest or lack of time as barriers, seven noted uncertain or lack of bathroom facilities. Three respondents indicated that they did not experience any barriers to the use of the site.

Level of Support for the Use of Nature Play Sites

Another set of questions was posed to determine the level of support by crucial adult groups involved: parents, professional preschool staff, and facility administrators. Respondents were asked to rate their comfort level with the idea/practice of taking children out to play in nature play sites using a five-point Likert scale. The results showed that out of the 14 respondents that answered this question, only one was “somewhat uncomfortable”, while five were “somewhat comfortable,” and eight were “extremely comfortable.” These results indicating a high level of comfort were almost the same as respondent comfort perceptions of the other key adult groups (parents and administrators).

3.3. Focus Group Methods
A subgroup of the 18 respondents from the survey was invited to discuss the survey results and questions of access to nature play in Duluth in detail; invitations went to all participants who had indicated on the survey their willingness to discuss the topics further. In addition, preschool professionals that self-identified from a DNPC public event and indicated an interest in these topics were invited; a total of 12 participants were asked. The focus group intended to consider the details of the survey and, specifically, further assess the viability of the idea of Duluth parkland as useful in the question of access to nature play for Duluth preschool-aged children.

Specific questions regarding access and use of Duluth city parkland were prepared and asked of the group. Follow-up questions allowed for the sharing of particular examples and a detailed descriptions of access and park use; the discussion was allowed to follow group interest based upon a semi-structured interview approach. The session was planned for two hours and was recorded with the participants’ consent. The recordings were transcribed and analyzed using a qualitative coding procedure known as constant comparison analysis. The process involved a three-step process of open coding for consideration of meaningful chunks of data followed by additional coding to group the chunks into categories [71]. The final step was the identification of themes expressing relevant content. Both a sample of the data collected and analyzed themes are presented in the results.

3.3.1. Focus Group Results

Six participants representing a range of early childhood education settings participated in the focus group (See Table 1). During the introductions, other connections to nature play and early childhood environmental education were shared. Also, as part of the introductions, participants shared descriptions of their university training, advanced degrees, and role as parents of young children.

| Participant Affiliation                                              |
|---------------------------------------------------------------------|
| Elementary school pre-kindergarten setting                         |
| University pre-kindergarten setting                                |
| Non-profit nature preschool associated with a nature center and housed within a city park |
| Home-based care facility with a nature play focus                  |
| Private business that designs nature play settings                  |
| Parent organizer for the Nature Play Collaborative                 |

This section will highlight participant response to the survey follow-up questions regarding proximity and access to city parks, nature play policy, program design, and other emerging themes.

Proximate Access

Nature play in city parks was strongly supported. While the 100 m measure was accepted as a useful measure, although not without qualifications such as the theme of seasonality. The group discussed how distance is a seasonal measure in a four-season region, highlighting the distance challenges of winter snow and cold and spring mud and wet. For example:

“...if the snow is deep, if it is icy, if you have un-shoveled sidewalks... and if you can be out for only 5 min due to frostbite risk...”

“I remember there was a week in April... the trails were closed because it was so wet and muddy...”

Nature Play Policy

The access discussion moved quickly from distance to policy. The focus was directed at policy barriers and the need for policy change. One participant discussed the challenge of getting children to nature-rich sites for play based upon a Headstart/public school setting policy mandating fenced play space. Another example of a policy barrier was concerned with the interpretation of licensing
requirements by inspectors. For instance, whether a particular park or nature sites or specific activities would be approved. One participant voiced concerns about whether an accommodation such as hand sanitizer for clean-up after a “nature pee” vs. soap and water hand washing policy. A hopeful aspect of the policy barrier discussion was the awareness of some group members regarding policy initiatives underway to support and encourage nature play. For example, one participant noted that licensing standards effort in Washington State [72] provided a model for other states to follow. Other policy efforts were noted as well, specifically the Minnesota Department of Education/Health’s actions. Further, the Minnesota Department of Human Services program Parent Aware was noted as developing a specialty rating that would support policy change in favor of nature play programming [73].

