



UiT The Arctic University of Norway

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Nature Connectedness in Preschool Children

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Master's Thesis in Psychology (PSY-3900) - May 2024



Preface

The beneficial effects of natural environments on humans are of great interest to me, particularly as a contrast to the stressful conditions of our modern world. When I learned about a research project on nature connection in preschool children in Iceland, I was intrigued. I wish to deeply thank Meghan Orman for inspiring me to conduct similar research in a Norwegian context. I also want to extend a heartfelt thank you to the people involved in Youth for Arctic Nature (YAN) in Iceland for the great discussions we have had, and for taking care of us during our visit.

I am forever thankful to the preschools, children and parents who wished to be a part of my research. You were instrumental in bringing this project to life.

I want to express my sincere gratitude for all the support I have received from my supervisor, Monika Abels. You have been a crucial part in writing and finalizing this thesis. Your knowledge has been of great importance in every aspect of this project.

As with many other things in life, I am grateful that I was not fully aware of the amount of work ahead prior to writing my master's thesis. Taking each step at a time, however small, is how you get through anything.

I wish to thank the Department of Psychology for giving me the opportunity to embark on this project. I am proud of myself for doing the work and persevering to the end.

Helenah Gustavsson



Monika Abels





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Sammendrag

Denne studien hadde som mål å vurdere naturtilknytning hos førskolebarn. Naturtilknytning er forbundet med flere helsegevinster, når det gjelder kognitivt, sosialt og emosjonelt velvære. Individuer som er sterkt knyttet til naturen har en tendens til å tilbringe mer tid i naturen. Målene med denne studien var tredelt: å undersøke om barn i naturbarnehager er forskjellig i deres naturtilknytning sammenlignet med tradisjonelle førskolebarn, om foreldres naturtilknytning er positivt relatert til barns naturtilknytning, og om tid tilbrakt ute i barnas fritid er assosiert med deres naturtilknytning. Et utvalg på 42 førskolebarn, 16 barn i naturbarnehager, og 26 i tradisjonelle førskoler, svarte på spørsmål om deres tilknytning til naturen. Et utvalg av 19 foreldre svarte på lignende spørsmål om deres naturtilknytning. Det ble ikke funnet forskjeller mellom natur og tradisjonelle førskolebarn når det gjelder deres naturtilknytning. Vi fant ingen sammenheng mellom tilknytning mellom foreldre og barn på tvers av begge institusjonstyper. Imidlertid identifiserte vi et sterkt, negativt forhold i naturtilknytning mellom foreldre og barn tilknyttet naturbarnehager. Det ble ikke funnet sammenhenger mellom tid tilbrakt ute i barnas fritid og deres naturtilknytning. Fremtidig forskning må videre undersøke hvordan barns forhold til naturen etableres og fremmes, ved hjelp av en kombinasjon av kvantitative og kvalitative forskningsmetoder.

Nøkkelord: naturtilknytning, førskolebarn, overføring mellom generasjoner, tid i naturen

Sammanfattning

Denna studie syftade till att undersöka förskolebarns förhållande till naturen. Naturkontakt är förknippat med flera hälsofördelar, som till exempel kognitivt, socialt och emotionellt välbefinnande. Individer med högre naturanknytning tenderar att spendera mer tid i naturen. Syftet med denna studie var trefaldigt: att undersöka om barn i naturförskolor skiljer sig i sin naturanknytning jämfört med barn i traditionella förskolor, om föräldrars naturanknytning är positivt relaterad till barns naturanknytning, och om tiden som barnen spenderar utomhus på sin fritid är förknippad med deras naturanknytning. Ett urval av 42 förskolebarn, 16 barn i naturförskolor och 26 i traditionella förskolor svarade på frågor om deras anknytning till naturen. Ett urval av 19 föräldrar svarade på liknande frågor om deras naturanknytning. Inga skillnader hittades mellan barn i naturförskolor och traditionella förskolor gällande deras naturanknytning. Vi hittade inget övergripande samband mellan föräldrars och barns naturanknytning. Däremot identifierade vi ett starkt, negativt samband i naturanknytning mellan föräldrar och barn knutna till naturförskolor. Inga samband hittades mellan tiden som barn tillbringade utomhus på sin fritid och deras naturanknytning. Framtida forskning behöver undersöka hur barns relation till naturen grundläggs och utvecklas, företrädesvis genom en mix av kvantitativa och kvalitativa forskningsmetoder.

Nyckelord: naturanknytning, förskolebarn, generationsöverföring, tid i naturen

NATURE CONNECTEDNESS IN PRESCHOOL CHILDREN

Abstract

This study aimed to assess nature connectedness in preschool children. Spending time in nature is associated with multiple health benefits, in terms of cognitive, social, and emotional well-being. Individuals who are highly connected to nature tend to spend more time in nature. The objectives of this study were threefold: to examine if children in nature preschools differ in their nature connectedness compared to traditional preschoolers, whether parent nature connectedness is positively related to child nature connectedness, and if time spent outside in children's free time is associated with their nature connectedness. A sample of 42 preschool children, 16 children in nature preschools, and 26 in traditional preschools, responded to questions about their connection to nature. A sample of 19 parents responded to similar questions about their nature connectedness. No differences were found between nature and traditional preschoolers in terms of their nature connectedness. We found no association between parental and child nature connectedness across both institution types. However, we identified a strong, negative relationship in nature connectedness between parents and children affiliated with nature preschools. No associations were found between time spent outside in children's free time and their nature connectedness. Future research needs to further examine how children's relationship with nature is established and promoted, using mixed-methods research.

Keywords: nature connectedness, preschool children, intergenerational transmission, time spent in nature

Nature Connectedness in Preschool Children

In our modern society, digital technology increasingly dominates the lives of humans (Pergams & Zaradic, 2006). The rise of digital media simultaneously illustrates a decline in recreational nature visits (Pergams & Zaradic, 2006). This is unfortunate, because spending time in nature in childhood has repeatedly been associated with multiple benefits (Chawla, 2020). Being in nature yields better physical, mental, and emotional health (Gill, 2014; McCormick, 2017; Roberts et al., 2020). Natural environments are widely recognized for being an important space for children to play and explore (Davis et al., 2006; Samborski, 2010; Skår & Krogh, 2009), as well as for being physically active (Samborski, 2010; Fjørtoft, 2004). Nature exposure has also been shown to be beneficial for cognitive functioning (Wells, 2000; Taylor et al., 2001; Dadvand et al., 2015). Due to increased urbanization, the kind of nature children and adults are exposed to has shifted, with urban nature experiences being more prevalent than wild nature encounters (Soga & Gaston, 2016).

Nature is an abstract construct that differs depending on the cultural context in which it is spoken (Ducarme & Couvet, 2020), making it mostly a sociocultural invention (Zylstra et al., 2014). For this study, nature may be best described in terms of its function (Fjørtoft, 2001; Bartnæs & Myrstad, 2022). This view is referred to as affordance theory, an approach that may better reflect how children interact with and relate to nature than a specific location (Gibson, 2014). Children perceive natural elements with regards to how they can be interacted with, such as how to lift them, what they taste like or whether they can be hidden (Gibson, 2014). An important feature of affordance theory is that an affordance refers to a relationship between two entities, suggesting that an affordance may emphasize a relational approach (Giusti et al., 2018). This relationship indicates that an affordance is relative to its partnering entity (Gibson, 2014). In this case, it suggests that a natural element, such as a rock, provides differential affordances for adults and children (Gibson, 2014). The principles

of affordance theory offer a valuable perspective of how dissimilar nature may appear to children compared to adults.

Inspired by the definition used by Kaplan & Kaplan (1989) and Gibson's (2014) affordance theory, for the purpose of this study, nature was simply referred to as any outdoor location, near or distant, that encompassed any kind of green elements, such as trees, grass, or bushes, or any color that characterized the current season, such as brown, red, or white. Moreover, any outdoor location was considered nature regardless of whether it was managed by humans or not. In the city of Tromsø in Northern Norway, where this study was conducted, natural surroundings dominate. Aspects of nature become recognizable whenever one goes outside, justifying using the broad definition mentioned above.

Definitions of connection are multiple and depend on the context it is used in. The broad definition provided by Cambridge Dictionary suggests that connection is "a feeling that you understand, like, and are interested in someone or something." (Cambridge Dictionary, n.d.). Another definition emphasizes relationships and "the act of joining two things together" (Cambridge Dictionary, n.d.). Influenced by these definitions, this study defined connectedness as a relationship characterized by an affective bond that may also include physical proximity (Zylstra et al., 2014).

Dimensions of Connectedness to Nature

Children's nature connectedness has been described in terms of four dimensions. These dimensions entail appreciating the natural environment, caring for other living creatures, feeling unity with nature, and feeling a sense of responsibility toward nature (Cheng & Monroe, 2012).

First Dimension: Enjoyment Of Nature

The first dimension involves the numerous ways in which children enjoy nature. Spending time in nature provides more opportunities to engage in free play (Samborski,

2010; Lysklett & Berger, 2017). Nature generally lacks the set of strict rules that are associated with indoor play, in terms of how the environment should be used (Melhuus, 2012). Nature may therefore be more inviting in terms of engaging in open-ended activities (Melhuus, 2012). Children tend to feel most happy in nature when they are allowed to autonomously play for long stretches of time without adult interference (Skar et al., 2016). This is simply because they determine their own agendas and their appropriate pace of play, as opposed to when adults interfere (Skar et al., 2016). A study by Samborski (2010) found that children perceived that play in “natural play settings provided a respite from adult expectations and the opportunity to establish both personal identity and friendships in a dynamic, ongoing social setting” (p. 102). This is in line with what Matthews et al. (2000) found during interviews with children between ages nine and 16 in a rural community in the UK. The aim was to investigate what it was like growing up in a rural area (Matthews et al., 2000). In the interviews, some children emphasized the importance of spending time with peers and preferably away from adult supervision (Matthews et al., 2000). However, the nature of children’s free play has changed substantially in the last decade (Skår & Krogh, 2009). Time spent engaged in child-led play has now increasingly become controlled by adults (Skår & Krogh, 2009).

In general, how children spend their time has also changed. Children spend increasingly more time in diverse types of institutional settings, such as schools, preschools, after-school activities, and at home (Rasmussen, 2004). These settings are designed by adults and are thus tailored to what parents believe are good places for children (Rasmussen, 2004). This may be problematic because adults and children define play differently (Glenn et al., 2012). According to children, adults focus on the beneficial outcomes of play, such as its social and health benefits (Glenn et al., 2012). On the contrary, children view play as something that lacks any other purpose than the play itself (Glenn et al., 2012). Thus, adult-

controlled activities are an obstacle between children and the natural environment (Skår & Krogh, 2009). Adult interference hinders them from engaging with nature in a more free, creative, and embodied way (Skår & Krogh, 2009). Children appreciate outdoor play more when they have opportunities of being engaged in creative and simple play that lacks rigid instructions (Skar et al., 2016). A key element of children's outdoor play is the multitude of opportunities the natural environment provides that dovetails well with whatever socioeconomic background a child has (Skar et al., 2016). In conclusion, some evidence suggest that children may not necessarily appreciate the essence of nature, but rather of being away from adult supervision.

Joyful nature experiences in childhood seem to be influential even in adulthood (Chawla, 2007). Adult individuals who are deeply committed to nature conservation often explain their deep dedication to nature by referring to joyful childhood experiences in nature, such as camping, fishing, and hiking together with family, friends, and other influential role models (Chawla, 2007). Thompson et al. (2008) found that the absence of childhood nature visits was indicative of refraining from visiting natural areas as an adult. A retrospective study asked adults about their childhood engagement with nature, e.g., environmental education, nature experience, and nature participation (Wells and Lekies, 2006). Findings showed positive associations between childhood activities in wild (e.g., hiking and fishing) and domesticated nature (e.g., flower picking and tending to plants) with adult pro-environmental attitudes and behaviors (Wells and Lekies, 2006). In conclusion, childhood nature experiences seem to powerfully affect one's future relationship and connection with nature.

