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Perspectives from Caregivers on the Advantages of Nature-Based Education Before and During COVID-19 Pandemic

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ABSTRACT

Nature-based preschool programs continue to grow in popularity across the world. These programs provide children with critically important experiences and help them gain skills that contribute to early school success and accomplishments later in life. However, the COVID-19 pandemic and mandatory lockdowns resulted in reduced opportunities for children to attend in-person preschool programs of all types. Under these circumstances, researchers hypothesized that COVID-19 would have negative or even deleterious effects on students' well-being, but that these effects might be buffered by spending time outdoors and engaging with nature. The purpose of this study was to gain perspectives from caregivers in the United States (US) about the effects of a nature-based program on their children and determine how the COVID-19 pandemic and subsequent loss of access to the preschool affected their children. Using a mixture of choice and open-ended questions, 91 caregivers shared perspectives on their children's outdoor activities, sleep habits, and general mood/well-being. Open-ended responses were qualitatively coded into major thematic categories. Results indicated that although the lockdowns had some negative effects in terms of sleep quality and general well-being, most children were resilient as they remained active outdoors and maintained healthy sleep patterns. Furthermore, many caregivers specifically attributed the development of this resilience to the nature-based preschool and the habits it instilled in their children. This research highlights the potential positive influences that nature-based preschool has on children and how these programs can contribute to resilient children who are better equipped to deal with disruptions to daily life.

Keywords**:** preschool, resilience, sleep quality, time outdoors, well-being

The impacts of the COVID-19 pandemic on young children have been various, significant, and widespread. In some cases, children's eating habits, activity levels, and sleep quality were negatively affected (Clarke et al., 2021). Other studies point to decreased mental health, increased depression, and escalated externalizing behaviors such as temper tantrums and fighting with household members (Glynn et al., 2021). In fact, during the COVID-19 pandemic, 52% of caregivers reported that their 3-5 year-old children experienced excessive crying or irritability, 60% were easily bored, and 14% experienced excessive sadness or worry, pointing to the deleterious impact of the pandemic

on preschoolers' mood (Arazi et al., 2022). In addition to these effects on children, there have also been negative ramifications for families including the added burden of remote teaching/learning (Timmons et al., 2021). All of these negative impacts due to the temporary absence of in-person preschool programs during the pandemic have reinforced the importance of quality early childhood education. For example, children enrolled in preschool programs gain crucially important social and emotional skills (Howes et al., 2008), and these skills, along with subsequent behaviors, contribute to early school success (i.e., academic achievement and health and well-being outcomes) as well as accomplishments in later phases of life into adulthood (Goldfeld et al., 2016; Raver, 2002; Thompson & Lagattuta, 2006).

As researchers continue to uncover negative impacts of the pandemic on young children, they are also discovering ways in which children have shown resilience. Historically described in many different ways, resilience can be defined as the human capacity to cope with stress (Masten, 2001). Mechanisms that have been shown to promote resilience in children during the pandemic thus far include well-established family routines (Cusinato et al., 2020), high-quality familial relationships (Masten & Motti-Stefanidi, 2020), adequate sleep (Tso et al., 2022), and engagement with at-home learning (Lokhandwala et al., 2021), to name a few. Interestingly, younger children appear to be more resilient than older children and adolescents, especially with respect to sleep disturbances (Sharma et al., 2021). One particularly understudied area in terms of building resilience is nature-based preschooling. Nature-based preschools are gaining international popularity (Leather, 2018), and research points to the positive effects that being outdoors can have on well-being (including but not limited to physiological, psychological, and socioemotional health) (Carpenter & Harper, 2015; Pasanen et al., 2014). In the current study, researchers hypothesized that COVID-19 would have negative or even deleterious effects on the sample children's well-being, but wondered if these effects might be mitigated by children spending time outdoors and engaging with nature. The purpose of this study was to gain perspectives from caregivers in the United States (US) before and during the COVID-19 lockdowns and determine the effects, if any, that engaging with nature through preschool had on children's well-being, including physical activity, outdoor engagement, sleep patterns, and mood.

Benefits of Being Outdoors

The publication of Richard Louv's *Last Child in the Woods* in 2005 brought renewed attention to the importance of spending time outdoors and spawned the term "nature-deficit disorder." According to Louv (2005), the term is not a diagnosis, but a way of viewing the cost associated with humans alienating themselves from nature. Clear trends show that life for many in industrialized countries has moved indoors. For example, research indicates that people in wealthy nations spend less than 10% of a typical day outdoors (Capaldi et al., 2015), and 90% of life is spent inside of buildings (Evans & McCoy, 1998). Research continues to link positive well-being with being outdoors, and even legislative bodies have taken actions to provide additional access to outdoor spaces. For example, in the US, the *Every Kid Outdoors Act* in 2019 provided free access to federal lands and waters to fourth graders and their supervising adults.

Furthermore, research involving outdoor interventions has revealed many positive aspects in regard to physiology, psychology, and socioemotional health. In some cases, contact with the outdoors lowered blood pressure (Lee et al., 2009) and increased physical fitness (Louv, 2015). Brief contact with nature has also been linked to improved emotional well-being (McMahan & Estes, 2015), with activities as simple as walking in rural environments improving mental outlook (Selhub & Logan, 2012). In addition, interventions such as wilderness therapy have been shown to increase self-efficacy (Margalit & Ben-Ari, 2014). Outdoor learning experiences have been linked to increased academic performance and helping students make more connections within their communities (Leather & Nicholls, 2016).

Outdoor Schooling

In addition to the emphasis on getting outdoors in informal contexts, many schools are being more intentional about getting their students into the outdoors. Led by countries like Denmark, Finland, and Sweden, forest and nature schools have existed in Europe for many years (Westwood, 2013). Non-European countries like New Zealand, Australia, and Singapore are also well-represented in the literature. The movement is quickly catching on in the US,

as the number of nature-based preschools in the US doubled to 586 from 2017-2020 (North American Association for Environmental Education (NAAEE), 2020). This massive movement is fueled in part by a growing sense that outdoor recess is not simply a mechanism for allowing students to expend energy before "real" school starts. To the contrary, many are beginning to view contact with nature as fundamental to a proper education (Turtle et al., 2015).