Program Design

The topic of barriers led to a detailed discussion of how this group of professionals manages or adapts via program design; for example, nature play programming to accommodate bathroom needs. The survey results noted that the uncertain or lack of bathroom facilities was a barrier. The discussion confirmed that focus group participants were eager to see better year-round facilities in the parks. Participants were also ready to adapt to a lack of facilities via teaching and supervising safe and clean trail bathroom behaviors. For example, participants acknowledged that they had strategies in place so that when they dealt with human waste management, it was not a question of disposal in the park. During this discussion of waste, the focus shifted to a strong perception that people with dogs were the real waste problem in Duluth parks, i.e., people not cleaning up after their pets. One participant described the seasonality of this concern: “and then there are places in the spring we can’t play because the dog poop is so disgusting!” Another outcome of the waste discussion was consideration of the reality that small children have different bathroom needs than the rest of the population. Accommodating those needs is not exclusively a concern for nature play facilities. Preschool-aged children are learning how to control their bodies; one participant remarked: “We have accidents indoors when children have a bathroom right there!” This subtheme ran throughout the discussion, a recognition that many perceived barriers can be either viewed or managed in ways that eliminate the perception that nature play itself is the barrier.

Another example of how programming is used to manage barriers was a discussion of nature play and impacts on the parks. Duluth must be ready to acknowledge that children need space for nature play, and as one participant noted: “Kids leave a trace when they play.” The broader perception regarding impacts was not focused on children, but rather the effect of unmanaged adult public behavior, from garbage disposal to concerns for stranger danger. Participants discussed how nature play in city parks must be preceded by intensive scouting/cleaning, for example: “I have done so much clean up, bags and bags, and bags!… the little creek we play in, I cleaned it for three years before we started playing there.” The focus group participants talked about how quality programming manages this type of risk management with rules about not allowing children to pick up trash, strategies to gather children before play at a new site (to allow for safety scans), and procedures for preventing interaction with dogs. This last point, interactions with the segment of the public that do not obey leash laws, raised a certain level of frustration among focus group participants, consider this exchange:

“No one keeps their dog on a leash!”

“And they are somewhat offended when you ask them to… and I am literally with 10 preschoolers! They say, ‘My dog is so nice’ and I really don’t care!”

These concerns about managing human behavior in parks led to discussions of program strategies about when to go into the parks, how to organize the children, and how to instruct the public about nonintervention.

Reclaiming Play
The noted barrier of interaction with the public in parks was discussed at length, and the theme of the need for the social norming of nature play emerged, i.e., the idea that we need to reclaim play both in terms of public perceptions of where children belong and the value of play for development. If children playing in undeveloped parts of city parks remain unusual, then the public will not have the opportunity to learn how to respect the play, and how to contribute to the children’s safety via non-interference and responsible behavior. Consider this comment illustrating the need to normalize nature play: “When we first started, our neighbors were sort of shocked! Now they are awesome, they find our hats and mittens and put them on the trees! It is changing a culture, and now we are a part of what they are used to.” The development value of play and supporting public and parental perception of that value is a part of this theme of reclaiming play, consider these comments:

“We have to convince our parents that the kids are learning in their play…”

“But the first-year people didn’t know what they had signed up for, like what does it mean to be in a nature preschool? But now parents are much more comfortable about risky play because they have heard… ‘Yeah, your child will be out every day and will come home muddy and dirty’… And now we are more comfortable saying that play is our focus and play is school readiness.”

Along with the discussion of reclaiming play came the consideration of equity issues. It is challenging to promote nature play when child comfort cannot be assured due to material needs. To broaden access, parents may need assurances that clothing is available and may need support to understand of why sand in the hair and other “dirtiness” may be routine, just as preschool professionals need to consider how economics, culture, or traditions may make a transition into nature play a challenge for parents.