Second Dimension: Concern For Living Creatures

Feeling empathy for creatures constitutes the second dimension of children's nature connection (Cheng & Monroe, 2012). Empathy is considered a key factor in nature

connectedness (Beery et al., 2020) and in ecological behaviors (Khalil et al., 2020). Empathy may be understood as an ability to read the minds of others, an ability deemed crucial throughout our evolutionary history because of its survival value (Decety & Jackson, 2004). However, empathy is a contentious and multifaceted construct (Cuff et al., 2016). At the most fundamental level, a main element of empathy is the ability to make “a mental simulation of the subjectivity of others” (Decety & Jackson, 2004, p. 93). Tam (2013) states that empathy can be differentiated into an affective and a cognitive dimension. However, Young et al., (2018) argue that empathy consists of three distinct but slightly different dimensions; affective, cognitive, and empathic concern. Affective empathy refers to the ability to physically experience the emotions of others (Young et al., 2018). Cognitive empathy is to intellectually understand the subjective emotional state of another (Ernst et al., 2022), and is informed by our intellectual understanding of others’ experiences (Young et al., 2018). Cognitive empathy involves perspective taking, an essential aspect of theory of mind (Cuff et al., 2016). Perspective taking indicates that one needs to have a sense of self, an independent identity delineating the boundaries of what constitutes the self (Schultz, 2000; Beery et al., 2020). This is a cognitive ability that is still developing in two- to five-year-old children (Beery et al., 2020). Empathic concern is considered a motivational tendency to behave in a caring way (Ernst et al., 2022), suggesting an element of action (Young et al., 2018).

Based on this, empathy may best be defined as “...an emotional response (affective), dependent upon the interaction between trait capacities and state influences. Empathic processes are automatically elicited but are also shaped by top-down control processes” (Cuff et al., 2016, p. 150). This definition of empathy elucidates the interactive nature of cognitive and affective processes, and the extent to which these are consciously controlled or automatically elicited (Decety et al., 2017; Decety & Jackson, 2004).

Decety & Jackson (2004) found that empathy is amenable to training through goal-directed programs. This is corroborated by a study by Ernst et al. (2022), suggesting that children's empathic ability (differentiated into affective, cognitive, and empathic concern) can be strengthened through focused interventions. Children in three different types of preschools; animal-focused, nature, and non-nature preschools were compared over a school year in terms of affective and cognitive empathy with wildlife in a Minnesota community, USA (Ernst et al., 2022). Pre- and post-tests of empathy were conducted in pre-existing preschool groups (Ernst et al., 2022). In addition to empathy towards wildlife, behavioral tendencies associated with empathy towards domestic animals and humans were considered. Children in the animal-focused and nature preschools showed higher levels of affective and cognitive empathy with wildlife, compared to conventional preschool children at the end of the year (Ernst et al., 2022). Moreover, the animal-focused and nature preschool children exhibited a higher degree of empathic behavioral tendencies towards humans (Ernst et al., 2022). Taken together, research on empathy suggest that different types of empathy can be learned through focused interventions.

Third Dimension: Sense Of Oneness

The third dimension refers to a sense of oneness and includes the extent to which one feels part of the natural world (Cheng & Monroe, 2012). Clayton (2003) argues that “an environmental identity is one part of the way in which people form their self-concept” (p. 45). Moreover, Clayton (2003) reasons that any type of identity we assume provides us with a sense of being part of a larger whole, either involving a human or non-human environment. However, because five-year-old children are in the process of developing a distinct self-identity, they might struggle with comprehending what being “part of nature” means (Beery et al., 2020, p. 9). In other words, the sense of feeling oneness with nature, may not be as

relevant to preschool children as to older children, adolescents, and adults who have a clearer sense of self-identity.

Fourth Dimension: Sense Of Responsibility

The last dimension entails responsibility (Cheng & Monroe, 2012). Responsibility items reflect actions such as picking up litter and the notion that one's own behavior can change the natural world (Cheng & Monroe, 2012). It is suggested that to care for the environment, one needs to feel that the environment is part of one's sense of self (Stets & Biga, 2003). A study by Mannetti et al. (2004), surveyed individuals aged 18-37 in Rome, Italy, and found that identity played a significant role in determining behavioral intentions of recycling in the home. Specifically, intentions to engage in a specific behavior were shown to be motivated by a desire to become more like one's idealized self (Mannetti et al., 2004). This contrasts with a study with social science undergraduates by Hinds & Sparks (2008). This study examined the predictive factors implicated in the tendency to visit natural environments (Hinds & Sparks, 2008). Factors included emotional connection to nature, a proenvironmental identity, and having had greater exposure to natural environments in childhood (Hinds & Sparks, 2008). The study concluded that adding the environmental identity factor to the model already containing an emotional connection as a predictive factor, did not explain more of proenvironmental behavioral intentions (Hinds & Sparks, 2008). This could be interpreted such that environmental identity and affective connection factors share overlapping dimensions (Hinds & Sparks, 2008). In other words, contrasting evidence provides an ambiguous picture of the role of identity and affection towards nature protective actions.

In addition, re-cycling and re-use behavior in eight-to-10-year-old German children seem to be shaped by the social environment through norms (Matthies et al., 2012). Subjective norms refer to expectations placed upon an individual by significant others,

whereas personal norms are associated with the intention of behaving morally and in line with one's personal values (Matthies et al., 2012). In terms of re-cycling behavior, sanctions imposed by parents and parental behavior were also influential (Matthies et al., 2012). In a cross-cultural study on environmental behaviors, parents and their young adult children in Israel, the US, and South Korea, were asked about their environmental behaviors. Findings suggest that when young adults remembering being seen as equals as children, as being active participants and allowed to be self-directed as opposed to being taught specific behaviors, intergenerational learning was the strongest (Katz-Gerro et al., 2020). In another cross-cultural study, comparing German and Japanese children, elementary school children were more successful in learning a behavior when observing what their parents do, rather than parents attempting to verbally teach what is appropriate or not (Ando et al., 2015). In Danish adolescents, the motivation to act eco-friendly was mostly shown to stem from the norms and values of the parents (Grønhøj & Thøgersen, 2017). Moreover, the extent to which autonomy was encouraged also influenced children's interest in eco-friendly behaviors (Grønhøj & Thøgersen, 2017). In summary, parental influence on eco-friendly behavior in children and adolescents tends to be quite impactful. Based on the intergenerational transmission of recycling and re-use behaviors, there is reason to assume that the extent of nature connectedness might also be transmitted from parents to children.

Children's Nature Connectedness

The dimensions discussed above were identified in a factor analysis and constitute a widely used measure of children's connection to nature, referred to as the Connectedness to Nature Index (CNI) by Cheng & Monroe (2012). The CNI is developed in Florida, USA (Cheng & Monroe, 2012). The CNI is specifically aimed at eight to 10-year-old children (Cheng & Monroe, 2012; Bragg et al., 2013), however, it has successfully been used in children as young as 6.5-years old (Savolainen, 2021). The CNI can be used to predict

children's level of engagement in nature activities as well as in ecological behaviors (Cheng & Monroe, 2012). Results of the CNI indicate that children who score high on the four dimensions also tend to be more interested in being in nature (Cheng & Monroe, 2012). Moreover, a child's connection to nature is associated with a higher likelihood of being interested in ecological behaviors (Cheng & Monroe, 2012; Mayer & Frantz, 2004).

Variables Associated with Children's Outdoor Time and Their Nature Connection

Parental Influence. The topic of parent attitudes and their association with children's nature connection, mentioned in the sense of responsibility section, will now be revisited. Family values have been shown to be a significant factor in developing a child's connection to nature (Cheng & Monroe, 2012). In addition, family is also instrumental in children's interest in ecological behaviors (Cheng & Monroe, 2012).

Parents are the primary gatekeepers in how much time children spend in nature (Beery et al., 2020). McFarland et al. (2014) investigated the association between parental nature attitudes and their three-to-five-year-old children's nature visits in Texas, USA, by examining the amount of time children engaged in outdoor free play. Parents in the sample had generally positive attitudes toward nature, and about their children's time outdoors (McFarland et al., 2014). Findings of this study indicate a moderate positive association between parent attitudes and the time children spend outside, i.e., the higher the parents scored on the parental nature attitude scale, the more time they indicated that their children spent outside (McFarland et al., 2014). Parent attitudes toward nature may also affect parents' willingness to provide transport to natural environments located at a distance from the home (Skår & Krogh, 2009). Ernst (2018) found that parents who are positive toward outdoor play in natural environments reflect their children's preference for playing in natural settings. In conclusion, the attitudes and values of parents seem to greatly influence how children perceive and relate to nature. These studies indicate that parents who are more positive

toward nature are more willing to let their child be outside more and may be more willing to facilitate their exposure to natural environments.

In a Turkish study, Ahmetoglu (2019) examined whether parental attitudes toward nature was implicated in promoting children's sense of biophilia. Biophilia refers to an inherent tendency to like and be attracted to natural elements (Ahmetoglu, 2019). Results suggest that the stronger the family importance of being outdoors, the higher the child's biophilia (Ahmetoglu, 2019). In terms of nature connection, Passmore et al. (2021) examined the influence of parent nature connectedness on child nature connectedness. Findings suggest that parents' level of nature connectedness was more predictive of their child's nature connectedness than multiple other factors, such as features of the environment, maternal education, and frequency of their child's visits in nature (Passmore et al., 2021). In conclusion, how connected to nature the parent is seems to significantly influence the child's nature connection. Children's time spent in nature was less influential than parental nature connection, suggesting there may be other factors involved (Passmore et al., 2021).

Another way in which parents influence their children's nature connection is through parent education. Ahmetoglu (2019) further observed that parental education was related to how important free play outdoors was perceived by parents. Findings indicate that the higher educated the parent, the stronger the emphasis on outdoor play (Ahmetoglu, 2019). This was also found in a US study by Rice & Torquati (2013). Mothers with higher academic education were more likely to send their children to a preschool with access to more outdoor natural play environments, than preschools with less natural elements (Rice & Torquati, 2013). Taken together, there seems to be an association between parental level of education and preference for natural environments in terms of child well-being.

Child Gender. Gender has been shown to influence children's nature connectedness. In children and their parents in the UK, being a girl was shown to be associated with having a

higher nature connection in seven-to-nine-year-old children (Passmore et al., 2021).

However, the role of gender in nature connectedness has not been identified in other studies (Savolainen, 2021; Bragg et al., 2013; Ahmetoglu, 2019). In brief, results on the effects of gender on a child's nature connection are mixed.

Effects of Time Spent Outside

Frequent positive childhood nature experiences have been shown to strongly underpin a high nature connection in adulthood (Cleary et al., 2020; Fretwell & Greig, 2019; Guiney & Oberhauser, 2009). Being strongly connected to nature is associated with higher engagement in ecological behaviors (Mackay & Schmitt, 2019). Some studies have even found a causal connection of nature connectedness predicting ecological behaviors (Davis et al., 2009; Zelenski et al., 2015). Children and adults who report being highly connected to nature also tend to spend more time in nature (Cheng & Monroe, 2012).

Giusti et al. (2014) found that repeated interactions with the natural environment are associated with having emotional and cognitive bonds with it. In a longitudinal study, they investigated whether a small sample ($N = 25$) of five-year-old children who had more frequent exposure to natural environments displayed a stronger emotional and cognitive connection with the natural world, as opposed to children with less nature visits (Giusti et al., 2014). Preschools were categorized according to distance to nature areas and the frequency of which these distances were traveled (Giusti et al., 2014). In addition, preschools were further ranked according to the types of nature they visited (Giusti et al., 2014). Findings indicate that children who have more nature visits during their four years in preschool have a more pronounced intellectual and emotional connection with nature than the children who spend less time in natural environments during their four preschool years (Giusti et al., 2014). This study supports the notion that visits to and engagement with nature promotes empathy for

other than human organisms in nature and an increased intellectual awareness of environmental issues.