Positive Outcomes

A recent literature review of school-based outdoor interventions summarized that students needed fewer redirects after being outdoors (Kuo et al., 2018). At the middle school level, outdoor-based learning was connected to greater motivation in students who had previously come to view school as "meaningless" (James & Williams, 2017). In younger children, Elliot et al. (2014) discovered that Kindergarteners had deeper engagement in outdoor-based pedagogy than did traditional students. Forest school settings also improved mood in both students who had previous behavioral challenges in schools and those who did not (Roe & Aspinall, 2011).

In some cases, these types of positive outcomes have been associated with specific factors that exist in outdoor settings. For example, nature-based schools afford students opportunities to engage in more physical activity, and students in nature-based schools are exposed to more natural daytime light than students in traditional classroom settings. These facts are important because increased physical activity and more exposure to natural light have been shown to positively affect sleep quality and quantity (Boubekri et al., 2014; Lang et al., 2013). Moreover, increased physical activity has been shown to buffer the impacts of stress on academic performance in adolescents, leading to better sleep (Wunsch et al., 2017).

Resilience

Ernst et al. (2019) suggested that resilience in children is built through improved self-control and self-regulation. These authors point out how play in nature often involves children interacting in social groups away from adult supervision, a situation that improves self-regulation over time. Furthermore, Chawla et al. (2014) suggested that children can experience reduced stress when exposed to nature, a condition that also contributes to resilience. Wells (2021) went so far as to say that, "…within the context of resilience, nature may buffer (dampen) the impact of risk and adversity on human health, development, and functioning" (p. 195). This author goes on to share multiple studies showing evidence of a connection between nature and resilience in humans.

Research Questions

As information about the effects of COVID-19 on the education system in the US continues to emerge, researchers in the current study wondered how the shutdowns and isolation of children from nature-based schools potentially affected their well-being. In spite of positive associations between preschools, nature contact, and children's well-being, the COVID-19 pandemic has brought never-before-seen challenges. As a result, this study pursued answers to the following research questions:

RQ1: Pre-COVID, what were caregivers' perceptions of the effects of a nature-based program on their children?

RQ2: How did the COVID-19 pandemic and subsequent loss of access to the nature-based preschool affect children and families? Was there any evidence of resilience in children?

In order to answer these questions, we focused on changes in physical activity, sleep, and mood in order to use a whole-child approach to understanding physical and socioemotional health. Physical activity and sleep are tangible measures of physical health, while the regulation of emotions, behaviors, and mood are tangible measures of socioemotional health. The purpose of this study was to gain perspectives from caregivers in the US about their children's well-being before and during the COVID-19 pandemic. Furthermore, researchers wondered whether any evidence suggested that the deleterious effects of the COVID-19 pandemic were dampened by children's association with the nature-based preschool program; if so, it would suggest a form of resilience.

Context of Current Study

The preschool in the current study was owned and operated by a nonprofit outdoor education company in the Midwest. The philosophy and mission of the preschool centered around engaging students' natural curiosity in order to prepare children for future lives of active learning and connection to nature. The daily schedule of each classroom consisted of arrival, outdoor choice time (1 hour), outdoor clean-up and recall to reflect on and talk about their outdoor play experiences (15 min), outdoor whole group meeting (15 min), outdoor hike (15 min), transition to inside (5 min outside, 5 min inside), inside snack (10 min), indoor choice time (20 min), indoor clean-up and small group meeting (20 min), final whole group meeting (5 min), and pick-up (10 min). Children spent 60% of their time outdoors and 40% of their time indoors during a typical 180 minute class day. The program used developmentally appropriate practices grounded in child-centered, experiential play-based learning to implement an evidence-based curriculum called, *Creative Curriculum* (Dodge et al., 2010).

This daily schedule shifted in March 2020 during the pandemic when schools were required to be closed. During the COVID-19 pandemic, caregivers were provided with resources intended to get children outside and connect with nature from home at their own pace when it worked best for their family. These resources included a Facebook page for interested families where families could post pictures of activities they had tried and to provide updates. Preschool staff also provided 15-20 minute Facebook live lessons three times per week (Mon, Wed, Fri), which typically included a song or follow-along activity and book. These videos were recorded for families to view later after it went live. In addition, preschool staff created a website with weekly resources for families called "Soaring from Home." This website was created specifically for families during the pandemic. The link was shared with all caregivers of children enrolled at the nature-based preschool. The goal was to provide families with easy, developmentally appropriate ideas to work on academic/social emotional goals as well as ideas to get outside and connect with nature from home. Social workers also provided resources for caregivers to help them navigate the challenges of parenting during a pandemic.

Method

The design of this study was precipitated by the COVID-19 pandemic and subsequent closure of preschools across the US in 2020. The researchers had an established relationship with the preschool as a result of other studies that were being conducted when the pandemic manifested itself in the US. As a result, researchers amended IRB protocols and were able to gain approval in a timely fashion such that data collection could occur within the narrow window between the mandatory shutdowns in March of 2020 and the end of the traditional school year in May.

Sample

The preschool enrolled approximately 175 students. The children in the sample were from ages 4-5, and the vast majority were enrolled for the duration of the 2019-2020 school year. Students attended half day (i.e., three hours per day) preschool programming for three or four days each week. Sixty percent (60%) of their class time was spent outdoors. Caregivers (i.e., family members or other designated persons responsible for care at home) were solicited to participate and provide perspectives about their child through electronic questions. Recruiting through emails was done with the help of preschool staff. Caregiver consent reached $n = 91$, with varying levels of participation for each question in the study. Demographic information was not collected in regard to these caregivers and/or their children. Nature-based preschool students in the region are predominantly White, reflecting the demographics of the area (78.8% White, 22.3% Hispanic or Latino, 6.6% Multiracial, 5.9% Black or African American, 2.0% Asian, .5% American Indian or Alaskan Native) (U.S. Census Bureau, 2020). The race and ethnicity representation for the school district included 87.12% White, 7.08% Hispanic or Latino, 3.93% Multiracial, .96% Asian, .71% African American, and .21% American Indian or Alaskan Native students (Center for Educational Performance and Information School Overview, 2021). At the time when caregivers provided feedback for this study, the average child was 5.17 years old and on trajectory to be enrolled in Kindergarten in the upcoming fall.

Data Collection and Analysis

An electronic survey containing a mixture of choice responses and open-ended questions was emailed to caregivers by school staff in May of 2020 (see Appendix for questions).