4. Discussion

This paper has documented a research effort to consider whether city parkland provides proximate access to nature play opportunity for preschool settings in one small city. Moreover, whether other barriers beyond proximity may exist to limit or prevent the use of city parks for preschool nature play was considered. The study has been conducted based on the idea that access to nature play opportunity in early childhood may be a critical element in the development of individual resilience and an important part of sustainability [22]. The spatial analysis results provided an overview of favorable proximate access to nature play opportunity for preschool settings in the city of Duluth, with a majority of preschool facilities located within 400 m of a city park and many within 100 m. Further, the analysis of the survey data provided an overview of how preschools within 100 m of a city park are taking advantage of this proximity. The survey results provided a generally hopeful view of the use of city parks for nature play programming by preschool programs. The focus group session’s results allowed for more in-depth consideration of access and provided details regarding access and barriers. For example, issues of social equity, preschool policy, nature play programming, and social norming of nature play were specific themes in the detailed discussion of access barriers. Altogether, the results support the idea that access to nature play is a complex idea of which proximity is just one element. The following section will discuss the limitations and opportunities provided by the results of this study.

4.1. Limitations

While this study was focused on the question of proximate access to nature play as a precursor for the development of individual resilience, specific elements of resilience have not been measured; the proposed relationship between nature play and child resilience needs to be more fully explored. In a recent review of resilience theory and research, Masten pointed toward a profound change underway, emphasizing a better sense of the role that complex adaptive systems may play in childhood resilience [3]. Chawla et al. [25] noted that coping and resilience literature has not fully reflected the importance of positive human connections with the natural world. Resilience theory needs to consider access to nature as a protective factor, much like safe neighborhoods, youth
organizations, food security, parental resilience, and other social systems serve to support child development [74,75]. Future research should explore how nature play sites may support connectedness to nature for young children and recent efforts from the North American Association for Environmental Education provide guidance [33,76].

This study has focused on the importance of parks as sustainability indicators for access to nature relative to early childhood education efforts. For example, the National League of Cities, in collaboration with the Children and Nature Network has recently emphasized the critical role of city parks in the promotion of access to nature [31]. Nonetheless, another limitation of this study is the possibility that green space is appropriate for nature play on sites other than designated parkland (e.g., school sites, private property, tax-forfeit). Proximity and access to non-park green space (including preschool facilities themselves) have not been fully considered in this study. The question of how children use or benefit from the “in-between” spaces [77] is a related direction for future research. Further research into how early childhood education facilities can redesign their own play areas to nature play sites would also be useful for addressing the opportunity that nature play provides.

It must also be noted that Duluth is a unique case study. The abundance of city parkland, coupled with a community engaged with sustainability efforts and the nature play (as represented by the University of Minnesota Duluth’s efforts and the Nature Play Collaborative), may make the results appear to lack any generalizable value. A small survey sample and a small number of focus group participants further contribute to the concerns regarding the potential value of these findings for other communities. Strict generalizability may not be possible, but may nonetheless be phenomenologically informative [78]. The results provide insight and illumination about the relationship between preschools and access to nature play, and thus potential transferability. Transferability refers to how well a study has made it possible for a reader to decide whether similar processes will be at work in their settings and communities by an in-depth understanding of how they occur at the research site [79]. The findings here have the potential for a level of transferability given the deliberate use of multiple methods to provide rich detail to establish relevance. The results provide insight and illumination about the relationship between preschools and access to nature play.

Ultimately, what has been learned in Duluth may be able to inform efforts in other places as interest and opportunity develops. For example, despite the uniqueness, what has been shown in Duluth is a useful reminder for other areas based upon urban growth trends. By 2050, the total global number of people living in cities is expected to rise to 68% [80]. Given these statistics, we need to extend the guest list at city parks and do so urgently [81]. How we do this needs to be considered across the life-span. This study supports the case for including our youngest urban residents on that very important guest list.

4.2. Parks

Parks have increasing sustainability and resilience demands placed upon them, from serving needs such as stormwater management, biodiversity protection, or human-powered transportation [82] to providing opportunities for physical fitness or social integration [83]. One specific sustainability/resilience park use example is nature play, as explored in this study. Moreover, while most of the nature play park spaces described in this study are not designed elements of parkland, many of these sites have the components required to nurture individual resilience. As noted in the Background section, nature play sites provide elemental nature for children to interact with things like rocks, dirt, trees, bugs, flowers, mud, and water [32]. Nature play sites also allow for the manipulation of these items; children must be free to dig, collect, climb, build, and hide. Giusti et al. [84] identified important nature play site qualities for young children, which included opportunities for creative expression, physical activity, challenge, engagement of senses, and child-directed activity. All of these overlap with the factors associated with development of resilience in young people: close relationships with capable adults and friends, problem-solving skills, self-control, emotional regulation, and self-efficacy [24]. This overlap helps us to think about how undeveloped
public space, such as urban parks, can be transformed or better managed to support the development of resilience in young learners.

Buchecker and Degenhardt [83] emphasized that equal investments in park quality and accessibility must be made in order to fully capitalize on the role of nearby nature to support psychological resilience in park users. Moran et al. [85] identified three barriers to outdoor play in their study of suburban and inner-city neighborhoods: one, low quality and poorly maintained play areas; two, other people in public spaces; and three, and social norms that undermine outdoor play. These barriers are highly relevant to the current study. Despite good access to parkland in Duluth, garbage and dog waste were stressed as problematic factors by focus group participants. The other two concerns seem to fit together in the Duluth experience as well; one, there is the perception by participants that the general public does not know how to act in the presence of children engaged in nature play; and two, participants perceived a lack of social norms to guide behavior. Participants noted that the public, upon encounter with nature playgroups, is often initially surprised and then wants to interact. The public does not necessarily see the preschool professionals’ concern regarding their presence, or the presence that their dogs can have on efforts to secure safe nature play experiences for children. Another argument for the social norming of nature play is the perceived safety that comes from heightened public awareness of children using parks, i.e., increased use of safety supports [86]. Perhaps as nature play programming is expanded in Duluth parks, the less surprising it will seem for other park users. Such increased awareness may support public social norming of nonintervention with groups and adherence to leash laws. One final aspect of the social norming of nature play noted by participants in the effort to increase awareness that play is learning, i.e., unstructured play in wild settings, is good education.

4.3. Beyond Parks

Beginning with the spatial analysis, another outcome of this study is the reminder that parks will not work for every preschool facility. Thus, other avenues to the promotion of nature play may need to be supported, for example, nature play space on preschool sites, preschools located within in parks, and pop-up (temporary) playscapes may be able to address specific access barriers. The make-up of the focus group provided a reminder that a variety of settings with developed nature play spaces can meet the outdoor play needs of young children. All of these different avenues to nature play point to the value of groups like the DNPC to create and share opportunities. This group of parents and preschool professionals may be able to have a significant impact on changing social norms and contribute to a greater acceptance of nature play in public spaces. The results presented in this study remind us that nature is not the barrier in communities like Duluth, but rather the challenge lies in a complex interaction of access, human perception, and adult behavior.

5. Conclusions

The idea that access to nature play, as a sustainability indicator, could be a factor to support the development of resilience was explored in this study. A major concern in early childhood education is the perception that despite the growth of environmental education and related nature-based educational programming, children’s experiences in nature are becoming increasingly rare. Nature is becoming an abstraction, and children are losing an embodied connection that serves as a foundation for affective, cognitive, and physical development. One potential way that we reverse the course of this disconnection trajectory is through efforts to reinvigorate early childhood education. We need to find ways to nature-enrich play and nature-enrich daily life. We need to make sure that nature-rich daily routines are not only prioritized but, in the case of this research, made possible via proximity and access. It is suggested that access and proximity to nature play provides a tangible example of how we support both the development of individual resilience and community sustainability.

Nature play-based experience and learning appears to be a protective factor, the kind needed to help young children bounce forward from adversity and disruption. Nature play in city parks provides a supportive setting for the joys of childhood to be intertwined with navigating challenges,
potentially resulting in strengthened resilience. The study results point to the importance of accessible parks to support nature experience opportunities for young children. We need to ask the question of whether park planning takes into consideration both access to nature along with the role of nature to nurture our children. In doing so, we have the potential not only to get kids into parks in new and enriching ways but also to shift public perception. This study has provided direction into the importance of how facilitating public awareness and acceptance of early childhood programming use of public parkland. The research has highlighted areas where the efforts in Duluth may be able to serve other communities attempting to use existing proximity between public parkland and early childcare facilities. We have the opportunity to support nature play through a broadening of public access and acceptance. Additionally, beyond our interest in supporting the development of children’s resilience, we can couple sustainability efforts to the question of access and proximity. Parks and public green space meet numerous community sustainability needs, not least opportunity to support the human relationship with nature.

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