Ewert et al. (2005) suggested that spending time engaged with natural environments in childhood “preconditions him or her to developing a pro-environmental, or eco-centric set of beliefs and attitudes, about the environment later in life” (p. 234). Indeed, Collado and colleagues (2013) investigated whether attending one- and two-week long summer camps changes children’s affective and cognitive relationship to nature, as well as the tendency to behave ecologically. Collado et al. (2013) examined the effects of nature camps with and without a nature education component and added an extra control group in the form of a city camp without nature education. Findings indicate that spending time in nature enhanced children’s emotional relationship with nature (Collado et al., 2013). However, there was no additional explanatory effect of nature education on attitudes toward the environment, nor on inclinations to engage in ecological behaviors (Collado et al., 2013). The findings from the study by Collado et al. (2013) may point to that in children and youth, interventions should be focused on emotional engagement, rather than educational learning.

Challenging natural environments seem to trigger physical activity and are associated with enhanced physical health factors and motor development. Söderström et al. (2013) found that the outdoor environment of day care centers in Sweden influences preschoolers’ physical health. Specifically, an outdoor environment characterized by multiple opportunities for play by combining play structures with a high number of green elements, such as trees and shrubs, was associated with a healthier body shape (waist circumference and BMI) and longer night sleep (Söderström et al., 2013). Moreover, a study by Fjørtoft (2004) suggests that convoluted, wild natural environments are valuable for children in terms of motor development. A physically varied landscape constitutes a more physically challenging experience, in which children can practice the complex movement patterns implicated in

navigating a more difficult landscape (Fjørtoft, 2001; Fjørtoft, 2004). Taken together, diverse environments that contain trees, shrubs, and foliage, and in addition, uneven terrain, tend to stimulate better motor development and higher levels of physical activity in preschoolers. Studies suggest that children's time spent outside confer beneficial effects in terms of an increased interest in behaving ecologically, and enhanced physical health.

In conclusion, the primary factors shown to be implicated in children's connection to nature are parental values toward nature and child gender. Parents have a direct influence on how much time children spend outside (Beery et al., 2020). Moreover, parents' own attitudes toward nature may reflect their choice of enrolling their child in a preschool with an emphasis on nature and outdoor life.

Nature Preschools

The idea of nature preschools emphasizes the importance of early fostering children's connection to nature. The opportunity of improving children's nature connection and environmental attitudes through frequent visits to natural environments, should ideally occur prior to the age of 11 (Liefländer et al., 2013; Wells & Lekies, 2006).

In a study on the effects of environmental education in Canadian preschools, Elliot et al. (2014), examined whether learning more about nature influenced children's nature connectedness and ecological behavior. Assessments of nature connectedness were done twice, at the beginning and near the end of the school year, and included playing a board game, in which the child played with the interviewer (Elliot et al., 2014). The game included items that were read out aloud to the child, prompting the child to pick the option they preferred (Elliot et al., 2014). Items depicted different types of scenarios in nature and aspects of ecological behavior, and the study involved children in both nature and traditional preschools (Elliot et al., 2014). Findings showed that there were no differences between the children in nature and traditional preschools in terms of nature connectedness in the first

assessment (Elliot et al., 2014). However, at the end of the school year, the two groups differed significantly in extent of nature connectedness (Elliot et al., 2014). The traditional preschools who had less frequent nature contact throughout the year, exhibited slightly lower levels of nature connectedness at the end of the year (Elliot et al., 2014). Conversely, the nature preschool group, who had spent more time outside between the pre-and post-assessments, displayed slightly higher nature connectedness (Elliot et al., 2014). Findings of this study indicate that time spent in nature may be an important aspect of promoting nature connectedness in preschool children (Elliot et al., 2014). However, no differences in terms of ecologically responsible behavior between the two groups were identified, suggesting other factors could be at play (Elliot et al., 2014).

The results found in the study by Elliot et al. (2014), contrast with findings by Savolainen (2021) and Passmore et al. (2021). In a Finnish study, Savolainen (2021) studied whether visits to wild nature during preschool hours were associated with feeling a higher sense of connectedness to nature. Savolainen (2021) found that nature preschool children who spent more time in wild nature areas displayed a higher sense of responsibility toward nature than did traditional preschoolers who spent less time in wild natural environments. However, no significant differences in terms of overall nature connection between the two groups were identified (Savolainen, 2021). A relationship between the number of weekly nature visits and children's nature connectedness was not identified in the study by Passmore et al. 2021. In conclusion, these studies were conducted in different geographical locations, which may influence their results. The study by Savolainen (2021) in Finland is closest to the cultural and geographical context of this study.

Nature Preschools in Norway

In Norway, 379 preschools identify as nature preschools (Utdanningsdirektoratet, 2024). In 2023, there were a total of 5314 preschools in Norway, where being a nature

preschool was the most common pedagogical profile, constituting 7% of all preschools (Utdanningsdirektoratet, 2024). In 2023, 49% of all preschools in Norway were public preschools, and 51% private (Utdanningsdirektoratet, 2024). Most nature preschools in Norway are privately operated, and generally smaller than public preschools (Lysklett & Berger, 2017).

The history behind the establishment of preschools located in wild natural environments is associated with Norwegian culture and its strong emphasis on outdoor activities (Borge et al., 2003). In Norwegian culture, nature plays an essential role in the idea of a happy childhood, and in fostering physically active children (Borge et al., 2003). Nature daycare centers were established to embody the idea of a natural and free childhood, providing children with the opportunity to learn with nature as a teacher (Borge et al., 2003).

However, there is no unified national framework specific to the operation of nature preschools (Melhuus, 2012). Rather, individual nature preschools establish their own curricula that may vary in terms of pedagogy and daily activities (Melhuus, 2012). The main factor differentiating nature preschools from traditional preschools is that nature preschools seem to spend more time in outdoor, natural areas (Lysklett & Berger, 2017). During the winter months, roughly 70% of the nature preschools included in their study, spend at least four hours outside (Lysklett & Berger, 2017). During summer, about 87% spend more than six hours outside (Lysklett & Berger, 2017). However, in a study by Moser & Martinsen (2010), 117 Norwegian preschools reported how much time children generally spend outdoors during preschool hours. Findings suggest that Norwegian preschoolers generally spend a considerable amount of time outside, especially during the summer months (Moser & Martinsen, 2010). This suggests that the amount of time spent outdoors in nature and traditional preschools may be quite similar.

Another significant factor of outdoor preschools appears to be the additional trust that characterizes the relationship between staff and children (Lysklett & Berger, 2017). The freedom found in outdoor preschools includes invisible area limits, necessitating having verbally agreed upon rules and routines that everyone must follow (Lysklett & Berger, 2017). The general absence of physical obstacles as area boundaries are replaced by verbal agreement of movement, comprising a unique dimension of nature preschools (Lysklett & Berger, 2017). Taken together, it is unclear how different the daily routines in traditional and nature preschools are. The national guidelines for preschools in Norway declare that preschools should establish that all children are given the opportunity to interact with and “explore nature in all its diversity” on a regular basis (Utdanningsdirektoratet, 2017, p. 52).

In Norway, natural environments are widespread and easily accessible. Tromsø is a particularly interesting place to study nature connectedness, because of the strong focus on ‘friluftsliv’, i.e., outdoor life, and nature being at your doorstep. Due to the location and the strong emphasis on the outdoors, children in Tromsø generally spend much time outdoors. We were interested in what happens to their nature connection if their nature exposure is increased even more. According to some studies, there seems to be a linear relationship, i.e., the more nature exposure, the higher the nature connection (Barrable & Booth, 2020; Elliot et al., 2014). According to other studies (Savolainen, 2021; Passamore et al., 2021), no relationship between time spent in nature and extent of children’s nature connection has been identified. This was in line with findings by Rice & Torquati (2013), who did not find a difference in biophilia among preschool children attending preschools with outdoor play areas containing more natural elements compared to children in preschools with less greenery. In conclusion, studies suggest somewhat mixed results on the implications of time spent in nature in childhood.

Hypotheses

Based on the varied findings on this topic, the aim of the present study was to contribute to the current body of research on nature connectedness in preschool children. Firstly, we expect children attending nature preschools to show a higher degree of nature connection than children attending traditional preschools. Secondly, we expect a positive correlation between parents' and children's nature connection. Lastly, we expect children who spend more time in nature outside of preschool hours to show a higher degree of nature connection.

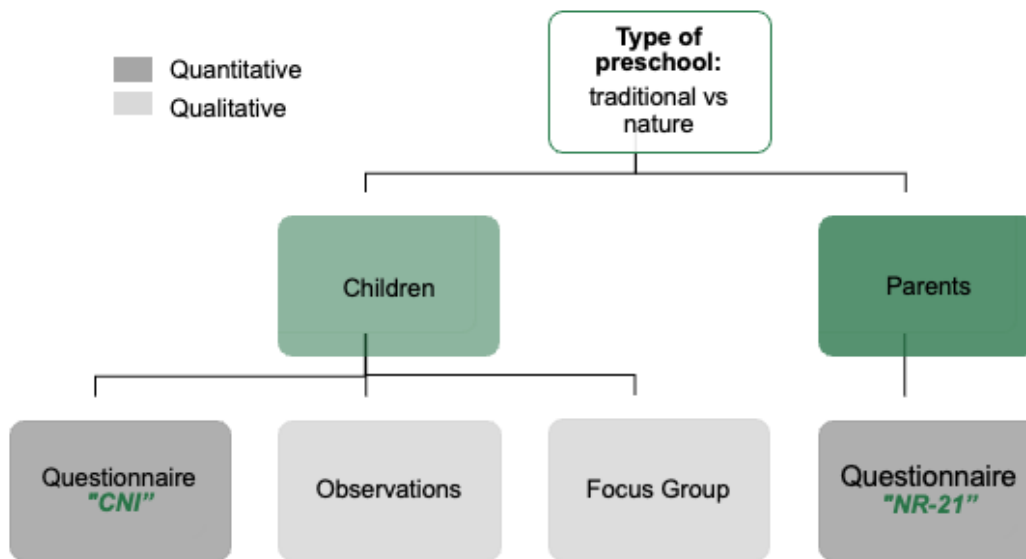
Methods and Materials

General Data Collection Procedure

We collected data from multiple sources: questionnaires, observations, and focus group discussions, but in this thesis, we are only using the questionnaire data. The primary objective was to measure children's connectedness to nature. The approach included individual interviews with each child, using a standardized questionnaire. The secondary objective was to assess parent nature connectedness. The idea was to examine the association between child and parent nature connectedness. The third objective was to examine whether there was a positive correlation between the number of hours children spend in direct contact with nature in their non-institutional time, as reported by parents, and children's degree of nature connection. Other aspects of the child's home environment were also assessed.

Selection Of Preschools

Traditional and nature/outdoor preschools in Tromsø municipality were invited via email to participate in the study, six of whom ultimately agreed to participate. Nature/outdoor preschools will subsequently be referred to as simply nature preschools. Three preschools were nature preschools, and three were traditional preschools.

Figure 1*Overview of Sample Groups and Data Collection Procedures*

Selection of preschool type was based on the name of the preschool, i.e., whether it had a name associated with nature or outdoor activities. The three participating preschools with a nature or outdoor association in their names, were placed in the nature preschool group. The three participating preschools without a nature or outdoor association in their names, were placed in the traditional preschool group.

Sample 1: Children

The main participants were five-year-old preschool children, attending either a traditional preschool or a nature preschool in Tromsø, Norway. A sample description of participating children and parents in both institution types is presented in table 1. Because of the gender imbalance in our sample, there were more girls than boys, we are controlling for gender in our analysis.