Physical activity and outdoor engagement

Researchers used two choice questions (Appendix) to gather caregivers' perspectives on students' outdoor activity levels. In addition, an open-ended question was asked to allow caregivers to expound upon their child's activities. Responses to the open-ended question were read independently by two researchers to develop a list of codes. Researchers met and discussed the codes until a final set of codes was agreed upon. Researchers independently coded each caregiver's comments and met to discuss agreements and disagreements. Similar codes were grouped together and major themes were established.

Sleep

The aforementioned electronic survey was sent to caregivers to gather their perspectives on sleep patterns of their children. Open-ended questions were provided for caregivers to respond to in regard to their child's sleep patterns before and after COVID-19 shutdowns. These responses were read independently by two researchers who independently developed a list of codes, then met to discuss agreements and disagreements. Similar codes were grouped together, and major themes were established.

Well-being and mood

Open-ended questions were provided on the electronic survey (Appendix) for caregivers to respond to in regard to their child's well-being and mood before and during COVID-19. Caregiver responses were coded independently by two researchers who coded each caregiver's comment, met to discuss agreements and disagreements, and ultimately established final codes that were grouped together into major themes.

Resources

The electronic survey emailed to caregivers included one choice question and one open-ended question asking about the use of the resources provided by the preschool. As in the other contexts, open-ended responses were read independently by two researchers to develop a list of codes. Researchers met and discussed the codes until a final set of codes was agreed upon. Researchers independently coded each caregiver's comment and met to discuss agreements and disagreements. Similar codes were grouped together, and major themes were established.

Findings

Physical Activity and Outdoor Engagement (post-COVID)

According to most caregivers, the activity levels of their children either increased (42%; 36 of 85) or stayed the same (42%) when students were forced to stay home after COVID-19 (Figure 1). In contrast, only 15% of caregivers (13 of 85) reported decreased amounts of overall activity.

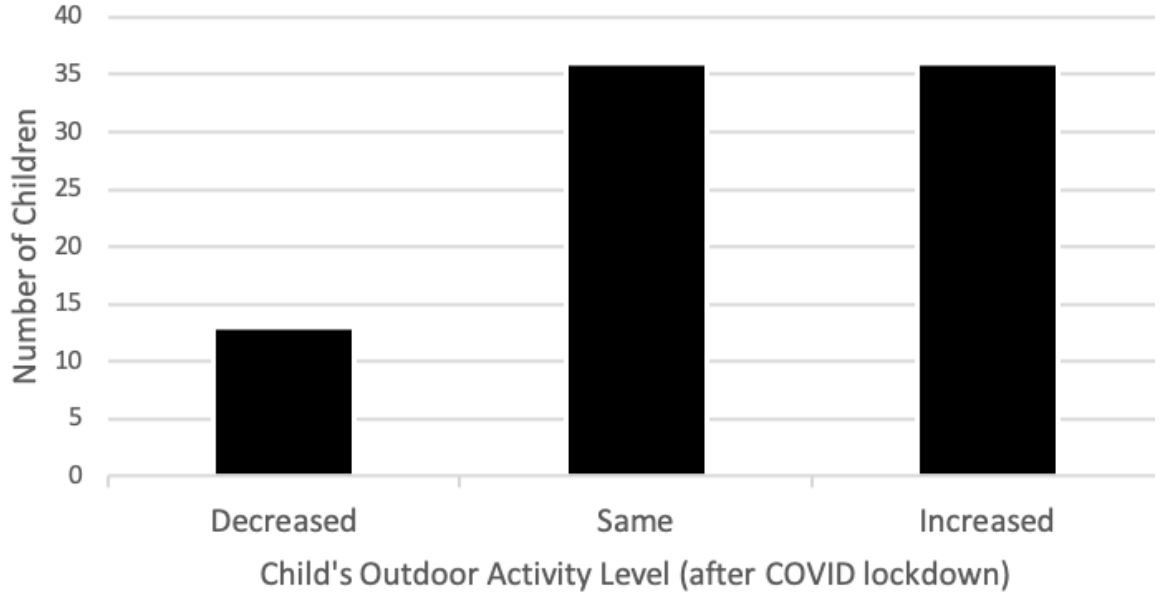
Figure 2 shows results from the question asking caregivers about how much time their children recently spent outdoors. Eighty-seven percent (87%; 77 of 89) of the responses indicated that children spent more than one hour outdoors each day. Furthermore, 9% responded that their child spent about one hour outdoors each day. Only 4% responded that their child spent approximately 30 minutes outdoors. No one responded that their child spent less than 30 minutes outdoors each day on average.

When asked to provide additional details about their children's outdoor activities during lockdown, 40 caregivers responded. Specifically, 35 of 40 (87%) provided positive comments related to outdoor activity, and 13% provided

negative feedback. Figure 3 contains a breakdown of the positive responses. Most caregivers shared how their children were spending more time outdoors because of increased family engagement in outdoor activities (31%). Other caregivers attributed their child's time outdoors to either an intrinsic love for the outdoors (23%) or the fact that the preschool program had specifically influenced their child to be outdoors more often

Figure 1

Change in Children's Activity Levels After COVID Lockdowns



Note. Prompt question: "How has your child's level of outdoor activity changed as a result of COVID-19?" (*n* = 85)

(23%), an influence that persisted into the pandemic. A smaller number of caregivers (5%) shared how their children were spending more time outdoors due to improving weather conditions.