Table 1*Number of Participating Children and Parents By Institution Type*

	Nature	Traditional	Total	Statistic	<i>p</i>
Participants Children	16	26	42	$\chi^2 = 1.21$.27
Girls	6	20	26	$\chi^2 = 6.53$.01*
Participants Parents	9	13	22	$\chi^2 = .02$.90
Mean Age (<i>SD</i>)	34.78 (3.19)	36.92 (2.96)		$t = -1.62$.12
Mothers %	41%	59%	17	$\chi^2 = .00$.96
Education (MA or higher)	6	7	13	$\chi^2 = .36$.55
Girls' Parent Response %	31%	69%	13	$\chi^2 = 2.04$.15
Nature as Reason For Enrolling Child In A Specific Preschool	3	2	5	$\chi^2 = 3.19$.07

Note: Not all parents who participated have a corresponding child response.

Sample 2: Parents

One parent of each child was invited to participate. To assess parental nature connectedness, the Nature Relatedness Scale (NR-21) (Nisbet et al., 2009) was used. The full parent questionnaire, including the NR-21 items and sociodemographic questions, is found in appendix H. The original NR-21 items and their Norwegian translations are found in appendix G. All participants were told their participation was voluntary and that they could withdraw from the study at any point.

All parents who participated could not be connected to a child. One parent had a child who did not want to participate. Another parent questionnaire could not be associated with the corresponding child. Lastly, both parents of one child responded to the questionnaire.

Because of these reasons, the parent-child numbers do not always correspond. In total, 22 parents responded, of which 19 are unique responses that could be connected to their respective children.

Parent education level was dichotomized as lower and higher, i.e., all education levels up to and including a bachelor's degree were considered lower. Levels above and including master's degree were considered higher. The sample consisted of seven parents (37%) with lower attained education, and 12 parents (63%) with higher attained education. However, because there was no significant difference in parent education in our sample, we did not control for it.

Ethics Statement

Prior to initiating the research project, it was ensured that the research proposal was approved by the Norwegian Agency for Shared Services in Education and Research (Sikt), found in appendix A, and The Research Ethics Committee at the Institute for Psychology at UiT The Arctic University of Norway, found in appendix B. Written consent by parents and verbal assent by children were obtained prior to commencing the study. All but two children initially assented to participate. One of the two children decided to try again, and the interview was successfully completed.

The consent form proposal consisted of two documents: an infographic directed to children and a consent form to the parents, found in appendix C. A richly illustrated infographic was provided to each child, outlining the broad strokes of the research in simple terms. The infographic emphasized children's right to decline participating, even though their parents had given their consent. The consent form consisted of a two-page information text of the study, and two pages in which parents indicated what parts they and their child wanted to participate in. Each consent form had its own unique three-letter code, such that each child would be associated with the right parent, and to ensure anonymity. Codes were used in the

protocols associated with the questionnaire interviews. Parents were asked to provide the code when responding to the online questionnaire.

Variables

Children's Nature Connectedness

To measure children's nature connectedness, we used the Connectedness to Nature Index (CNI) by Cheng & Monroe (2012). The original CNI items and the Norwegian translations are included in appendix D. The interview protocol with the Norwegian translations is found in appendix E. The CNI was developed for capturing children's affective affiliation with nature (Cheng & Monroe, 2012). The CNI can also be used in predicting children's engagement in future ecological behaviors, as well as the tendency to spend time engaged in nature activities (Cheng & Monroe, 2012).

The CNI has been used in previous studies (Bragg et al., 2013; Savolainen, 2021), and was found to be an appropriate measure for children as young as seven (Bragg et al., 2013). In a study on Finnish children, Savolainen (2021) used it on children as young as 6.5 years. The CNI items are considered sufficiently concrete for preschool children's level of comprehension (Savolainen, 2021). Bragg et al. (2013) stated that the sense of oneness subscale may be more a more comprehensible concept than the more abstract notion of connection.

A limitation of the CNI is that it does not contain any measurements on the extent to which nature is experienced as part of a larger social community (Chawla, 2020; Tam, 2013). Chawla (2007) found that nature experiences shared with a significant other are vital to developing an emotional connection to nature. This informed our decision to include focus group discussions in our initial research design, attempting to capture the community aspect of nature connection.

The CNI scale was translated from English to Norwegian with help from native Norwegian speakers. It was important that the true essence and meaning of the items were appropriately translated, resulting in some items slightly deviating from the original in terms of word choice. The items were back translated to ensure the proper meaning was conveyed. Four people were involved in the translation procedure, of which two were native speakers.

To measure children's responses, a scale of five emojis was developed, shown in figure 2. The emojis represent a child-friendly version of a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Children were asked to point to the emoji that best reflected their level of agreement to the item. Emojis were displayed on an A4-sized paper. The final score was calculated by computing the average of the 16 items. A higher score indicates a higher nature connectedness. Cronbach's Alpha for the CNI dimensions was .72, and for CNI items, .75, indicating good scale reliability.

Figure 2

Sample Emojis Shown to Children During Interviews



Parental Nature Connectedness

The second objective was to assess parent nature connectedness. Parent nature connectedness was measured using the Nature Relatedness Scale (NR-21) by Nisbet et al. (2009). The NR-21 consists of 21 items, and measures cognitive, affective, and experiential dimensions of an individual's relationship with nature (Nisbet et al., 2009). The CNI and the short-form version of the NR-21, the NR-6, have been shown to be strongly correlated (Bragg et al., 2013). The items are rated on a five-point Likert scale, and ranges from 1 representing "strongly disagree" to 5 "strongly agree". Final scores were calculated by computing the

mean of the 21 items in the parent NR-21 scale. A higher score indicates a higher nature connectedness. Cronbach's Alpha for the NR-21 scale was .80, indicating good reliability.

Children Data Collection Procedure

Because of documented issues with using proxies, e.g., proxy information not reflecting self-reports (Varni et al., 2007), the aim was to ask children questions directly about their relationship to nature. Interviews were conducted individually with each child. A preschool staff member was invited to be present during interviews. In accordance with the conditions laid out in the consent form, I started the interview sessions by asking the child whether they wanted to participate. If the response was positive, I explained the procedure to the child. I said that I was to read a few statements about nature and that they would point to one of the five emojis to indicate the extent of their agreement with each statement.

I continued with pointing at each emoji, explaining what each smiley meant in terms of degree of agreement. Based on the procedure from Savolainen (2021), I continued with the practice statement "Jeg liker vintern" ("I like the winter"), to ascertain whether they understood what to do. Next, we worked our way through the 16-item questionnaire, where I made relevant comments on issues where needed. After finalizing the questionnaire, the child received a diploma, found in appendix F, as a thank you for participating, on which they could also write their name. On the back was a reminder to the parents to fill out the online survey, complete with link, QR code, and the unique code they received previously.

Parent Data Collection Procedure

The Nature Relatedness Scale (NR-21) by Nisbet et al. (2009), used to assess parental nature connectedness, was initially provided only as an online questionnaire.

Sociodemographic questions were also included in the second part of the questionnaire. A full overview of the online parent questionnaire can be found in appendix H. To increase participation, the survey was subsequently also distributed in a physical format, identical to

the online survey. It was provided to the children together with their diploma after completing the questionnaire interview. To connect each child with their parent, each dyad was assigned a three-letter code included in each individual consent form. The unique participation code, a written link, and a QR code to the online questionnaire were provided in the consent form. Parents were asked to provide this code in the consent form when filling out the online and paper survey.

Preschools In This Study

Nature Preschools

The three nature preschools in this study differ in their respective approaches, but all share the element of spending a large part of their days outside. In addition to being outdoors, one preschool had an additional pedagogical focus on the natural sciences (Læringsverkstedet Bukkespranget Barnehage, n.d.). Another preschool focuses on the active use of outdoor environments throughout the year, in which children are taught to actively prepare for being outside (Ekrehagen Friluftsbarnhage, n.d.). Preparing to be outdoors includes choosing the appropriate clothing, having the right gear, as well as developing the ability to use tools. In another nature preschool, pedagogy is inspired by the Reggio Emilia philosophy that emphasizes the interplay between children, preschool staff, and the surrounding physical environment (Hamna Friluftsbarnhage, n.d.). The core of Reggio Emilia philosophy is that children are born intelligent and capable of being their own teachers (Norsk Reggio Emilia Nettverk, n.d.). Children are considered to possess a strong, innate motivation to explore the world, a process in which preschool staff constitute an additional, supporting teacher (Norsk Reggio Emilia Nettverk, n.d.). The emphasis is on learning within the larger physical environment, using it as an integrated part of the pedagogical approach (Norsk Reggio Emilia Nettverk, n.d.). In conclusion, the general nature preschool philosophy is based on the importance of including nature in their routines, spending most of the time outdoors. While

being outdoors is the primary common factor, the three preschools in this study tend to deviate in terms of pedagogical focus.

Traditional Preschools

Similarly, the three traditional preschools participating in this study collectively value the role of nature in their daily operations and as an essential part of children's development. One of the three traditional preschools in this study also adheres to the Reggio Emilia philosophy (Slettaelva Barnehage, n.d.). Another one has a strong focus on being outdoors, in which nature is perceived as an important arena for learning and mastery in terms of children's development (Karveslettlia Barnehage, n.d.). One day a week is dedicated to conducting outdoor excursions to various places, such as the forest or the mountains (Karveslettlia Barnehage, n.d.). Another one has a more general approach, in which play, learning, participation and being outdoors are equally emphasized (Gimle Studentbarnehage, n.d.). The main goal of another preschool is to create an environment characterized by safety, well-being, and joy (Karveslettlia Barnehage, n.d.). The ability to learn to reflect on one's actions is emphasized through play, safe environments, care, experiences, and friendship (Karveslettlia Barnehage, n.d.). Taken together, in traditional preschool curricula, nature does tend to constitute a key aspect in daily operations and pedagogy. However, traditional preschools seem to mostly rely on a conventional approach, focusing on multiple other areas simultaneously, with no extra focus on any specific area of learning and development.

Results

Analyses were done using SPSS 29.

Hypothesis 1

We expected that children attending nature preschools show a higher nature connection than children in traditional preschools. First, we visualized the data distribution in a scatterplot, to determine the presence of outliers, presented in figure 3. Descriptive statistics

for both institution types are presented in table 2. We identified a possible outlier (M = 2.37) in the nature preschool group. We ran an analysis of variance with the overall CNI scores including the outlier, N = 42. Children’s CNI score was the dependent variable, and the independent variable was institution type, controlling for child gender. Gender has been identified as a factor in children’s nature connectedness, where being a girl was shown to be positively and significantly correlated with having a higher nature connectedness in seven-to-nine-year-old children (Passmore et al., 2021). Thus, we included child gender as a covariate in the analysis. Results of the analysis of variance are presented in table 4. Contrary to our hypothesis, no significant differences were found between the two institution types in terms of nature connection.

Figure 3

Distribution of Scores By Institution Type Indicating a Possible Outlier

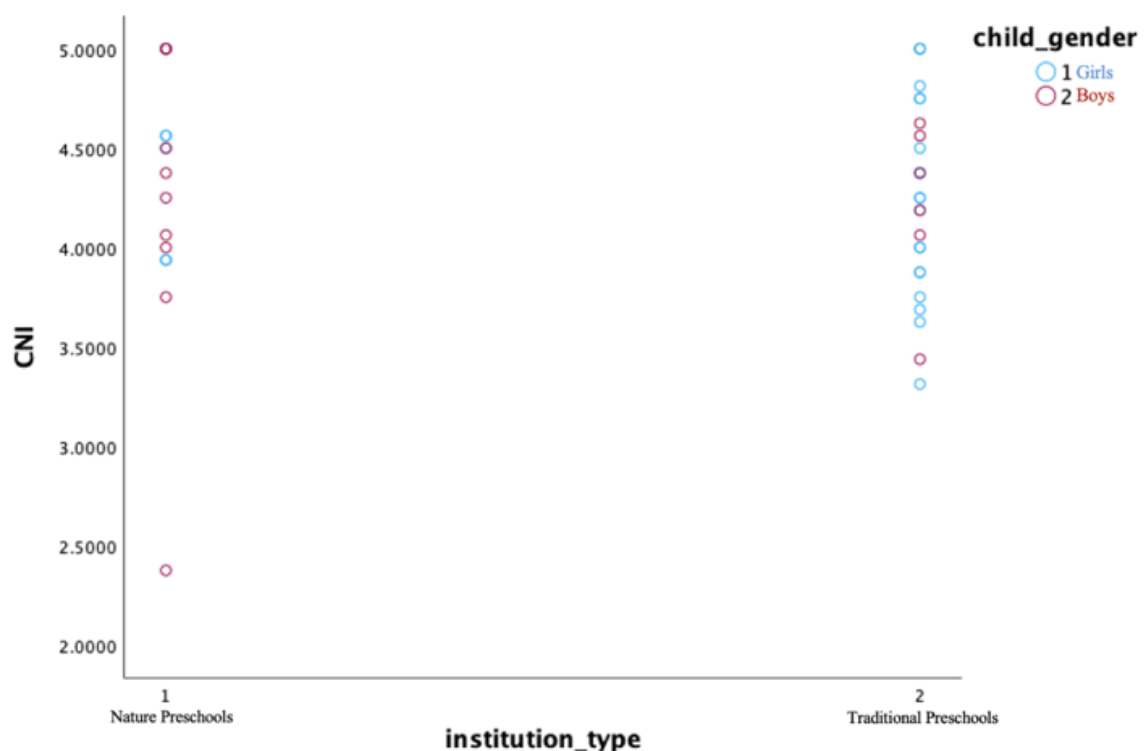


Table 2*Descriptive Statistics By Institution Type and Gender*

Institution Type	Gender	Mean CNI Score	SD	N
Nature Preschool	Girls	4.42	0.41	6
	Boys	4.23	0.79	10
Institution Total		4.30	0.66	16
Traditional Preschool	Girls	4.27	0.50	20
	Boys	4.21	0.43	6
Institution Total		4.25	0.48	26
Total	Girls	4.30	0.48	26
	Boys	4.22	0.66	16
Overall Total		4.27	0.55	42

Table 3*Descriptive Statistics and Cronbach's Alpha Scores of the CNI and Each CNI Subscale*

	N	Mean	SD	Cronbach's Alpha
CNI Sum Score	42	4.27	.55	.72
<i>Enjoyment of Nature</i>	42	4.15	.73	.67
<i>Empathy for Creatures</i>	42	4.54	.57	.40
<i>Sense of Oneness</i>	42	4.30	.78	.25
<i>Sense of Responsibility</i>	42	4.21	.83	.43

To ascertain that the non-difference we found between the institution types was not driven by the outlier, we re-ran the analysis excluding the outlier. Even after excluding the outlier, no significant differences in nature connectedness were found between the two

institution types. No differences in nature connectedness in terms of gender were identified in our sample. None of the analyses we did rendered significant results, neither with nor without the outlier.

Table 4

Analysis of Variance With CNI as Dependent Variable

	df	F	Sig.	Partial Eta Sq.
Institution Type	1	.22	.64	.00
Child Gender	1	.36	.55	.00
Error	39			
Total	42			
Corrected Total	41			

Table 5

Multivariate Analysis of Variance With The Subscales as Dependent Variables

	df	F	Sig.	Partial Eta Sq.
Institution Type	1	.83	.51	.09
Child Gender	1	.63	.64	.07
Error	39			
Total	42			
Corrected Total	41			

Note. This table shows the results of the multivariate analysis of variance, including the four subscales as the dependent variables.

Savolainen (2021) found a significant result at the subscale level, even when not finding any significant differences at the overall scale level. Thus, based on the findings by Savolainen (2021), in addition to assessing overall CNI sum score, we examined whether there were significant results with any of the CNI subscales. Descriptive statistics for the CNI scale and its subscales are found in table 3.

In addition to the findings by Savolainen (2021), because the CNI scale weighs all 16 items equally, whereas each subscale contains a different number of items, we also ran a multivariate analysis of variance, found in table 5. Here, the dependent variables were the four CNI subscales: enjoyment of nature, empathy for creatures, sense of oneness, and sense of responsibility. Institution type was the independent variable, and child gender was a covariate. There was no significant effect of institution type on any of the children's subscale scores.

Hypothesis 2

We predicted that a high parent nature connectedness is associated with a high child nature connectedness. First, we checked whether parents who responded to the questionnaire were different from the parents who did not respond in terms of their child's nature connection. We found that parents who did not respond, have children with lower CNI scores, compared to parents who responded, who have children with higher CNI scores, shown in figure 4. However, parent responses did not differ by institution. Descriptive statistics of the total number of participating parents are presented in table 6. Descriptive statistics of complete participating parent-child pairs are presented in table 7.

Figure 4

Children’s Nature Connectedness as a Function of Responding and Non-Responding Parents

By Institution

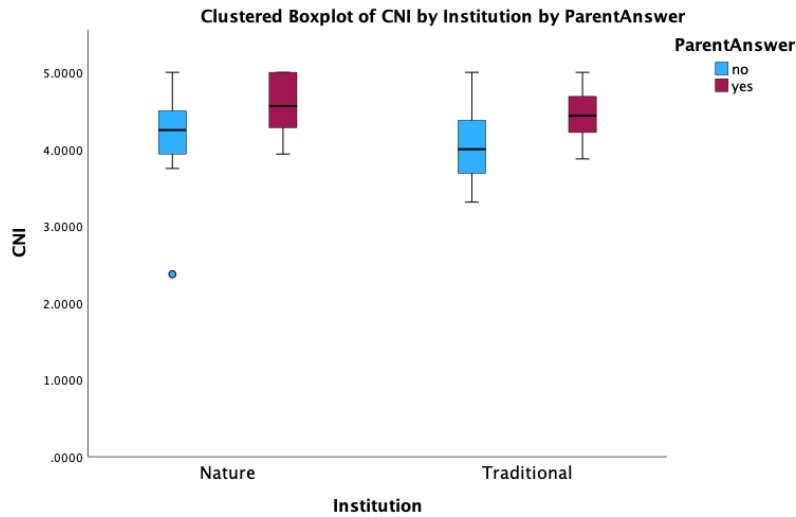


Table 6

Descriptive Statistics Of Total Number of Parent Responses by Institution Type and Gender

Institution Type	Role	Mean NR21 Score	SD	N
Nature Preschool	Mothers	3.91	0.28	7
	Fathers	4.40	0.44	2
Institution Total		4.02	0.36	9
Traditional Preschool	Mothers	3.98	0.54	10
	Fathers	3.68	0.24	3
Institution Total		3.91	0.49	13
Total	Mothers	3.95	0.44	17
	Fathers	3.97	0.48	5
Overall Total		3.95	0.44	22

Note. The total number of participating parents was 22, of which 19 had a corresponding child.

Table 7

Descriptive Statistics of Complete Parent-Child Dyads Who Responded to the Parent NR-21 and Child CNI Questionnaires

	N	Mean NR-21 Score	SD
Total			
CNI	19	4.50	0.37
NR-21	19	3.99	0.44
Nature Preschools			
CNI	7	4.58	0.46
NR-21	7	4.06	0.38
Traditional Preschools			
CNI	12	4.45	0.32
NR-21	12	3.95	0.49

Table 8

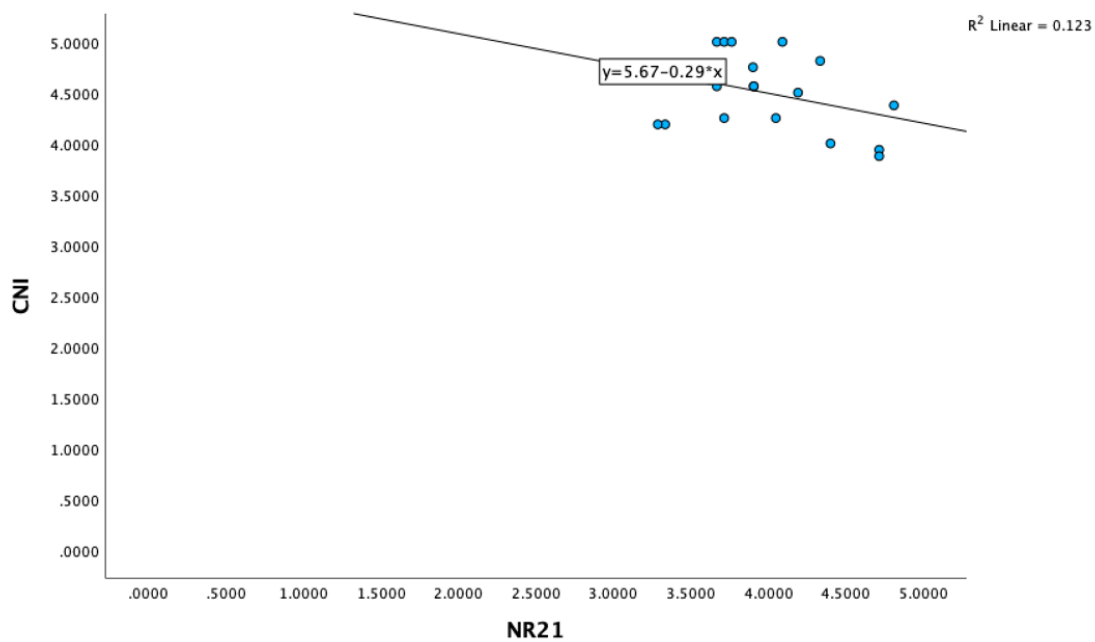
Correlation Coefficients By Institution Type

	N	Correlation Coefficient	Sig.
Total	19	-.35	.14
Nature Preschools	7	-.86	.01*
Traditional Preschools	12	-.12	.72

Correlations between child and parent scores in both institutions are displayed in table 8. Contrary to our hypothesis, we did not find a significant relationship between child and parent scores across both institutions, $r(19) = -.35$, $p = 0.14$, as shown in figure 5.