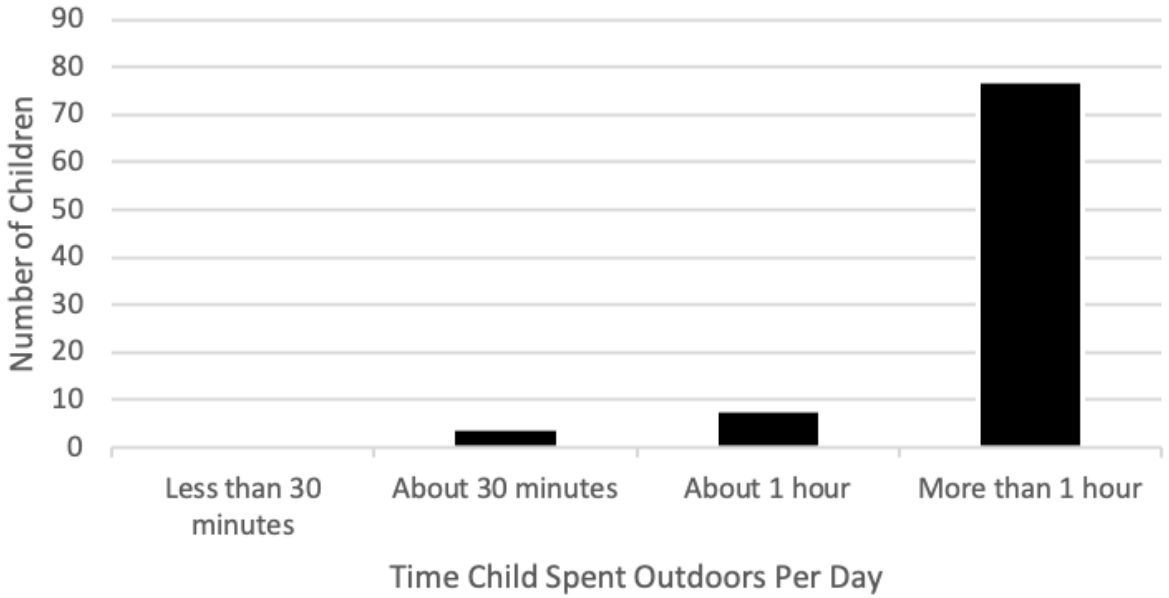
In regard to the five negative comments, one caregiver shared that his/her child needed more structure to be enticed to play outdoors and was therefore less active away from preschool. Two caregivers indicated that their respective child's motivation was reduced to go outdoors without preschool. Finally, two caregivers generally stated how outdoor time had decreased for their child, with one in particular stating that the reduced amount of time was because the caregivers wanted the child indoors more often due to COVID-19.

Sleep

A noteworthy number of caregivers reported that preschool attendance (pre-COVID) positively affected sleep patterns in their children (33 of 76; 43%). According to 35 of the 76 caregivers (46%), attending the preschool program pre-COVID did not associate with any remarkable changes in sleep patterns in their children. Only 4% of caregivers reported that attending preschool negatively affected their children's sleep. (Note that five responses to this prompt were unrelated to sleep and therefore not coded as such).

Figure 2

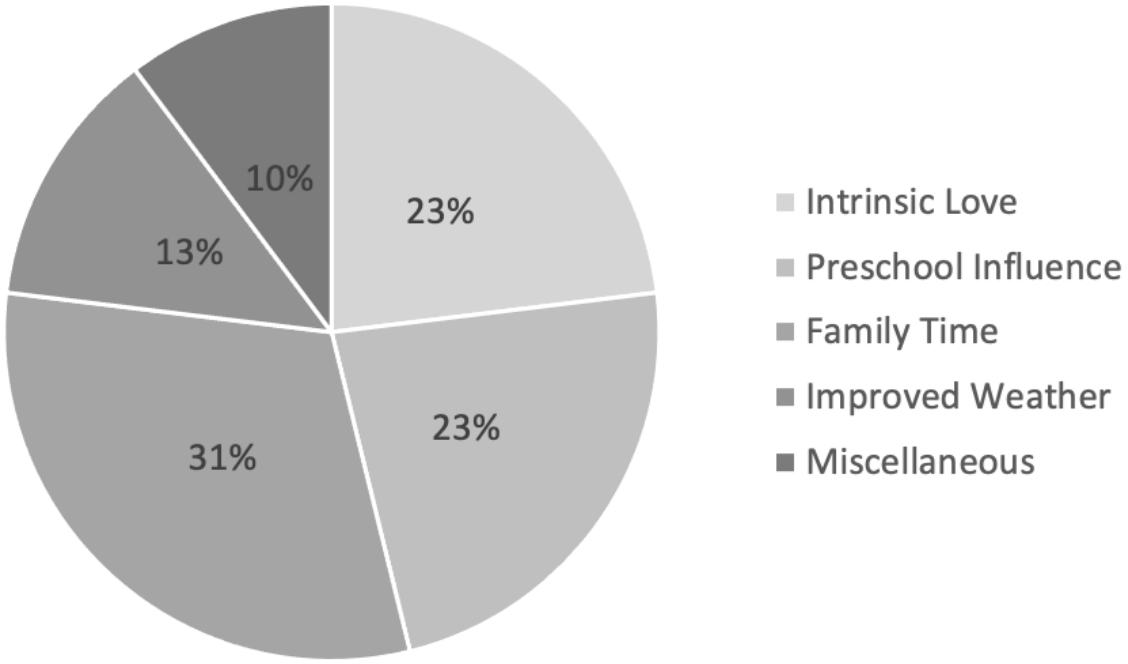
Amount of Time Children Spent Outdoors Each Day After Lockdowns



Note. Prompt question: "How much time per day on average has your child spent outside over the last two weeks?" (in lockdown) (*n* = 89).