Figure 5

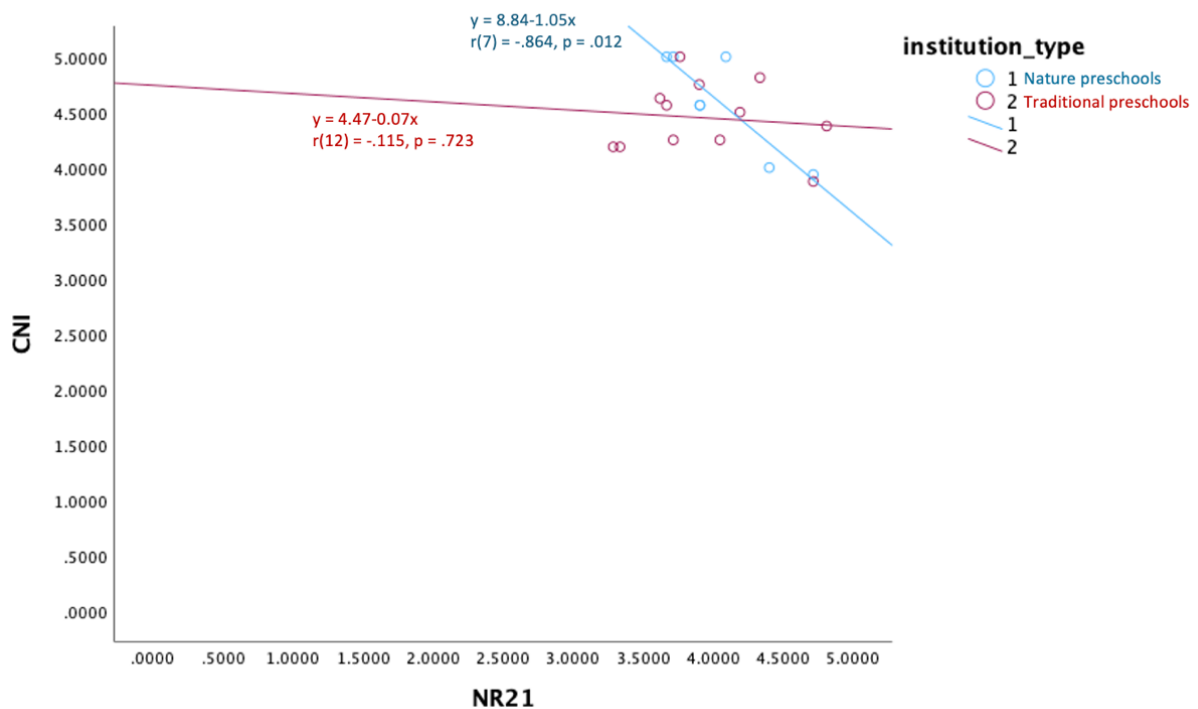
Correlation Between Child CNI Scores and Parent NR-21 Scores Across Both Institution Types



Given our interest in the differences between nature and traditional preschools, we exploratively ran the analysis separately for parent-child pairs affiliated with nature and traditional preschools. As shown in figure 6, the result for children and parents in nature preschools, indicate a strong, negative relationship, $r(7) = -.86$, $p = .01$. For children and parents in traditional preschools, we did not find a significant relationship, $r(12) = -.12$, $p = .72$.

Figure 6

Child CNI Scores as a Function of Parent NR-21 Scores By Institution Type



Hypothesis 3

We expected that children who spend more time in nature during non-institutional hours, as reported by their parents, show higher nature connectedness. Savolainen (2021) examined the relationship between the number of hours children spend outside in their free time with their overall CNI score and its subscales. In line with Savolainen's (2021) results, we found no association between overall CNI score and number of hours spent outside during non-institutional hours. Results are shown in table 9.

Upon further examining the subscales, Savolainen (2021) found that the number of hours children spend outside in their free time were significantly associated with the sense of responsibility subscale. Contrary to the findings of Savolainen (2021), we did not find any significant correlations between the number of outside hours with any of the subscales, shown in table 9.

Table 9

Correlations Between Total Time Spent Outside During Non-Institutional Hours and the CNI Scale, and The Subscales

	N	Correlation Coefficient	Sig.
CNI	15	.16	.56
Enjoyment of Nature	15	.20	.47
Empathy for Creatures	15	.09	.76
Sense of Oneness	15	.13	.64
Sense of Responsibility	15	.16	.57

Discussion

Based on previous research on nature connectedness in preschool children (Savolainen, 2021; Elliot et al., 2014; Passmore et al., 2021; Rice & Torquati, 2013), the purpose of this study was to extend the current research on this topic. We aimed to assess three aspects of nature connectedness in preschool children, through investigating 1.) whether nature and traditional preschool children differ in their nature connectedness, 2.) whether parental nature connectedness predicts child nature connectedness, and 3.) whether time spent outdoors during non-institutional hours is positively related to children's nature connectedness.

In our first hypothesis, we expected nature preschoolers to have higher nature connectedness than traditional preschoolers. However, in line with a previous study in Finland (Savolainen, 2021), we found no difference in nature connectedness between nature preschoolers and traditional preschool children.

In our second hypothesis, we expected parent nature connectedness to be positively related to child nature connectedness, based on a UK study by Passmore et al. (2021). Across

both the nature and traditional preschools in our study, we did not find a significant relationship between parent and child nature connectedness. However, we found that parent nature connectedness was strongly negatively associated with child nature connectedness in parents and children affiliated with nature preschools. Our result contrasted with the findings of Passmore et al. (2021), who found a positive association between parental and children's nature connection.

In our third hypothesis, we expected the total number of non-institutional hours children spend outside, as reported by parents, to be positively associated with children's nature connectedness. We examined the correlation between the number of hours children spend outside with their overall CNI score and each subscale. As opposed to findings by Savolainen (2021), we did not find any significant associations with the time children spend outside in their free time with their score on the sense of responsibility subscale. Moreover, we did not find any significant relationships between the time children spend outside in their free time with any of the subscales.

Hypothesis 1: Children's Nature Connectedness in Nature and Traditional Preschools

The absence of a difference in children attending nature and traditional preschools was expected, considering that we only used quantitative measures. In Canada, Elliot et al. (2014) employed a mixed-methods approach and found that children in nature preschools had increased their nature connection during the school year, whereas the children in a traditional preschool experienced a slight decrease in their nature connection. However, Barrable & Booth (2020) used quantitative measures to assess nature connectedness in 4.5-year-old preschoolers and their parents in the UK, as well as the frequency of children's time in preschool. They found that children attending nature preschools were more connected to nature than the children attending traditional preschools. However, children's nature connection scores were reported by their parents, suggesting that scores could reflect parent

perceptions of the child's connection to nature, rather than the child's actual nature connectedness.

Our results are in line with Savolainen (2021), who did not identify any differences in nature connection between nature and traditional preschool children. As there is some consistency between the results from Norway and Finland, we speculate that in the Nordic context, preschools that are referred to as nature preschools may not be that different from traditional preschools. Curricula for preschools in general include a focus on nature (Utdanningsdirektoratet, 2017), and children in both types of institutions generally spend considerable amounts of time outside (Moser & Martinsen, 2010). For example, Moser & Martinsen (2017) imply that Norwegian children across 117 preschools spend a large amount of their preschool hours during the summer outside. How similar or different children's experiences in both types of institutions are, is a question for future research.

Another important factor could be reduced instrument sensitivity, resulting in ceiling effects. Overall CNI score for all the children was 4.27 in our sample, in line with the findings of Savolainen (2021), that identified an overall CNI score of 4.1, as well as Bragg et al. (2013), who found an overall CNI score of 4.41 in their sample. Considering that the maximum score is 5, Cheng & Monroe (2012) suggest that a score between 4 and 5 indicates a high nature connectedness. In conclusion, results from multiple studies suggest that preschool children generally have a high connection to nature.

Hypothesis 2: Parent and Child Nature Connectedness

We did not find a significant relationship between parent nature connectedness and child nature connectedness across both institutions. However, we found a negative relationship in parents and children affiliated with nature preschools. Explanations for this could be that parents with a lower nature connection tend to send their children to a nature preschool to instill a stronger sense of nature connection, to compensate for not spending

enough time in nature with them. Secondly, it could also be that parents have a high nature connection and may put some additional pressure on the child to be in nature more than the child wants. Thirdly, it could be related to the different measures we used. Unlike Passmore et al. (2021), we did not use the same measure to assess parents and children's nature connection. This was done to accommodate the children's young age in our sample. We considered this acceptable because Bragg et al. (2013) found the two measures to be correlated and assess the same aspects of nature connection. However, the potential lack of a relation between child and parent measures makes this assumption quite uncertain, at least in the Norwegian context.

Both scales were developed in a US context (Nisbet et al., 2009; Cheng & Monroe, 2012) and predominantly used in urban environments in the UK (Bragg et al., 2013; Passmore et al., 2021; Barrable & Booth, 2020). We are not sure whether the scales have sufficient validity in a Nordic context. Again, Savolainen's (2021) lack of results may strengthen this view. Similarly, we did not find an influence of either nature preschools or of parents on children's nature connection. In conjunction with Savolainen's (2021) results, this may suggest that there could be something about the Nordic context that the measures fail to identify. Perhaps Nordic children already spend enough time in nature, and the excess influence of time spent outside during preschool hours or parental influence only marginally influences how they relate to nature.

Hypothesis 3: Time Spent Outside During Non-Institutional Hours and Child Nature Connectedness

We did not find a significant relationship between the number of hours spent outside during non-institutional hours and the overall CNI score or with any of the different subscales. This could be due to parents misreporting the time their children spend outside. And as mentioned previously, the CNI scale is limited in terms of context and nuance. The

CNI does not contain questions on the social and community aspects of spending time, which was previously discussed by Tam (2013) and Chawla (2020).

To obtain additional understanding of our samples, we asked parents supplementary questions pertaining to socioeconomic background, highest attained education, age, distance between home and preschool, reason for enrolling their child in a specific preschool, how much time their child spends in outdoor activities per week, etc. Responses show that our parent sample was generally highly educated, which may have contributed to particular response patterns by parents. As Ahmetoglu (2019) mentioned in her study in Turkey, the higher parent education, the more they emphasized the importance of free play outdoors. Similarly, in a study by Barrable & Booth (2020), it was found that highly educated mothers were more likely to send their children to a preschool with green outdoor areas, than to preschools with more barren outdoor playgrounds.

The reasons why parents chose a specific preschool ranged from proximity, having heard good things, and the opportunity for children to spend time outside in all kinds of weather. There were more nature related reasons for sending a child to a specific preschool among parents affiliated with nature preschools than with traditional preschools. Reasons for this could be the generally highly educated parent sample. Higher maternal education has previously been associated with a tendency to choose nature preschools with more green outdoor environments (Rice & Torquati, 2013). It could also be due to parental desire to promote their children's nature connection in line with the cultural emphasis on spending time outdoors.

In this project, the idea was to collect and use data from multiple sources to mitigate the limitations of only using questionnaire data. A mixed-methods approach to examining children's nature connectedness has been previously suggested (Beery et al., 2020; Chawla, 2020; Giusti et al., 2018). Teachers and other staff working close with children have

emphasized the importance of using observations, interviews, focus groups etc., to more effectively represent how children relate to nature (Beery et al., 2020). In this study, we tried to heed this by including observational research and focus group discussions. However, observational data gathering was discontinued after a few sessions, because of scarce opportunities of observing children in an outdoor environment other than the preschool outdoor environment and little nature-related behavior, possibly because of the environment being covered in snow. Focus group discussions were conducted as planned, however, due to time constraints, analysis of this data is pending.

Limitations

There were multiple limitations of this study. The child sample size was small, 42 children across both institutions, with 16 nature preschoolers and 26 traditional preschoolers participating. A chi square test showed that institution differences were negligible. However, there was a gender imbalance, with more girls than boys overall. This could also contribute to the results because girls, that were underrepresented in our nature preschool sample, have previously been shown to be more connected to nature (Passmore et al., 2021).

The CNI was originally developed for eight- to 10-year-old children but has previously been used with 6.5-year-old children in Finland (Savolainen, 2021). However, to our knowledge, the CNI has not yet been used with children as young as five years. The young age of our sample may be an issue in terms of limited comprehension that could potentially influence the results. Moreover, the items were read aloud to the children during individual interviews. This setting may have presented an additional issue with the children responding in a certain way, influenced by whether they liked me (the interviewer) or not.

The parent sample size was even smaller than the child samples. Of totally 42 children, we ended up with 19 unique parent responses, seven affiliated with nature preschools, and 12 with traditional preschools. The parents who did respond to the

questionnaire had children with higher nature connectedness, compared to the parents who did not respond. This has likely influenced the correlation between parent and child nature connection scores. Moreover, our parent sample generally had a high educational background, making our results difficult to generalize to individuals of other socioeconomic backgrounds.

Future Directions, Recommendations, and Implications:

The data from our study suggest that in the context of Northern Norway, attending a nature or a traditional preschool does not significantly influence a child's nature connectedness. However, the small sample size limits how much we can say about the implications of this finding. Future research should focus on mixed-methods research to explore what factors are implicated in children's nature connection. One aspect that questionnaires fail to reflect is the community aspect of feeling connected to nature (Tam, 2013; Chawla, 2020). Starting with observing children and then engage them in open discussions about nature has been suggested as a suitable approach (Beery et al., 2020). Ideally, quantitative measures should not be conducted until after qualitative measures have been explored (Beery et al., 2020). This may be one explanation to why our study did not identify a significant result. Further recommendations include finding means to validate parent reports on the time children spend outside, such as through observing children, what activities they are engaged in when outside, using GPS trackers to identify their whereabouts etc. Lastly, it may be interesting to examine the role that parents play in their children's outdoor activities, e.g., are parents instrumental in organizing structured activities, or do they allow children to actively participate in planning the activities?

Conclusion

The current study examined nature connectedness in preschool children. The primary objective was to investigate whether children attending nature preschools differ in their

nature connectedness compared to traditional preschool children. Secondly, we examined the influence of parent nature connectedness on child nature connectedness. Lastly, we assessed whether the time children spend outside during their free time was associated with their nature connectedness. We did not identify any differences in terms of nature connectedness in children affiliated with nature vs. traditional preschools. We did not find a correlation between parent and child nature connectedness when examining both groups. However, in parents and children affiliated with nature preschools, we found a strong, negative relationship between parent nature connectedness and child nature connectedness. Lastly, we found no relationship between children's outdoor time during non-institutional hours and their nature connectedness score.

This study contributes to the current research on nature connection in preschool children by elucidating that standardized questionnaires may not be the optimal approach to understanding how children perceive and connect with nature. The most effective approach in understanding children's nature connection seem to be through using a combination of methods, e.g., observation, discussions, and technological solutions such as body cameras and GPS trackers.

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[0021-3](https://doi.org/10.1007/s40362-014-0021-3)

Appendix A

Research Proposal Approval

Norwegian Agency for Shared Services in Education and Research (Sikt)

Meldeskjema for behandling av personopplysninger

<https://meldeskjema.sikt.no/648c332f-e48b-443f-9681-5c93954da8f1/vurdering>



Assessment of processing of personal data

Reference number	Assessment type	Date
469631	Standard	12.09.2023

Title

Children's connection to nature

Institution responsible for the project

UiT Norges Arktiske Universitet / Det helsevitenskapelige fakultet / Institutt for psykologi

Project leader

Monika Abels

Project period

14.08.2023 - 31.05.2024

Categories of personal data

General
Special

Legal basis

Consent (General Data Protection Regulation art. 6 nr. 1 a)
Explicit consent (General Data Protection Regulation art. 9 nr. 2 a)

The processing of personal data is lawful, so long as it is carried out as stated in the notification form. The legal basis is valid until 31.12.2034.

[Notification Form](#)

Comment

ABOUT OUR ASSESSMENT

Data Protection Services has an agreement with the institution where you are a student or a researcher. As part of this agreement, we provide guidance so that the processing of personal data in your project is lawful and complies with data protection legislation. We have now assessed that you have legal basis to process the personal data.

TYPE OF DATA

The project will process special categories of personal data about parents ethnic origin

LEGAL BASIS SAMPLE ONE CHILDREN

The project will gain consent from the parent for the processing of personal data about the children.

LEGAL BASIS SAMPLE TWO PARENTS

The data subjects give their consent to the processing of their personal data. The legal basis for the processing is art. 6.1 a) of the GDPR. The data subjects give their explicit consent to the processing of special categories of personal data. Thus, the conditions in art. 9.2 a) are met and the prohibition against processing special categories of personal data does not apply.

THIRD PERSONS

During the data collection, information about other persons close to the children, may appear in the recordings of the focus group interview with the children. T

LEGAL BASIS THIRD PERSONS

The planned processing of personal data is necessary to perform a task carried out in the public interest, as referred to in Article 6(1)(e) of the GDPR.

According to Article 6(3)(b), the basis for such processing shall be further determined by national law. Section 8 of the Norwegian Personal Data Act confirms that the processing of personal data for archival, research, or statistical purposes is in the public interest and can be based on Article 6(1)(e).

The project takes necessary measures to safeguard the rights and freedoms of the data subjects, as stated in Article 89(1). In our assessment, we have considered that:

- the purpose of the project is to investigate the extent of nature connectedness in preschool children, 5 years of age, as well as first-graders, 6 years of age.
- it is only in the focus group interview where the children may mention other people by name, or talk about situations that may identify others.
- only general categories from third persons
- small amount of data
- data subjects may protest against the processing of their personal data
- only project members will have access to the data/dataset
- personal data will be removed during transcription
- the duration of processing is short, these third persons data will not be stored

DISPROPORTIONATE EFFORT TO INFORM THIRD PERSONS

The data subjects will not be provided with individual information since it would prove disproportionately difficult to inform, cf. General Data Protection Regulation Art. 14 (5) b. The personal data is processed for research purposes, and the data controller will take appropriate measures to safeguard the rights and freedoms of the data subjects. In our assessment we give weight to the fact that:

- the researcher does not have the contact details
- the project has low risk
- information will be provided to parents and the childrens prepreschools and elementary schools.

FOLLOW YOUR INSTITUTION'S GUIDELINES

You must store, send and secure the collected data in accordance with your institution's guidelines. This means that you must use data processors (and the like) that your institution has an agreement with (i.e. cloud storage, online survey, and video conferencing providers).

Our assessment presupposes that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data.

NOTIFY CHANGES

If you intend to make changes to the processing of personal data in this project, it may be necessary to notify us. This is done by updating the information registered in the Notification Form. On our website we explain which changes must be notified. Wait until you receive an answer from us before you carry out the changes: <https://sikt.no/en/notify-changes-notification-form>

FOLLOW-UP OF THE PROJECT

We will follow up the progress of the project underway (every other year) and at the planned end date in order to determine whether the processing of personal data has been concluded/is being carried out in accordance with what is documented.

Good luck with the project!

Appendix B

Research Proposal Approval

Department of Psychology's Internal Research Ethics Committee (IPS-REC)



Institutt for Psykologi
Arkiv ref.: 22/23/Abels
Dato: 18. oktober 2023
off. § 26,4

Monika Abels
Department of Psychology
UiT - The Arctic University of Norway

—

Ethical evaluation of research project

Dear Monika,

Your application concerning your research project "*Families' connection to nature*" has been evaluated and approved by the Department of Psychology's internal research ethics committee (IPS-REC) based on the received information.

on behalf of the Committee

—

Matthias Mittner
Chair of IPS-REC

—
research-ethics.ips@uit.no

Kopi sendt: John Vegard Bjørklund



Appendix C

Children and Parent Consent Form

Informasjon om studien

FOR BARNNA

Hva syns du om naturen?

Hei!

Mitt navn er Helenah og jeg er en masterstudent på universitetet. Jeg ønsker veldig gjerne å besøke deg i barnehagen din for å snakke litt om naturen. Liker du å være ute i skog og mark? Tenker du noen gang på dyrene som bor der? Eller kanskje fisken som svømmer i elva? Dersom du har lyst å hjelpe meg med min studie, så sees vi i mars!

1. Samtale alene | 2. Være ute i lag | 3. Samtale i gruppe

Husk! Du trenger ikke å være med hvis du ikke vil, selv om mamma eller pappa har sagt at det går greit

UiT Norges arktiske universitet





Vil dere delta i forskningsprosjektet

”Barns forhold til naturen”?

Dette er en invitasjon til å delta i en studie hvor formålet er å undersøke barns og foreldres forhold til naturen. I dette skrevet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg og ditt barn.

Formål

Vi ønsker å undersøke hvordan barn og deres foreldre ser på naturen, hvor viktig den er for dem, og deres atferd i naturen. Innsamlet data vil bli brukt som grunnlag for studentoppgaver ved UiT Norges arktiske universitet som mulig vil bli offentliggjort gjennom vitenskapelige publiseringskanaler.

Hvem er ansvarlig for forskningsprosjektet?

Institutt for psykologi (IPS) ved UiT Norges arktiske universitet er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Du får denne forespørselen fordi du har et barn som er 5 eller 6 år gammel. Du har blitt kontaktet med denne forespørselen gjennom ditt barns barnehage eller skole.

Hva innebærer det for deg å delta?

Dersom dere ønsker å delta i forskningsprosjektet, innebærer det at du som forelder svarer på et spørreskjema. Dette spørreskjemaet inneholder ulike spørsmål om deg og hva du syns om naturen. Masterstudenten ønsker også å spørre deg om diverse demografisk informasjon i dette spørreskjemaet.

Barnet vil få 16 påstander om hans/hennes holdning til naturen og barnet blir spurt om å besvare ethvert spørsmål med at peke på en av forskjellige emojis. Svarene vil bli notert på et spørreundersøkelsesskjema. Dette skjemaet kan dere gjerne få se på forhånd om ønskelig.

Noen barn vil bli observert av masterstudenten i forbindelse med daglige aktiviteter ute. Masterstudenten vil observere barn i deres normale atferd uten å sette i gang interaksjoner med dem.

Avslutningsvis vil noen barn delta i en gruppesamtale med 4-5 andre barn og masterstudenten. Formålet er å snakke om spørsmål fra spørreskjemaet og opplevelsene ute. Barna oppmuntres også til å snakke fritt om deres tanker rundt naturen. Lyd av gruppesamtalene tas opp for analyse. Hvis barnet kommer med opplysninger som gjør personer identifiserbar, vil det bli erstattet med pseudonym eller anonyme betegnelser.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke ditt samtykke tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet, men vi kan ikke slette dine innsamlede data etter de har blitt prosessert og anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg. Dette prosjektet er ikke relatert til aktiviteter eller tilbud gitt av barnets barnehage eller skole, og de barn som ikke deltar vil fortsette med sine daglige aktiviteter.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrevet. Vi behandler personopplysningene konfidensielt og i samsvar med personvernregelverket.

- De eneste som vill ha tilgang til opplysningene du velger å gi er interne medarbeidere, og ekstern samarbeidspartner (som kun får tilgang til anonymiserte data, og transkribert/oversatt gruppediskusjon).
- Navnene deres vil bli erstattet med en kode som lagres adskilt fra øvrige data, slik at det ikke vil være mulig å koble dette sammen. Hvis det ikke finnes lydopptak, vil samtykkeerklæringen på dette arket bli oppbevart ved UiT til 31. mai 2024, før det blir makulert.
- Hvis det finnes lydopptak, vil vi oppbevare det og samtykkeerklæringen i 10 år av hensyn til forskningstransparens.
- Data vil bli samlet inn med Qualtrics, en godkjent leverandør av programvare for avansert kvantitativ og kvalitativ forskning. Lydopptak og dataene dere bidrar med vil bli lagret i tråd med UiTs personvernreglement.
- Du som deltaker vil ikke kunne gjenkjennes i masteroppgaven eller en potensiell publikasjon. Opplysninger du gir vil muligens siteres, men navn eller informasjon som kan knyttes til deg, vil ikke forekomme.

Hva skjer med personopplysningene dine når forskningsprosjektet avsluttes?

Prosjektet vil etter planen avsluttes 31. mai 2024. Etter prosjektslutt vil lydopptakene oppbevares kun for kvalitetssikring i tilfelle noen ønsker å validere transkripsjonene ved en mulig publisering. Datamaterialet blir lagret i 10 år av hensyn til forskningstransparens.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra *Institutt for psykologi ved UiT Norges arktiske universitet* har personverntjenestene ved Sikt – Kunnskapssektorens tjenesteleverandør, vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
- å få rettet opplysninger om deg som er feil eller misvisende
- å få slettet personopplysninger om deg
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hvis du har spørsmål om studien, eller ønsker å vite mer om eller benytte deg av dine rettigheter, ta kontakt med:

- Student: Helenah Gustavsson, masterstudent i psykologi ved UiT. Epost: hgu046@uit.no
- Prosjektansvarlig: Monika Abels, førstemanuensis ved UiT. Epost: m.abels@uit.no eller telefon: 77 64 53 43
- Vårt personombud: Annikken Steinbakk. Epost: personvernombud@uit.no eller telefon: 77 64 69 52

Hvis du har spørsmål knyttet til vurderingen som er gjort av personverntjenestene fra Sikt, kan du ta kontakt via:

- Epost: personverntjenester@sikt.no eller telefon: 73 98 40 40.