Figure 3

Reasons Children Wanted To Go Outdoors

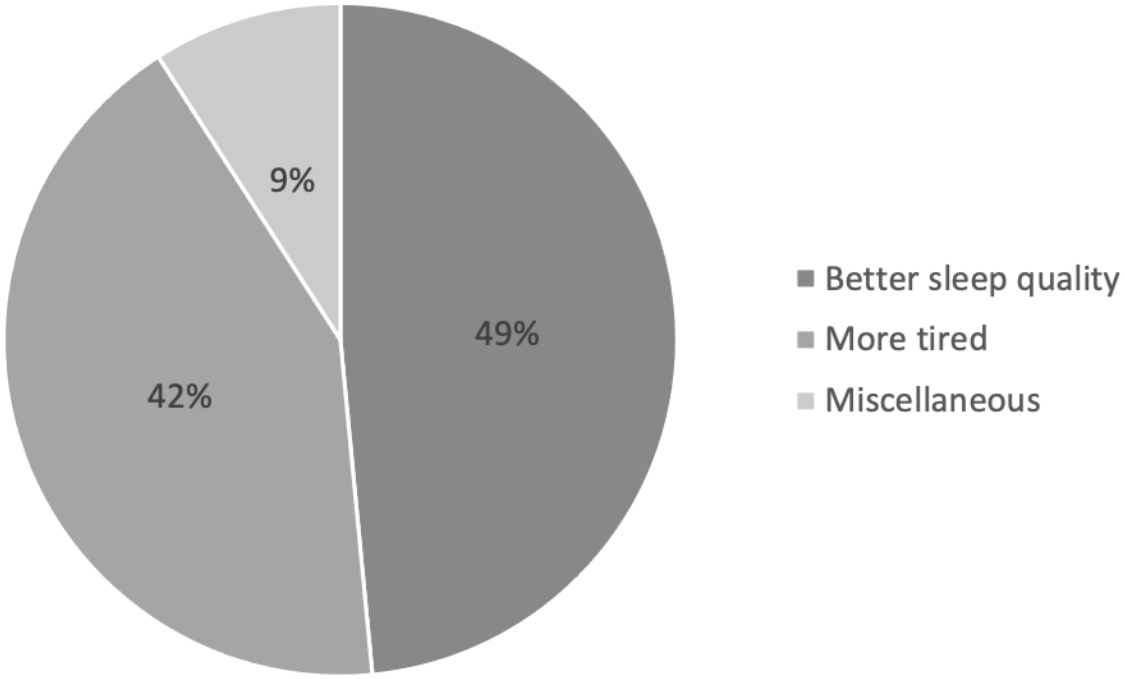


Note. Prompt question: "Share comments about your child's outdoor activity." Thirty-five (35) different caregivers provided positive reasons. Four (4) of these caregiver responses were double-coded, as they mentioned two distinctly different reasons for their child's outdoor activity (39 total responses).

In regard to those who reported positive changes, Figure 4 shows the breakdown of those responses. Of the caregivers who reported positive changes, 49% specifically said their child experienced better sleep quality. Forty-two percent (42%) of the positive comments revealed that children were more tired after a typical day in the nature-based preschool. The 9% of caregivers who reported other positive aspects shared things like quicker sleep latency (latency is the amount of time it takes for a person to fall asleep once in bed). Of the original 4% of caregivers who said their child's sleep was negatively affected, reasons included longer sleep latency and/or that their child had poorer sleep quality (e.g., restlessness or wakings) after beginning the nature-based preschool.

Figure 4

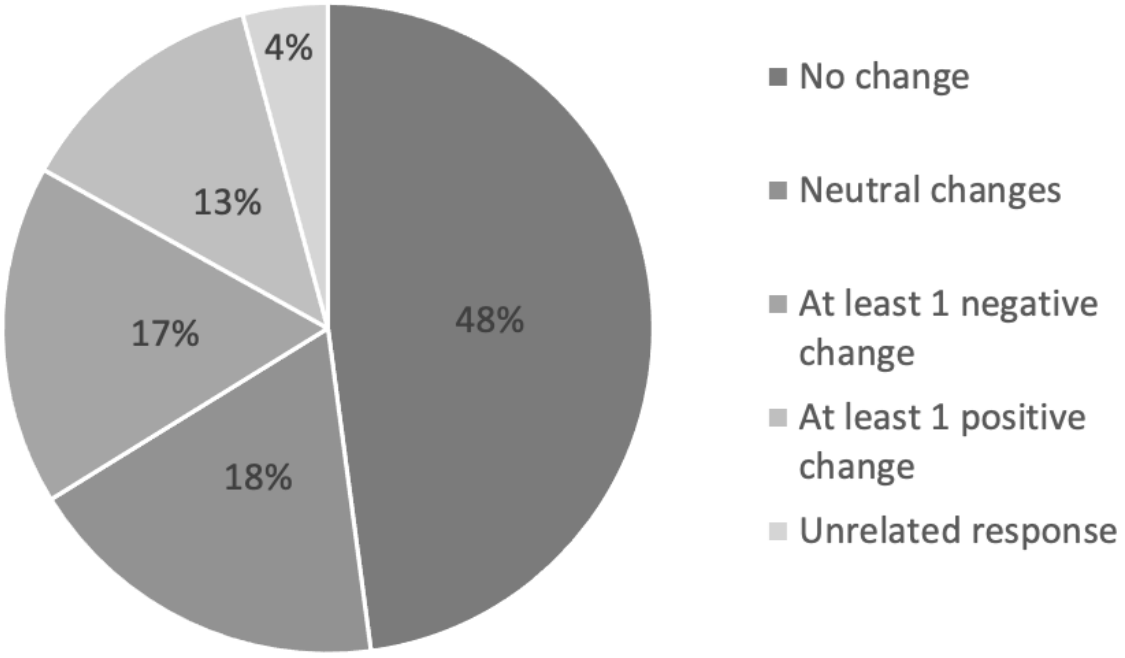
Children's Sleep Quality Attributed to Pre-School Attendance



Note. Prompt question: "Describe how your child's sleep patterns changed as a result of attending [preschool] (before COVID-19)." (*n* = 33)

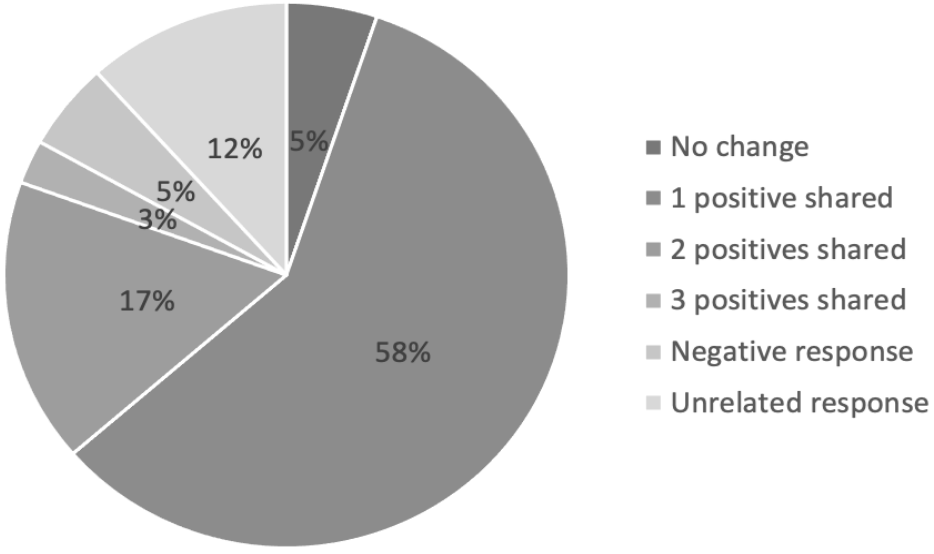
Figure 5 shows results from the question asking caregivers about how COVID-19 and the subsequent lockdowns affected their children's sleep habits. Interestingly, 34 of 71 (48%) caregivers reported no change in their children's sleep habits after COVID-19 and the lockdowns. Of the remaining categories, neutral changes and negative changes were the most prevalent (making up a combined 35% of responses). Positive changes accounted for 13% of the responses, and 3 responses were unrelated to the prompt.

Figure 5
Children's Sleep Quality After COVID-19



Note. Prompt question: "How have the sleep patterns you described changed since the emergence of COVID-19?" (*n* = 71)

Figure 6
Children's Mood and Well-Being As A Result of Preschool Attendance (pre-COVID)



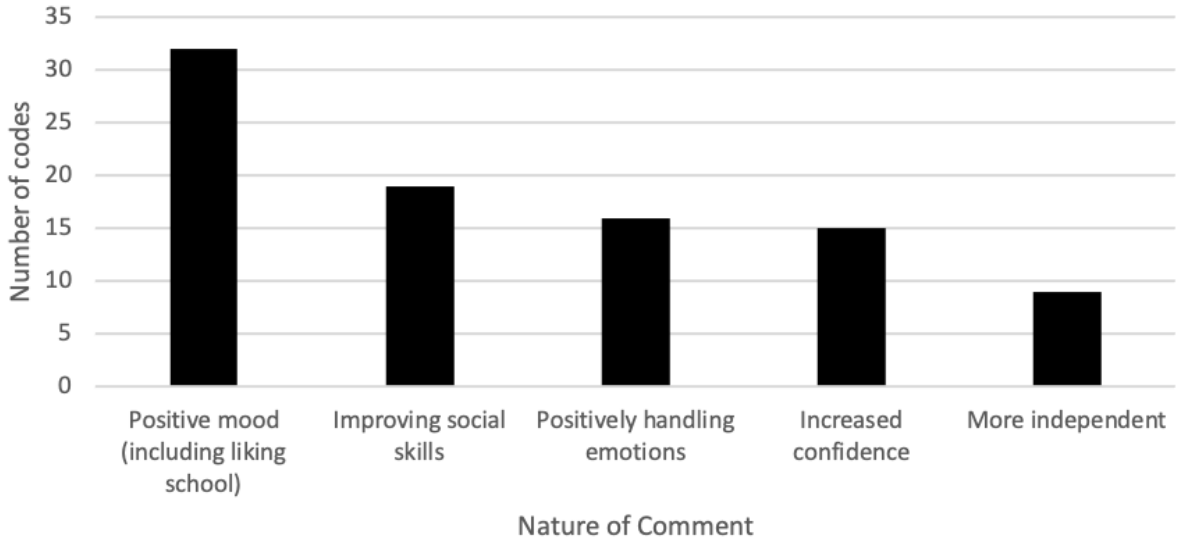
Note. Prompt question: "Describe how your child's mood, emotions, and overall well-being changed as a result of attending [preschool] (before COVID-19)." (*n* = 77)

Well-Being and Mood

Overall, 78% of responding caregivers shared at least one positive comment when asked how attending the nature-based preschool had affected their children's moods before COVID-19 (Figure 6). Four percent (4%) reported no change, and 4% reported negative effects. In terms of positive comments, the specific code counts are included in Figure 7. Caregivers shared comments such as, "He has THRIVED at [the preschool]. He has grown leaps and bounds socially and academically. He is able to *express his emotions more effectively* and confidently." Other positive comments alluded to how much children enjoyed going to school, how their confidence increased, how they were exerting more independence, and how they had developed better social skills.

Figure 7

Specific Positive Themes From Caregivers Regarding Well-Being and Mood of Children (pre-COVID)



Note. Prompt: "Describe how your child's mood, emotions, and overall well-being changed as a result of attending [preschool] (before COVID-19)." (91 total codes; some participants made multiple comments that were coded in more than one category)

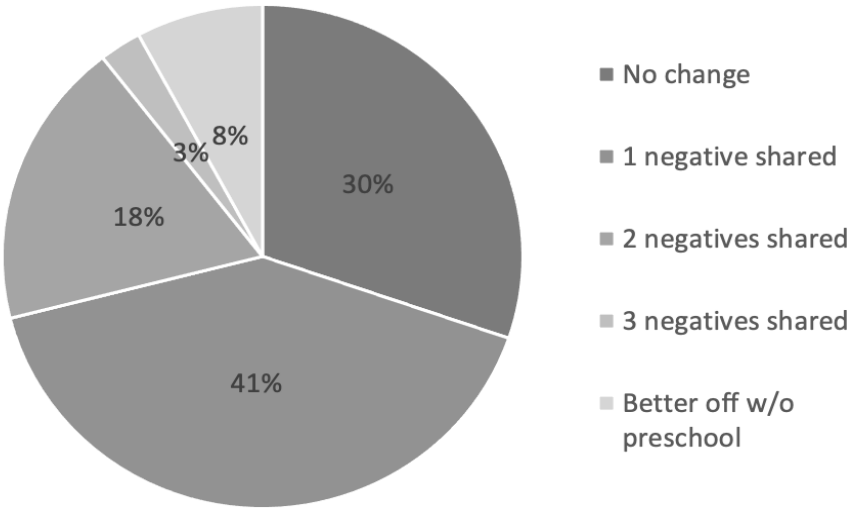
When asked about how COVID-19 and the subsequent lockdown from preschool affected their children's mood, 62% of caregivers (47/76) reported at least one negative consequence (Figure 8). Thirty percent (30%) reported no changes. The remaining 8% stated their children were better off in terms of mood as a result of being at home. In terms of the negative consequences, Figure 9 provides a breakdown of the code counts.

Resources

In terms of utilizing the resources provided to caregivers by the preschool (i.e., the website created for caregivers and their families, Facebook page, Facebook live lessons), approximately one quarter of the caregivers responded to the question (24 of 89). For those who did respond, 20 of 24 (83%) indicated the resources were helpful. Specifically, caregivers mentioned the benefits of the video clips, stories, crafts, challenges, and songs. The remaining four responding caregivers indicated they did not use the resources (17%).

Figure 8

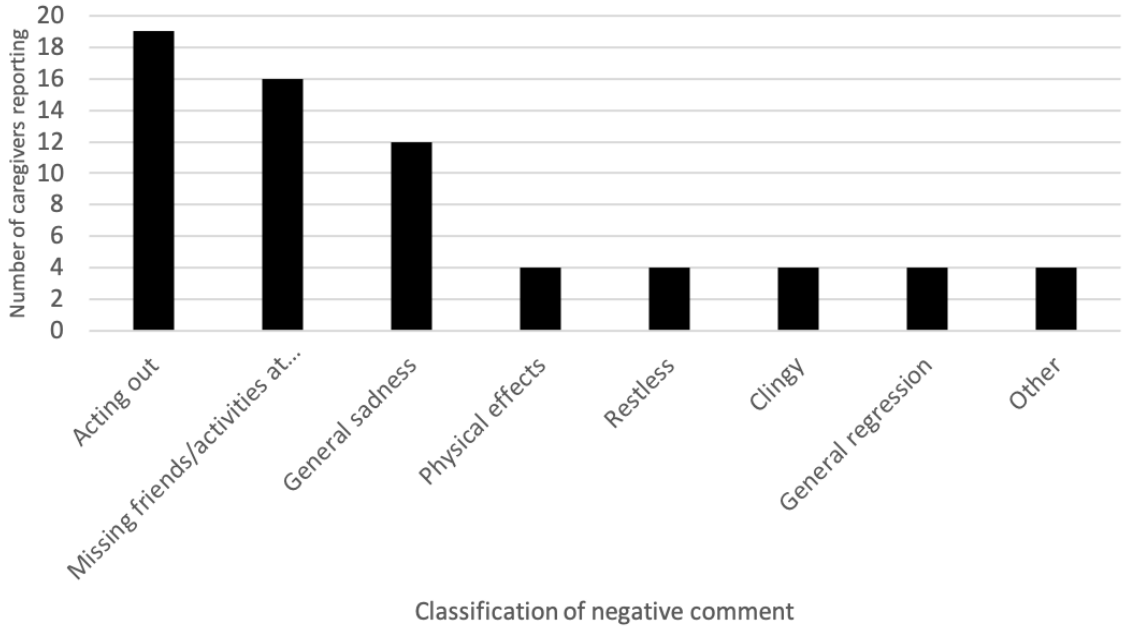
Changes In Children's Perceived Well-Being and Mood (post-COVID)



Note. Prompt: "How have your child's mood, emotions, and overall well-being changed since the emergence of COVID-19?" (*n* = 76)

Figure 9

Number and Categorization of Negative Comments From Caregivers About Children's Well-Being and Mood as Attributed to COVID/Lockdowns



Note. Prompt: "How have your child's mood, emotions, and overall well-being changed since the emergence of COVID-19?" (67 total codes, with some caregivers being double-counted as they provided distinctly different reasons)

Discussion

Outdoor Activity

Before COVID-19, general trends in countries like the US revealed that children are spending less time outdoors. In fact, the National Recreation and Parks Association reported that children spent only 4 to 7 minutes per day in outdoor settings characterized by unstructured play (https://www.nrpa.org/uploadedFiles/nrpa.org/Advocacy/Children-in-Nature.pdf). In contrast, many children spent up to 7.5 hours per day with electronic media. Under COVID-19 restrictions, one might hypothesize that the amount of time spent outdoors would decrease even more as children, along with adults, adjusted to life at home under stay-at-home orders and the like. Furthermore, it seemed reasonable to expect that COVID-19 would adversely affect the well-being of these children as their sleep schedules and/or moods were disrupted due to the rapid changes.

However, findings from the current study indicated that after lockdowns due to COVID-19, most children continued the practice of being outdoors for significant periods of time (Figures 1 & 2). This finding is in direct contrast to other research from around the world about the effects of COVID-19 on outdoor time. For example, in Portugal, studies showed that children under six years of age were less physically active and more sedentary (Cordovil et al., 2021). Similarly, the study from Portugal and one from Ireland (Egan et al., 2021) reported that digital screen-time increased dramatically in young children. Although one cannot make causal claims, it is clear that in the minds of many caregivers in the current study (23%; Figure 3), the nature-based preschool and the habits they instilled influenced their children to spend more time outdoors. In fact, many caregivers (31%; Figure 3) indicated their family time outdoors had increased. So, it is possible that the nature-based preschool had a positive influence on the family to spend more time outdoors with their children. Overall, it seems plausible that the nature-based preschool provided experiences that helped students (and potentially their families) maintain and foster a habit of going outdoors on a regular basis. These findings are in direct opposition to the general trends of preschool children across the globe. However, because of the design limitations of this study, it is impossible to determine a direct connection between being outdoors and increased well-being. Yet, some compelling evidence provided by caregivers suggests a possible connection.

Sleep

Initial attendance at the nature-based preschool (pre-COVID) did not affect a large percentage of children's sleep patterns (46%). However, it is important to note that 43% of caregivers did report positive changes in their child's sleep as a result of starting preschool (pre-COVID). These positive changes included better sleep quality and more tiredness as a result of attending the school (Figure 4). After COVID-19 and the subsequent shutdowns, data indicated sleep was not adversely affected in most children, as 48% of caregivers reported no change in sleep, 18% reported neutral changes, and 13% reported positive changes (Figure 5). These overwhelmingly positive and/or neutral responses are indicative of resilient children who maintained healthy sleep patterns amidst the chaos around them. This finding in no way discounts the 18% of caregivers who reported at least one negative change (Figure 5), but these results are consistent with other research showing that sleep in preschool-aged children was not as affected by COVID-19 as expected. For example, research from Singapore showed that primary and secondary children's sleep patterns were more adversely affected by COVID-19 than preschool children's patterns (Lim et al., 2021). In the current study, it seemed as though starting preschool in pre-COVID times had more of an effect on sleep than did COVID-19 and the subsequent lockdowns.

Mood and Well-Being

Findings in the current study clearly showed that the vast majority of caregivers (78%) believed that nature-based preschool contributed positively to their child's mood and well-being (Figure 6). Children liked school and were gaining social skills as well as learning how to handle their emotions. Furthermore, they were increasing in confidence and independence (Figure 7). These outcomes are consistent with factors that build resilience in children as discussed by Ernst et al. (2019).

In spite of these pre-COVID positive factors, COVID-19 and the associated lockdowns initiated general fears about how the disruptions might affect the overall family structure and specific fears about the potential social-emotional impacts on children (Timmons et al., 2021). In the current study, the negative effects of COVID-19 were definitely detected by caregivers, with 62% reporting at least one negative effect on their child (Figure 8). Similar to research from Australia (Vasileva, 2021), children in the current study often acted out in response to the uncertainty around them (Figure 9). The study from Australia also revealed that young children were extremely worried about permanent change as a result of the pandemic. Perhaps that occurred to children in the current study as well, as many missed friends, missed school, experienced additional attachment, and were generally sad (Figure 9).

Resilience

In addition to the negative outcomes, however, it should be noted that high percentages of reports included both neutral and positive outcomes. For example, 30% of caregivers reported no change in their child's mood after shutdowns (Figure 8), lending credence to the presence of resilience in a portion of the children. In most of these cases, this feeling was attributed to more family time and being with people who were normally not as available due to work arrangements. This finding is consistent with other research, including a study from Turkey that revealed how pandemic restrictions and stay-at-home orders increased caregiver engagement with their children in some cases (Yıldırım, 2021). Similarly, Prime et al. (2020) proposed that resilience of children was often enhanced during the pandemic if family well-being was preserved. It is also interesting to note that some research suggests that children had *more* opportunities to play outdoors due to school shutdowns (Egan et al., 2021). It is unclear whether this is the case for children in this study, but as discussed previously, the amount of outdoor time remained consistently high for these children when compared to other data from around the world. Perhaps the habits instilled in students during the preschool program contributed to this positive trend.

Despite these bright spots, it is disingenuous to claim that the pandemic and subsequent school shutdowns had anything other than a net negative effect on children. Nevertheless, evidence from this study highlights the importance of the preschool experience, as the 62% of caregivers who reported negative outcomes in their child's well-being attributed those negative outcomes to *missing* preschool components (e.g., lack of activities, missing friends, etc.). Furthermore, evidence strongly suggests that children in the current study seemed to resist sedentarism. Perhaps the habits instilled in children who attended the nature-based preschool setting provided a blueprint for them and the adults in their lives to overcome some of the negatives associated with the lockdowns.

Implications

One thing is certain, for those families who were engaged in preschools pre-pandemic, the burden of education shifted from teachers to caregivers in what seemed like the blink of an eye. In response, many caregivers across the world lamented the paucity of training they received for undertaking such a task and the reduced concentration and motivation of their children as a result of the changes (Yıldırım, 2021). Perhaps developing habits of going outdoors in nature-based preschools can help children develop more resilience to these kinds of radical changes. The free play component of the typical nature-based preschool may also be important, as students learn to self-regulate and entertain themselves to some extent. It is interesting to note that the preschool in the current study tried to support caregivers by providing them with resources to keep their children engaged in outdoor activities. We assume many of the caregivers did not use these resources, as this question had the lowest response rate on the survey (24 of 91; 26%). Although it was clear that 20 of the 24 caregivers who did respond used the resources to engage their children, the fact remains that many of the others still saw their children outdoors on a regular basis (Figure 1). Perhaps this finding was due to their children being accustomed to having unstructured time outdoors.

Limitations

Due to the swift nature in which COVID-19 shutdowns occurred in the spring of 2020, researchers made the decision to act quickly in terms of collecting data to capture the essence of how the pandemic had/was affecting children and families in that moment. In some cases, expediency and lack of direct access to children led to study limitations. The

fact that this study relied exclusively upon the perceptions of caregivers whose children attended one preschool is one of those direct limitations. Furthermore, caregiver reports could have been influenced by a social desirability bias and/or by the mental well-being of the caregiver who reported. It should also be noted that researchers did not have any data related to caregivers' schedules and how confounding variables like working from home or changes in caregivers mood and mental health might have affected children's ability or inability to get outdoors. These potentially significant changes in caregivers' schedules and mood may have influenced the behavior of their children, including physical activity, sleep patterns, and mood. It is important to note that parents were specifically asked to separately consider how their child's physical activity, sleep patterns, mood, emotions, and overall well-being changed as a result of attending preschool (before COVID-19) and as a result of the pandemic itself (since the emergence of COVID-19). These questions were specifically designed to help parents focus on any changes in their child's behavior as a result of attending nature-based preschool versus impacts of the pandemic.

In addition, it was not possible to gain access to comparison groups from more culturally diverse settings. Conducting outdoor education research in diverse settings is an ongoing challenge, as according to the recent Outdoor Participation Trends Report, during COVID-19 in 2020, 72% of outdoor participants were White, 11% Hispanic, 9% were Black, 6% were Asian, and 2% were reported as belonging to other identity backgrounds (Outdoor Foundation, 2021). Although the report observed that there has been some increase in the rate of outdoor participation by members of diverse groups, these gains have been in small increments (Hispanic and Latinx (6%), Black participants (.3%)).

Conclusion

It is apparent that children in this study were impacted by the uncertainty of the COVID-19 pandemic. However, this research highlights the potential positive influences that nature-based preschool had on time spent outdoors, sleep, mood and well-being, and resilience. More information about the importance of outdoor play on children's health and development should be disseminated to preschool teachers and caregivers to promote outdoor opportunities for children, as this could ease future disruptions to day-to-day life. Moreover, exposure to the outdoors during childhood has, historically, been a critical factor for the continuation of outdoor participation into adulthood (Outdoor Foundation, 2021). Access to nature-based preschool is one potential avenue for a diverse population of US youth to benefit from the outdoors and learning in nature-rich environments. In the end, these initial findings need to be subjected to more robust scrutiny to determine the potential impacts of nature on the resiliency of all preschool children.

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APPENDIX

Caregiver Survey Questions

Choice Questions

1. Please describe your child's recent level of outdoor activity (in the last two weeks). How much time, on average, do they spend outdoors?
    - Less than 30 minutes a day
    - 30 minutes a day
    - 1 hour a day
    - More than 1 hour a day

2. How has your child's activity level changed as a result of COVID-19?
    - Remained the same
    - Increased
    - Decreased

3. How helpful are the resources that the [preschool] provided to promote nature-based activities?
    - I use them once a week
    - I use them multiple times a week
    - I use them daily
    - I do not use them

Open-ended Questions:

4. Please share other comments you may have about your child's outdoor activity.

5. Please share other comments you may have about the resources.

6. Describe how your child's sleep patterns changed as a result of attending [preschool] (before COVID-19).

7. How have the sleep patterns you described above changed since the emergence of COVID-19?

8. Describe how your child's mood, emotions, and overall well-being changed as a result of attending [preschool] (before COVID-19).

9. How have your child's mood, emotions, and overall well-being changed since the emergence of COVID-19?

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