Med vennlig hilsen
Prosjektansvarlig

Masterstudent

Monika Abels

Helenah Gustavsson

Samtykkeerklæring (denne siden skal du beholde)

Husk at du kan velge hvilke deler du vil delta i.

Personlig kode: (Individual codes are randomly generated and specific to each parent-child pair)

Jeg har mottatt og forstått informasjon om prosjektet **“Barns forhold til naturen”**.

Jeg samtykker til at mitt barn (oppgi navn) _____:

- svarer på spørsmålene i spørreskjemaet
- blir observert i et utemiljø
- deltar i gruppesamtale som vil bli tatt opp med lyd
- at lydopptak lagres etter prosjektslutt, til forskningsformål

Jeg samtykker også til:

- å selv svare på spørsmålene i spørreskjemaet (oppgi personlig kode:)
- at mine opplysninger behandles frem til prosjektet er avsluttet

(Signert av prosjektdeltaker, dato)

QR-kode og link for å komme til spørreskjemaet:

<https://tinyurl.com/2p4fp5f3>



Samtykkeerklæring (denne siden skal leveres til barnehagen)

Husk at du kan velge hvilke deler du vil delta i.

Personlig kode: (Individual codes are randomly generated and specific to each parent-child pair)

Jeg har mottatt og forstått informasjon om prosjektet **“Barns forhold til naturen”**.

Jeg samtykker til at mitt barn (oppgi navn) _____:

- svarer på spørsmålene i spørreskjemaet
- blir observert i et utemiljø
- deltar i gruppesamtale som vil bli tatt opp med lyd
- at lydopptak lagres etter prosjektslutt, til forskningsformål

Jeg samtykker også til:

- å selv svare på spørsmålene i spørreskjemaet (oppgi personlig kode:)
- at mine opplysninger behandles frem til prosjektet er avsluttet

(Signert av prosjektdeltaker, dato)

QR-kode og link for å komme til spørreskjemaet:

<https://tinyurl.com/2p4fp5f3>



Appendix D

Children's Questionnaire Items

The Connectedness to Nature Index (CNI)

(Cheng & Monroe, 2012, p. 41)

Original Version:	Norwegian Version:
I like to hear different sounds in nature	Jeg liker å høre på forskjellige lyder i naturen
I like to see wild flowers in nature	Jeg liker å se på ville blomster i naturen
When I feel sad, I like to go outside and enjoy nature	Når jeg føler meg trist, liker jeg å gå ut å nyte naturen
Being in the natural environment makes me feel peaceful	Å være ute i naturen gjør at jeg føler fred og ro
I like to garden	Jeg liker å drive med hagearbeid
Collecting rocks and shells is fun	Det er gøy å samle steiner og skjell
Being outdoors makes me happy	Å være ute gjør meg glad
I feel sad when wild animals are hurt	Jeg føler meg trist når ville dyr blir skadet
I like to see wild animals living in a clean environment	Jeg liker å se ville dyr som lever i et rent miljø i naturen
I enjoy touching animals and plants	Jeg liker å kjenne på dyr og planter
Taking care of animals is important to me	Å ta vare på dyr er viktig for meg
Humans are part of the natural world	Mennesker er en del av naturen
People cannot live without plants and animals	Mennesker kan ikke leve uten planter og dyr
My actions will make the natural world different	Mine handlinger vil gjøre naturen annerledes
Picking up trash on the ground can help the environment	Å plukke søppel fra bakken kan hjelpe miljøet
People do not have the right to change the natural environment	Mennesker har ikke rett til å endre miljøet

Appendix E

Children Interview Template

Code	Response	# of rephrases	Comments
Jeg liker å høre på forskjellige lyder i naturen			
Jeg liker å se på ville blomster i naturen			
Når jeg føler meg trist, liker jeg å gå ut å nyte naturen			
Å være ute i naturen gjør at jeg føler fred og ro			
Jeg liker å drive med hagearbeid			
Det er gøy å samle steiner og skjell			
Å være ute gjør meg glad			
Jeg føler meg trist når ville dyr blir skadet			
Jeg liker å se ville dyr som lever i et rent miljø i naturen			
Jeg liker å kjenne på dyr og planter			
Å ta vare på dyr er viktig for meg			
Mennesker er en del av naturen			
Mennesker kan ikke leve uten planter og dyr			
Mine handlinger vil gjøre naturen annerledes			
Å plukke søppel fra bakken kan hjelpe miljøet			
Mennesker har ikke rett til å endre miljøet			

Appendix F

Children's Diploma for Study Participation



Hei, forelder!

Hvis du fortsatt ikke har svart på spørreskjemaet, men likevel ønsker å delta, så finner du din personlige kode, lenke og QR-kode her:

<https://tinyurl.com/2p4fp5f3>



Appendix G

Parent Questionnaire Items

The Nature Relatedness Scale (NR-21)

(Nisbet et al., 2009, p. 724)

Original Version:	Norwegian Version:
I enjoy being outdoors, even in unpleasant weather	Jeg liker å være utendørs, selv i dårlig vær
Some species are just meant to die out or become extinct	Noen arter er bare ment til å dø ut
Humans have the right to use natural resources any way we want	Mennesker har rett til å bruke naturressurser slik vi vil
My ideal vacation spot would be a remote, wilderness area	Mitt ideelle feriested ville være et avsidesliggende friluftsområde/villmark
I always think about how my actions affect the environment	Jeg tenker alltid på hvordan handlingene mine påvirker miljøet
I enjoy digging in the earth and getting dirt on my hands	Jeg liker å grave i jorden og bli skitten på hendene
My connection to nature and the environment is a part of my spirituality	Min tilknytning til natur og miljø er en del av min spiritualitet
I am very aware of environmental issues	Jeg er veldig bevisst i miljøspørsmål
I take notice of wildlife wherever I am	Jeg legger merke til dyrelivet uansett hvor jeg er
I don't often go out in nature	Jeg er ikke ofte ute i naturen
Nothing I do will change problems in other places on the planet	Ingenting jeg gjør vil endre problemer andre steder på planeten
I am not separate from nature, but a part of nature	Jeg er ikke atskilt fra naturen, men en del av naturen
The thought of being deep in the woods, away from civilization, is frightening	Tanken på å være langt inne i skogen borte fra sivilisasjonen, er skremmende
My feelings about nature do not affect how I live my life	Følelsene mine for naturen påvirker ikke hvordan jeg lever livet mitt
Animals, birds and plants should have fewer rights than humans	Dyr, fugler og planter skal ha færre rettigheter enn mennesker
Even in the middle of the city, I notice nature around me	Selv midt i byen legger jeg merke til naturen rundt meg
My relationship to nature is an important part of who I am	Mitt forhold til naturen er en viktig del av den jeg er
Conservation is unnecessary because nature is strong enough to recover from any human impact	Bevaring er unødvendig fordi naturen er sterk nok til å komme seg etter enhver menneskelig innvirkning
The state of non-human species is an indicator of the future for humans	Tilstanden til ikke-menneskelige arter sier noe om fremtiden for mennesker
I think a lot about the suffering of animals	Jeg tenker mye på dyrs lidelse
I feel very connected to all living things and the earth	Jeg føler meg veldig knyttet til alle levende ting på jorden

Appendix H

Parent Online Questionnaire

UNIVERSITETET I TROMSØ UiT

Romssa universitehta
University of Tromsø



Heil

Denne studien undersøker hvordan barn og deres foreldre ser på naturen, hvor viktig den er for dem, og hvordan deres atferd er i naturen.

Dette spørreskjemaet inneholder ulike spørsmål om deg og hva du syns om naturen.

Det vil også være spørsmål knyttet til sosiodemografisk informasjon.

Spørreskjemaet tar ca. 10 min å fullføre.

Du trenger ikke å fylle ut alle tekstbokser.

Hvis du velger å delta, kan du når som helst velge å trekke deg uten å oppgi noen grunn ved å lukke nettleseren.

Denne studien er opprettet av Helenah Gustavsson ved UiT Norges Arktiske Universitet.

Dersom du har spørsmål knyttet til studien, ta kontakt på hgu046@uit.no.

Takk på forhånd.

Hva er den personlige koden som står på samtykkeerklæringsskjemaet?

Dette er den første delen, som handler om ditt forhold til naturen.

Jeg liker å være utendørs, selv i dårlig vær

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Noen arter er bare ment til å dø ut

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Mennesker har rett til å bruke naturressurser slik vi vil

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Mitt ideelle feriested ville være et avsidesliggende friluftsområde/villmark

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg tenker alltid på hvordan handlingene mine påvirker miljøet

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg liker å grave i jorden og bli skitten på hendene

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Min tilknytning til natur og miljø er en del av min spiritualitet

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg er veldig bevisst i miljøspørsmål

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg er ikke ofte ute i naturen

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Ingenting jeg gjør vil endre problemer andre steder på planeten

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg er ikke atskilt fra naturen, men en del av naturen

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Tanken på å være langt inne i skogen borte fra sivilisasjonen, er skremmende

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Følelsene mine for naturen påvirker ikke hvordan jeg lever livet mitt

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Dyr, fugler og planter skal ha færre rettigheter enn mennesker

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Selv midt i byen legger jeg merke til naturen rundt meg

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Mitt forhold til naturen er en viktig del av den jeg er

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Bevaring er unødvendig fordi naturen er sterk nok til å komme seg etter enhver menneskelig innvirkning

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Tilstanden til ikke-menneskelige arter sier noe om fremtiden for mennesker

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg tenker mye på dyrs lidelse

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Jeg føler meg veldig knyttet til alle levende ting på jorden

- Svært uenig
- Litt uenig
- Verken enig eller uenig
- Litt enig
- Svært enig

Part 2: Questions on Sociodemographic Information

Dette er den andre delen, som handler om bakgrunnsinformasjon.

Hva er ditt forhold til barnet?

- Far
- Mor
- Annet:

Inkludert deg selv, hvor mange mennesker bor det i husholdningen din for øyeblikket?

Antall voksne:

Antall barn:

Hvor gammel er du?

Hva er det høyeste utdanningsnivået du har fullført?

- Barneskole
- Videregående skole
- Bachelorgrad
- Mastergrad
- Doktorgrad
- Annet:

Hva er din nåværende jobb?

Er du opprinnelig fra et lite sted eller en by?

Vennligst, velg det som best beskriver deg:

- norsk
 samisk
 kvensk
 annen nordisk/skandinavisk
 annen europeisk
 Annet:

Hva er avstanden fra hjemmet ditt til barnehagen? (vennligst, oppgi kilometer)

Hvor mange timer per uke tilbringer ditt barn utendørs og hvilken aktivitet er ditt barn engasjert i og med vem?**Eksempel: 3 timer/uke-fisking- med bestefar**

	Tid	Aktivitet	Med vem?
aktivitet 1	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 2	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 3	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 4	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 5	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 6	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 7	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 8	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 9	<input type="text"/>	<input type="text"/>	<input type="text"/>
aktivitet 10	<input type="text"/>	<input type="text"/>	<input type="text"/>

Hvilken type barnehage går barnet ditt i?

- Friluftsbarnhage/naturbarnehage
 Vanlig
 Annen:

Er du opprinnelig fra Tromsø eller flyttet du hit senere? Hvis ja, når og hvorfra?

Hvorfor valgte du å melde barnet ditt in i denne barnehagen?

Ytterligere kommentarer:

