A life "in and with nature?" Developing nature engaging and nature enhancing pedagogies for babies and toddlers

Joanne Josephidou
The Open University (UK)

Nicola Kemp
Canterbury Christ Church University (UK)

Abstract
The holistic relationship between children and nature is at the heart of Froebel's philosophy and practice: he took for granted that young children would grow up "in" and "with" nature. This paper explores the contemporary relevance of this thinking to babies and toddlers in early childhood education and care (ECEC) settings. It is based on a research project funded by the Froebel Trust which explores outdoor provision in English settings. Our findings suggest that whilst the pedagogic potential of the outdoors for babies and toddlers appears to be generally recognized, there is little emphasis on supporting them to engage with the natural characteristics of the outdoor environment. Concerns about safety and an emphasis on physical activity mean that natural elements may be discouraged in favor of manufactured alternatives such as artificial grass or commercially produced resources. We argue that Froebelian philosophy offers a much-needed theoretical lens that can illuminate the limitations of such practices for both the human and non-human world. Importantly, we highlight the interconnectedness of human and environmental health and suggest the need to develop nature engaging and nature enhancing pedagogies from birth.

Keywords
Froebel, Outdoor, ECEC, Nature, Babies, Toddlers

1.0 Background of the study and its context

1.1 Nature Connection: Why is it important for babies and toddlers?

This paper contributes to contemporary discourses about children's connection to nature and the role of early childhood education in providing this. Our specific interest is in the experiences of the youngest children (babies and toddlers) whilst attending Early Childhood Education and Care (ECEC) provision. Whilst there are cultural differences in terminology, we define babies as those aged under a year and toddlers as 12-24 months. We acknowledge 'nature' is a complex concept that carries different meanings. For the purposes of this paper, we draw upon Hartig, Mitchell, de Vries and Frumkin (2014) who base their definition upon an "objective" perspective that recognizes:

> the physical features and processes of nonhuman origin that people ordinarily can perceive, including the "living nature" of flora and fauna, together with still and running water, qualities of air and weather, and the landscapes that comprise these and show the influence of geological processes (p.208).

Citation: Josephidou, Joanne, & Kemp, Nicola. (2022). A life "in and with nature?" Developing nature engaging and nature enhancing pedagogies for babies and toddlers. *Global Education Review, 9* (2), 5-22.

They include within this definition places that "appear natural and provide opportunities to engage with and follow natural processes, but…are typically designed, constructed, regulated, and maintained"(ibid). Whilst there may be differences in how natural environments are defined in practice, there is a shared and growing concern about the reduction in both the quality and quantity of children's experiences with nature from birth (Gill, 2011). The idea that "children are becoming disconnected from the natural environment" (DEFRA, 2011, p. 12) has gained widespread traction and has been memorably termed "Nature Deficit Disorder" by Louv (2005).

From a childhood perspective, a focus on human health and well-being has led to an extensive body of research evidence which documents how children's nature contact contributes to their physical, psychological, social, and emotional health (Adams & Savahl, 2018). Whilst there is limited research focused specifically on under twos, Bento and Dias (2017) suggest that it is the "open and constantly changing environment" (p. 157) that provides many developmental possibilities for very young children:

> *While playing outside, children benefit from being exposed to sunlight, natural elements, and open air, which contributes to bone development, stronger immune system…and higher levels of attention and well-being (ibid).*

This outdoor scenario is contrasted with one of young children "spend[ing] long periods in closed environments, more exposed to disease contamination and saturated air" (p. 158), echoing Mendes et al. (2014) who suggest there can be much higher concentrations of bacteria within an ECEC setting than outside. Low air quality can impact on both children's health and their learning and development with the impact being greatest on the youngest children (Cosgun, 2020).

From an environmental perspective, early experiences of nature are now known to support the development of pro-environmental attitudes and behaviors (Louv, 2005). This is important given the growing body of evidence documenting the extent of the global environmental crisis. The latest reports from the Intergovernmental Panel on Climate Change (IPCC, 2018) and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) highlight the effects of human behavior on the environment. Pyle (1993) refers to the "extinction of experience" (p. 130) as nature declines and children are born into a less ecologically diverse world. By conceiving of this problem in different terms, two separate discourses have developed along parallel tracks each with limitations. The childhood discourse prioritizes the "quantity" of outdoor experiences whilst the environmental discourse tends to prioritize environmental quality.

1.2 The need for a holistic perspective

In recent years there has been a broad perspectival "turn" away from the dominant cultural position based on separation towards a more reciprocal understanding of human/environmental relations. This has generated a diverse range of theoretical responses from different disciplinary perspectives including deep ecology (Naess, 1989); post-humanism (Braidotti, 2013); complexity theory (Kauffman, 1995) and systems theory (Goodwin, 1996). These conceptual developments are significant both individually and collectively as they represent a move away from what Dasgupta (2021) powerfully refers to as the "anthropocentric lens" which values

nature only for what it can offer humans. However, they continue to prioritize "knowing" through human rational capacities rather than holistically through all domains of human experience. A deeper shift to a holistic perspective may offer insights for understanding the relationship between young children and the natural environment. Holistic perspectives offer a conception of the individual in relation to the whole and of the educational task as "learning to belong to the whole" (Mahmoudi, Jafari, Nasrabadi, & Liaghatdar, 2012, p.182). For the youngest children this learning is primarily achieved through embodied experience. Chawla (2002) draws upon Gebser's (1949) consciousness structures describing their dominant consciousness as "archaic" characterized by bodily absorption and driven by the autonomic nervous system.

> *Baptised in the world by immersion…close to the ground and up against the full sensory qualities of things (loc 2635)*

In this paper we explore the potential of one holistic early childhood educational approach based on the writing and practices of Friedrich Froebel (1782-1852).

1.3 A Froebelian perspective on children and nature

The holistic relationship between children and nature is at the heart of Froebel's philosophy and practice. Although most often associated with the kindergarten and associated pedagogic practices for pre-school children, Froebel's holistic philosophy of education applies from birth across the whole life span. In his seminal text, 'The education of man," Froebel (1826) highlights the significance of the earliest years. Nature is central to Froebelian philosophy and positions children "as nature," comparing their development to that of the young plants and animals within their environment. Froebel used nature as a metaphor for human development and encouraged parents to do likewise and draw upon the "silent teaching of nature" (p.8). He emphasized the importance of the quality of the environment and was clear that the senses, through which the young child experiences the world, "should be pure and clear – pure air, clear light, clear space" (p.24). He also highlights the importance of regular time spent "in and with" nature from birth.

The role of the adult is to observe closely as the child interacts with their external environment. Froebel advises a gentle approach which follows the child's interests and curiosity; his principle of life-unity positions education as an ongoing process of unification between the external (natural environment) and internal (human nature or spirit). Although written in a different spatial and temporal context, Froebel's writing reveals key insights into the relationship between children and nature, insights which are relevant to contemporary pedagogy.

1.4 1.4 The contemporary role of ECEC in fostering nature connection

In this paper we explore the value of Froebelian thinking on nature connection to contemporary English ECEC practice by drawing on the findings of a three-phase research project funded by the Froebel Trust. Whilst there is now a well-documented body of international research evidence that points to the benefits of children engaging with nature (Malone & Waite, 2016) and growing consensus that schools and settings have a role to play in facilitating connections with the natural environment (DEFRA, 2018), this has tended to focus on children aged three and above (Kemp & Josephidou, 2021). The needs and experiences of the youngest children are rarely considered.

The specific lack of research related to the outdoor experiences of the youngest children has been highlighted by Bilton, Bento and Dias (2017) and is recognized as a significant gap given the growing number of under twos who receive out of home care. Internationally, an average of 32% of children aged birth to two are enrolled in ECEC (OECD, 2019). Our research project focuses on the English context where provision is higher than this average at 42%. Whilst the project explores outdoor provision more generally, the aim of this paper is to focus more specifically on the role of ECEC in fostering nature connection in babies and toddlers; it presents data from the three phases of the research that offer new insights about the position of "nature" in outdoor ECEC provision.

2.0 Research Methods

The research project adopted a sequential mixed methods approach involving three phases. Given the lack of knowledge about outdoor provision for babies and toddlers the study was exploratory, and the three phases were designed to be developmental (Johnson & Onwuegbuzie, 2004), each generating new knowledge to inform the next. They were also designed to respond to an overall research question – what outdoor provision do English ECEC settings make for under twos?

Phase 1. Narrative review: A narrative review of literature focused on babies' and toddlers' (birth to two years) engagement with outdoor provision within ECEC settings. Internationally published literature was searched using six databases [LibrarySearch; Injenta Connect; the British Educational Index, Child Development and Adolescent Studies, Education Resources Information Center and Google Scholar] using the following search terms: babies; toddlers; infants; under twos; baby rooms; day care; outside; outdoors; nature; physical activity; sleep; physical development. This review allowed us to situate the project and supported the construction of the survey for Phase 2. Full detail about the methodology and findings from this phase are available as a published paper (Kemp & Josephidou, 2021)

Phase 2. Online survey: An online survey was used to audit current provision in one county (Kent) in the southeast of England. It was directed at setting managers and those working with under twos, inviting them to describe specific information about the outdoor provision for under twos in their setting (Kemp, Durrant, & Josephidou, 2020).

Phase 3. Case studies of 3 settings: For this phase, our lens was one of appreciative enquiry looking to gather examples of good practice that could then be disseminated further. Case study visits were made to three different settings. The original design intended to include five case studies, but the constraints of the Covid-19 situation meant that two planned visits had to be cancelled. Qualitative interviews sought practitioner views on their role when engaging with children in the outdoor area including what effective provision looks like. They were also asked to detail any experience, education or training they had undertaken. Narrative observations of practice were carried out and photographs and sketches were collected.

2.1 Participants and Sampling

All managers of settings with provision for children under the age of 2, in Kent, were contacted by email and invited to participate in the online survey (n=133). We accessed the sample through speaking to our professional contacts, contacting university partnership settings, researching quality assurance reports and websites and telephoning settings. The final

sample used to inform findings is representative in terms of socio-economic status and geographical location of settings with provision for the under twos in this area (n=53). This is shown in **Table 1** which compares responding and non-responding settings (as measured by their Index of Multiple Deprivation [IMD] score and geographical classification [ONS, 2011]). This is significant as there is evidence that access to the outdoors, and natural environments more specifically, may be mediated by children's economic status (DEFRA, 2018). Participants for the case study were recruited by asking them to indicate at the bottom of the survey whether they would be interested in taking part in phase 3 of the research.

2.2 Ethical Considerations

Full ethical approval for the research was given by the university ethics committee. British Educational Research Association (BERA) guidelines (2018) and those developed by the European Early Childhood Education Research Association (2015) helped to steer our thinking. Both researchers are experienced in undertaking fieldwork in professional settings which include young children and so were aware of the need for sensitivity and clear communication with professionals. We were particularly concerned not to convey the impression that we were taking a deficit view and looking to criticize current practice; rather our intention was to promote the voices of ECEC practitioners and to develop this important conversation about the outdoor experiences of under twos.

2.3 Data Analysis

Differing forms of analysis took place depending on the phase of the project and included a narrative review of the literature, descriptive analysis of quantitative data obtained through the survey and thematic, inductive analysis of qualitative case study data.

Narrative review: A narrative review of the relevant research papers (n = 21) was carried out to establish what is already known about outdoor provision for under twos internationally. We found no sources within the context of the UK and only a small body of work based in Scandinavia, USA, Canada, Australia, Portugal, Ireland. A thematic analysis based on Braun and Clark's framework (2006) was undertaken. This involved multiple readings of the papers by both researchers to identify both semantic (explicit) and latent (implicit) themes.

Numerical and thematic analysis of survey: The quantitative data provided by the survey was analyzed using the Statistics Package for Social Science (SPSS 23). The responses to each question were converted into the valid percentage of those who answered each question. Qualitative comments were analyzed using Nvivo 12 where 12 nodes or themes were initially identified. Where qualitative comments are cited, a code is used as the only identifying feature. The code for each setting is made up of a number (setting 1-53); a letter (U indicating urban or R indicating rural); a second number (1-10 referring to its IMD decile). For example, "S23U1" indicates a survey response from setting number 23 in an urban location with an IMD score of 1.

Thematic and inductive analysis of case studies: The data set provided by the case studies included photos and sketches, narrative transcripts of walking tour interviews with practitioners and setting managers, observation notes, transcripts of researcher conversations and individual researcher reflections. The data was analyzed using Nvivo 12 through a two-stage process; firstly, on a case-by-case basis to get a coherent sense of outdoor provision at each of

the three settings and secondly as a whole set to identify similarities and differences between settings.

In this paper we present the findings from across three phases using a Froebelian lens to draw out data related to the child/nature connection. We start by providing an "extensive" picture of the key themes. This is followed by intensive analysis of one of the case study settings.

3.0 Findings

3.1 The importance of the outdoors

Despite a paucity of published research, our study found that the pedagogic potential of the outdoors for babies and toddlers appears to be generally recognized in English ECEC practice. The narrative review identified just twenty-one relevant research papers within the international body of literature suggesting a lack of research interest in the outdoor experiences of under twos. Moreover, within these papers we identified a focus on mobile children and an underlying assumption that the outdoors is for older children and that babies will be inside. One US-based study of babies and toddlers prioritized activities including climbing, running, sitting, squatting and standing (Dinkel et al., 2019). Another study, this time undertaken in a Portuguese setting with a stated focus on birth to three, only included data related to the older children who were able to walk (Bento & Costa, 2018); there was just one mention of the younger age group with the observation that:

> *the younger children were a bit insecure outside. They showed some difficulties…they hardly explored the space autonomously (p. 294).*

In contrast, our survey revealed that settings recognize the diverse benefits of spending time outdoors for babies and toddlers and acknowledge their responsibility in providing regular access:

> *Natural light is important to development of eyesight. Vitamin D through sunlight is important to growing bones. Physical play is important to development of fine and gross motor skills. Being outside encourages understanding of different skills and risks. The development of knowledge about the world around us and the stimulation of sounds and natural presences around us. (S19U5)*

Most settings reported they go outdoors twice a day or more, all year around, and enjoy access to generous outdoor spaces. A minority provide free-flow access for both babies (14%) and toddlers (28%) throughout the year (see **Figures 1 & 2**).

Figure 1. *Frequency of access to the outdoors for babies (percentage of respondents)*

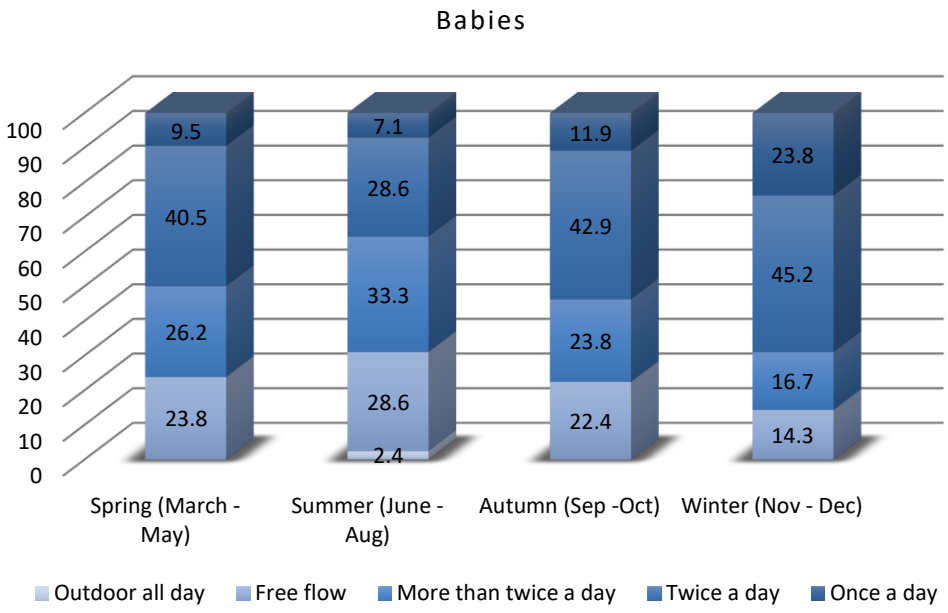
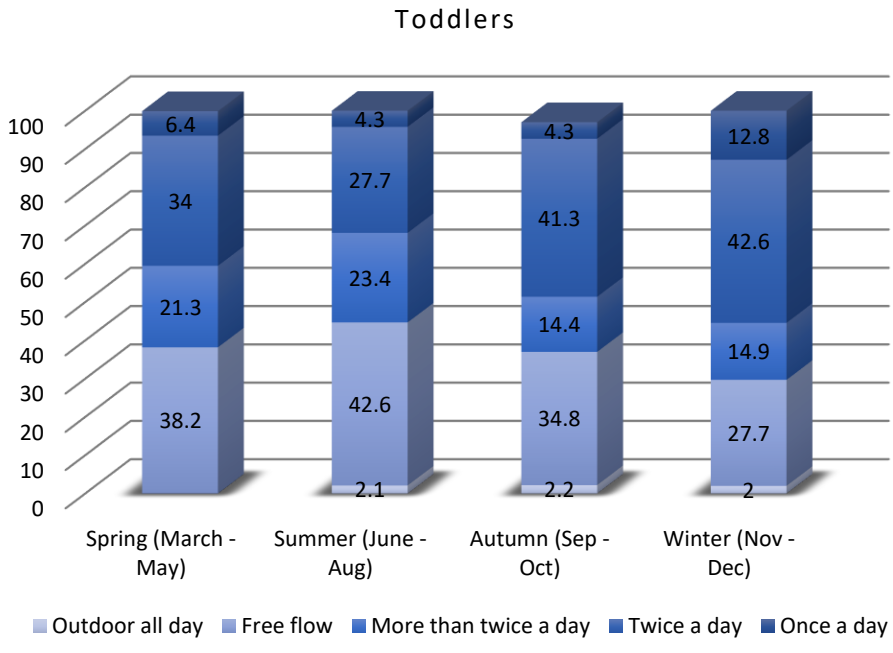


Figure 2: *Frequency of access to the outdoors for toddlers (percentage of respondents)*



A small number of settings report a specific commitment to outdoor provision and provide access to diverse outdoor environments. These are not necessarily owned by the setting which highlights the potential significance of off-site provision.

3.2 Limited emphasis on nature connection

Both the literature and our empirical research highlight the limited emphasis on supporting young children to engage with the natural characteristics of the outdoor environment. Only a very small number of research papers (Byrd-Williams, Dooley, Thi, Browning, & Hoelscher, 2019; Hall, Linnea Howe, Roberts, Foster Shaffer, & Williams, 2014; Moore & Cosco, 2014; Morrissey, Scott, & Wishart, 2015) emphasize the value of engagement with the natural environment. Hall et al. (2014) position the outdoor environment as "a place for hands-on learning about the world of nature" (p. 206) and observe how babies use "their eyes, hands, feet, mouths and entire bodies to experience the

minutia" (p. 198). Similarly, a study of a setting in Melbourne, Australia (Morrissey et al., 2015) focuses on the benefits of natural outdoor spaces for the youngest children. This research compared the responses of babies and toddlers to natural and built play space using behavior mapping and child tracking. The redesign of the space introduced planting and other natural elements and features. After "greening" the researchers found that the children used features such as the bridge, edging and platform to physically challenge themselves and to practice balancing and stepping. They spent much more time engaged in a wide variety of physical activities as well as using the space for quiet and sedentary activities and ranged more widely across the whole space. The study also noted increased sensory engagement with the natural world. In our survey, the significance of engaging with the natural environment was only mentioned three times, one comment being:

> *The natural environment provides the exact stimulus that babies need without being too overpowering. Outdoor environments provide opportunities for babies to use all their senses to explore them.* (S5R8)

This lack of prioritization of nature-based experiences appears to be reflected in the environments provided for the youngest children. Only a small number of settings emphasized the natural characteristics of the setting environment or indicated they were in the process of developing this. This means that although settings may provide regular opportunities to be outdoors, a sensory interaction with nature may not be part of this experience.

3.3 Nature as risky

Concerns about safety mean that natural elements may be discouraged in favor of manufactured alternatives such as artificial grass or commercially produced resources; it may also mean that time spent outdoors is limited and controlled by practitioners. The idea that the natural environment is a risky space for the youngest children is evident in the research literature. In her study of an Australian setting, Rouse (2015) identifies practitioner concerns about being able to keep babies and toddlers safe and therefore "isolated in a small play space" (p. 748). Morrissey et al. (2015) highlight the tendency to provide under twos with "artificial, 'safe' and non-challenging play environments." Following the naturalization of the outdoor environment at one Australian setting they noted how natural elements such as stick shelters and plants were perceived as unsafe by practitioners. The Infant and Toddler Environmental Rating Scale – Revised (ITERS-R) (Harms, Cryer, & Clifford, 2006) categorizes natural features (such as exposed tree roots) as a minor hazard which suggests an inherent problematizing of the natural environment in relation to the youngest children.

Qualitative responses to our survey also revealed a concern with safety issues including managing parental expectations:

> *We had babies sleeping outside in cots at one point, but a baby got bitten/stung and the parent was not happy. We now have air con in the sleep room to keep the temperature suitable in there instead.* (S7U5)

> *concern due to litigation from parents should there be an accident about taking the children outside and off site* (S10R7)

The impact of these safety concerns was highlighted at the case study settings:

> *This is their baby pen. So, I created this for our little babies that don't walk, so when they come out, they can crawl around in here with the supervision of the adult to make sure they don't get out and get trampled on by all the older children*. (Case study 1)

At another setting the manager discussed how they encouraged their staff to be less anxious about safety, using the term "meerkat-ing" to describe a practice they were trying to discourage:

> *so many adults "meerkat," and they literally are like this, looking around. Then, something happens, a fight, or somebody falls over, and they'll go over. They'll sort that out, and then they assume position*. (Case study 2)

Such concerns may be limiting practice even where natural elements are provided within a setting environment.

3.4 Being physically active is prioritized

An emphasis on physical activity means that wider affordances of natural outdoor environments and alternative ways of being are not always developed in practice. The association between being outside and being physically active is dominant in the research literature on under twos in ECEC. A contemporary interest is the extent to which physical activity guidelines are followed in ECEC settings (Byrd-Williams et al., 2019; Reunamo et al., 2014) to meet public health agendas. All settings in our research reported that they provide varied resources to support physical activity and recognize the diverse benefits of being physically active outdoors for babies and toddlers:

> *Physical activity promotes stronger bones and healthy hearts, reduces the chances of being overweight and generally makes you feel healthy. (S17R7)*

> *…they develop more advanced physical skills when using their gross muscles which tends to happen more frequently outside. (S6U5)*

We asked questions about provision to support different types of physical activity and climbing was the most supported activity. Although some settings mentioned natural features such as slopes and mounds, there is a reliance on fixed and moveable climbing structures. Artificial grass is a popular choice of surface to support physical activity such as walking and running for this age group, as is safety surfacing.

3.5 "A lot of time it is possible…" A case study of the possible in practice

Although our research highlighted the substantial challenges settings face in developing outdoor provision for the youngest children, the case studies demonstrated (each in different ways) what is possible. One of the most significant challenges reported in the survey was the weather (33 individual references), particularly for babies at the pre-walking stage. Parental support is also identified as a significant influence on outdoor practice (11 references) with one manager noting their "concern due to litigation from parents should there be an accident about taking the children outside and off site" (S10R7). The daily routines of sleeping, eating and nappy changing were felt to impact on time spent outdoors. At some settings, these tasks are associated with being

indoors and limit the opportunities to spend time outdoors.

Here we present one example to illustrate "the possible in practice." The setting is large and caters for 140 children a day from 3 months upwards. There are three rooms for the youngest age group– one for "little babies" which could be 3 months up to 18 months depending on demand and two for "big babies" (1-2-year olds). Each of these rooms has free-flow access to a large designated outdoor area (there is a door covered with a free-flow curtain). In addition to their own area, the babies also regularly use the gardens, the field, and a Forest School area. These are full of natural features including stinging nettles which are deliberately left so the children learn about risk. There are also animals on the site. Regular and diverse outdoor experiences are integral to the ethos of the setting and off-site environments are accessed in addition to those provided at the setting. Physical activity is encouraged through engagement with natural features and as part of a holistic learning experience:

> *we had an enormous log, that was just amazing, even this age group would climb on it, it was a dinosaur, it was a pirate ship*

The outdoor environment has been developed to foster diverse sensory experiences and includes spaces for sitting, lying down, and sleeping. In the drier summer months children sleep outside usually under covered area or in yurts:

> *For this age group, it's… the quieter aspect of, being outside, the smells, the textures not just for being active…they can just go and lay in the willow structures if they want. They don't have to do anything*

Natural textures are recognized as being "*really good sensory-wise, they like feeling the grass…*" but whilst practitioners recognize that "*on the whole they need grass,"* free-flow spaces are covered in soft surface and have a canopy to maximize year-round access.

There is a strong sense of pedagogical leadership at the setting and the outdoors is understood as an integral part of the setting ethos not as a discrete aspect of practice. This is clearly communicated with the result that "*parents have got the attitude that they want their children outside"* and staff "*have to love it* [being outdoors]." Although there are challenges, the attitude communicated by the lead practitioner sums up their approach:

> *it's just a case of putting our heads together and getting round the problem…a lot of the barriers can be diminished…a lot of the time it is possible*

4.0 Discussion

The picture of outdoor provision for babies and toddlers is a complex and contradictory one. If we look specifically at our empirical research in Kent, we find that there is certainly an awareness of, and an intention to provide, outdoor experiences for these very young children. At the same time, children are offered very different outdoor experiences depending on the context of the specific ECEC setting they attend. Furthermore, regardless of opportunity to spend time outdoors, the lack of natural elements means that most young children have limited experience to connect with, and therefore learn about, nature whilst attending a setting. This limited engagement seems in part informed by two key perspectives, one which is to keep the youngest children safe

and the other which emphasizes physical development. This emphasis has a direct impact on the types of resources provided meaning that they can be commercial rather than natural and aimed at mobile children. It may also exclude the youngest children whose learning needs center more on the sensory activities of watching, touching and feeling, and in particular babies not yet walking.

We suggest that Froebelian philosophy offers a much-needed theoretical lens that can illuminate both the limitations of contemporary practice and potential pathways for future development that are supportive of both the human and non-human world. Here we return to explore the three key insights about the child/nature relationship Froebel offers: the importance of nature connection from birth; the interdependence of children and nature; the role of the adult in fostering nature connection.

4.1 The importance of nature connection from birth

The recognition by settings of the importance of time spent outdoors for the holistic development of babies and toddlers is very encouraging although there is limited acknowledgement of the significance of nature and natural elements. Respondents to the survey demonstrated an understanding of the diverse benefits that outdoor environments can offer young children. However, whilst the youngest children are offered regular outdoor experiences, there are limited opportunities for engagement with nature. The implications of this have been argued by Moore & Cosco (2014) following their review of North Carolina ECEC settings:

> *every day young children are exposed to ecologically deprived land and receive a seriously flawed message about how we treat our natural resources (p.172).*

Contrasted to Froebelian understanding of the importance of time spent from birth "with the clear, still objects of nature" (1826, p.54), contemporary outdoor provision seems both limited and limiting. There is a need to raise questions about outdoor learning environments and the significance of building natural elements in so that young children are encouraged in "growing up green" and to become "agents of care for the natural world" (Chawla, 2009, p. 6).

4.2 The interdependence of children and nature

Even at the case study settings, with their explicit outdoor ethos, the outdoor environment is positioned as a resource that supports human (child) development so that its potential in terms of environmental quality is unacknowledged. This may encourage an egotistical perspective of nature as in "What can I get out of it?" rather than "What is my responsibility towards it?" Actions such as leaving "wild" areas with nettles are justified in terms of developing children's understanding of risk rather than from a perspective of biodiversity gain. Seen through a Froebelian lens, there are opportunities to develop practice that explicitly acknowledges the interconnectedness of human and environmental health. One example of this is the Natural Learning Initiative (Moore & Cosco, 2014) which positions ECEC settings as "land restoration sites" and through which it aims to simultaneously promote human health and ecological restoration through a naturalization process. Although it has a strong physical activity focus, it provides a contemporary holistic model for ECEC that could be developed so bringing together human and environmental concerns through ECEC practice.

The development of features such as pathways, shade/shelter, trees, shrubs, vegetable gardens and edible landscapes as well as more modest elements such as planters are recognized as encouraging or "pulling" young children outdoors to engage with the natural world as well as enhancing the biodiversity of sites. However, these need to be developed appropriately and sensitively to support the wider ecological context. In England this could involve ECEC settings working with environmental organizations such as Wildlife Trusts to better understand the environmental potential of their sites, to engage in a supported process of naturalization and "ecological literacy" (Orr, 1992). This would foster what Charles and Louv (2020) term "wild hope," that is:

> *a way of being and living that is rooted in nature-based experiences and contributes to a healthy present and future for today's children and generations to come (p. 395).*

4.3 The role of the adult in fostering nature connection

The responsibility of providing access to the outdoors for babies and toddlers is recognized by settings in our research, although the understanding of nature as risky may encourage the adult to take a "meerkating" role. This perspective also has the potential to position nature "as a threatening, hostile environment, related to emotions of disgust and fear" (Olivos-Jara, Segura-Fernandez, Rubio-Perez, & Felipe-Garcia, 2020). Instead, Froebel promotes a pedagogy based on close observation of the child and their interests arguing "nothing, therefore, is left for us to do but to bring him [sic] into relations and surroundings" (pp.10-11). This observational approach is evident in the work of Hall et al. (2014) and provides a potential contemporary model for practitioners to be "attentive and responsive" adults (Bento & Dias (2017, p.159) who closely observe children at play. Hall et al. (2014, p.202) add that "children's developmental growth in outdoor spaces is supported when adults themselves delight in the learning that occurs in the natural world". Nature engaging and nature enhancing pedagogies therefore need to promote conditions for both adults and children to feel comfortable and motivated during the time spent outside.

5.0 Conclusions and Recommendations

Using a holistic Froebelian theoretical lens, our research has revealed the limitations and possibilities within contemporary English ECEC practice in relation to providing opportunities for young children to connect with natural environments. Our argument, supported by evidence from the three phases of the research project, is that nature engaging and nature enhancing pedagogy remains largely unconsidered but are of fundamental importance not only to human health and well-being but also to that of the environment. Froebelian philosophy highlights the interconnectedness of human health and environmental health and the significance of this is emphasized in contemporary research about the global environmental crisis. The focus within practice appears to be one which is limited to the opportunities and possibilities that being outdoors can offer the individual child. Froebelian philosophy provides an alternative "holistic" lens and has value in informing both individual and collective responsibility towards the environment and how this disposition can be nurtured from a very young age in ECEC (Tourula, Polkki, & Isola, 2013). This shifts the perspective from one focused exclusively on children's connection with nature to one which also considers nature's connection with children.

This perspectival shift from an anthropocentric lens is challenging for ECEC but of fundamental importance given the growing body of evidence documenting the nature and extent of the global environmental crisis. Dasgupta (2021) refers to the "cruel irony" (p. 498) of offering young children pictures and toys of plants and animals without the associated environmental knowledge and direct experience. He highlights the importance of offering opportunities for children, from an early age, to connect with nature. ECEC settings have a role to play here. Pedagogy based on a romantic view of the child, that positions them at the center of their own world (Georgeson et al., 2015), is unhelpful in terms of considering how they fit within the intricate system of the natural world and what a mutually beneficial relationship could look like. Froebel's understanding that "each unique and individual child is part of the whole, through family, community and eventually to the vastness of the universe" (Bruce, 2012, p.1) presents a much-needed alternative perspective for the contemporary context.

The argument set out in this paper informs recommendations in terms of moving forward towards an enhanced one-health model of ECEC aimed at benefitting both human and non-human life. Moore and Cosco's (2014) Natural Learning Initiative for ECEC in the USA is based on the understanding that "the health of humankind, animals, and the biosphere is interwoven in a single, interdependent system" (p.169). This one-health model, with its dual consideration of "naturalization as a health promotion strategy," offers a valuable basis for thinking about the way in which a nature engaging and enhancing pedagogy could be developed. Both Froebelian thinking and contemporary research (Hall et al., 2014; Morrissey et al, 2015) highlight the importance of being "in and with nature" and would include sleeping and sensory engagement whilst lying or sitting as part of nature engaging pedagogy for under twos. By engaging in nature pedagogies from a very early age, babies can "begin to appreciate the infinitely beautiful tapestry of Nature's processes and forms" (Dasgupta, 2021) supported by knowledgeable adults. We would therefore recommend an extension of the Moore and Cosco's one-health model which would include consideration of the way nature pedagogies can support the holistic development of the youngest children as well as inducting them into their responsibilities as global citizens of a fragile earth. A further recommendation would be to develop partnerships between ECEC settings and local environmental conservation organizations to support the development of these approaches. However, the development of practice relies upon supportive policy and a strong evidence base (Malone & Waite, 2016). Whilst there have been some positive moves to include engagement with nature in some curricular contexts for the youngest children (Norwegian Directorate for Education & Training, 2017; Education Scotland, 2020), there remains little in the way of published research (Kemp & Josephidou, 2021). If the opportunities to develop nature engaging and nature enhancing pedagogies are to be maximized in practice, further research is needed.

Finally, Froebel reminds us that we may switch our gaze from the magnificence of nature to the individual child, but, at our peril do we allow it to remain exclusively on the child and fail to see the interconnectedness between the individual infant and the vastness of nature.

References

Adams, S., & Savahl, S. (2017). Nature as children's space: A systematic review. *The Journal of Environmental Education*, 48:5, 291-321. doi:10.1080/00958964.2017.1366160

Bento, G., & Costa, J. (2018). Outdoor play as a mean to achieve educational goals – a case study in a Portuguese day-care group. *Journal of Adventure Education and Outdoor Learning*, 18(4), 289-302. doi:10.1080/14729679.2018.1443483

Bento, G., & Dias, G. (2017). The importance of outdoor play for young children's healthy development. *Porto Biomedical Journal*, 2(5), 157-160. doi: 10.1016/j.pbj.2017.03.003

Bilton, H., Bento, G., & Dias, G. (2017). *Taking the first steps outside*. Oxon, United Kingdom: Routledge.

Braidotti, R. (2013). *The Posthuman*. Cambridge and Malden, United Kingdom: Polity Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101. Doi:10.1191/1478088706qp063oa

British Educational Research Association (BERA) (2018). *Ethical guidelines for educational research*. Retrieved from https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018

Bruce, T. (2012). *Early Childhood Practice: Froebel Today*. London, United Kingdom: Sage.

Byrd-Williams, C., Dooley, E., Thi, C., Browning, C., & Hoelscher, D. (2019). Physical activity, screen time, and outdoor learning environment practices and policy implementation: a cross sectional study of Texan childcare centers. *BMC Public Health*, 19, 274. doi: 10.1186/s12889-019-6588-5

Charles, C., & Louv, R. (2020). Wild Hope: The Transformative Power of Children Engaging with Nature. In A. Cutter-Mackenzie-Knowles, K. Malone & E. Barratt Hacking (Eds.), *Research Handbook on Childhood nature*, pp. 395-415. Switzerland: Springer Nature.

Chawla, L. (2009). Growing up green: Becoming an agent of care for the natural world. *The Journal of Developmental Processes*, 4(1), 23. doi:10.1.1.519.8387&rep=rep1&type=pdf

Chawla, L. (2002). Spots of Time: Manifold Ways of Being in Nature in Childhood. In P, Kahn & S. Kellert (Eds.), *Children and Nature: psychological, Sociocultural and Evolutionary Investigations pp. 199-227*. London, United Kingdom: The MIT Press

Cosgun, A. (2020). Determination of indoor air quality in collective living spaces utilizing Fuzzy logic analysis. *Journal of Construction*, 19: 3. Retrieved from http://ojs.uc.cl/index.php/RDLC/issue/view/1617

Dasgupta, P. (2021). *The economics of biodiversity*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf

DEFRA (2018). *A green future: Our 25-year plan to improve the environment*. Retrieved from https://www.gov.uk/government/publications/25-year-environment-plan

Dinkel, D., Snyder, K., Patterson, T., Warehime, S., Kuhn, M., & Wisneski, D. (2019). An exploration of infant and toddler unstructured

outdoor play. *European Early Childhood Education Research Journal*, 27(2): 257-271. doi: 10.1080/1350293X.2019.1579550

Education Scotland (2020). *Realising the Ambition*. Retrieved from https://education.gov.scot/media/3bjpr3wa/realisingtheambition.pdf

EECERA (2015). *Ethical Code for Early Childhood*. Retrieved from https://www.eecera.org/wp-content/uploads/2016/07/EECERA-Ethical-Code.pdf

Froebel, F. (1903). *The Education of Man*. (W. N. Hailmann, Trans.). Washington, DC: Appleton. (Original work published in 1826)

Gebser, J (1949). *The Ever-Present Origin*. Ohio: Ohio University Press.

Georgeson, J., Campbell-Barr, V., Bakosi, E., Nemes, M., Pálfi, S., & Sorzio, P. (2015). Can we have an international approach to child-centred early childhood practice? *Early Child Development and Care*, 185(11–12), 1862–1879. doi:10.1080/03004430.2015.1028388

Gill, T. (2011). *Children and Nature: a Quasi-systematic Review of the Empirical Evidence*. London, United Kingdom: Sustainable Development Commission.

Goodwin, B. (1996). *Form and Transformation: Generative and Relational Principles in Biology*. Cambridge, United Kingdom: Cambridge University Press.

Hall, E., Linnea Howe, S., Roberts, S., Foster Shaffer, L., & Williams, E. (2014). What can we learn through careful observation of infants and toddlers in nature? *Children, Youth & Environments*, 24 (2), 192-214. doi: 10.7721/chilyoutenvi.24.2.0192

Harms, T., Cryer, D., & Clifford, R. (2006). *Infant/Toddler Environment Rating Scales. Revised Edition*. New York: Teachers College Press.

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and Health. *Annual Review of Public Health*, 35: 207, 207-228. doi: 10.1146/annurev-publhealth-032013-182443

IPBES (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Retrieved from https://ipbes.net/global-assessment

IPCC (2018). *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Retrieved from https://www.ipcc.ch/sr15/

Johnson, R., & Onwuegbuzie, A. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33: 7, 14-26. doi: /10.3102/0013189X033007014

Kaarby, K., & Tandberg, C. (2018). ITERS-R as a tool for improving quality in Norwegian ECEC settings: A critical reflection. *Journal of the European Teacher Education Network*, 13, 58-70.

Kauffman, S. (1995). *At Home in the Universe: The Search for Laws of Self-Organization and Complexity*. Oxford, United Kingdom: Oxford University Press.

Kemp, N., Durrant, I., & Josephidou, J. (2020) *Making connections with their world: Outdoor provision for under twos in early childhood*

settings in Kent. Retrieved from https://www.froebel.org.uk/resources/froebel-trust-publications/

Kemp, N., & Josephidou, J. (2021). Babies and toddlers outdoors: a narrative review of the literature on provision for under twos in ECEC settings. *Early Years*. Doi: 10.1080/09575146.2021.1915962

Louv, R. (2005). *Last child in the woods*. New York: Workman publishing.

Mahmoudi, S., Jafari, E., Nasrabadi, H., & Liaghatdar, M. (2012). Holistic Education: An Approach for 21 Century. *International Education Studies*, 5:2, 178-185. doi:10.5539/ies.v5n3p178

Malone, K. & Waite, S. (2016). *Student Outcomes and Natural Schooling*. Retrieved from http://www.plymouth.ac.uk/research/oelres-net

Mendes, D., Papoila, A., Carreiro-Martins, P., Aguiar, L., Pereira, C., Neves, P., Azevedo, S., Cano, M., Proença, C., Viegas, J., Silva, S., Mendes, D., Neuparth, J., & Teixeira, J. (2014). Environmental and Ventilation Assessment in Child Day Care Centers in Porto: The Envirh Project, *Journal of Toxicology and Environmental Health*, 77:14-16, 931-943. doi: 10.1080/15287394.2014.911134

Moore, R., & Cosco, N. (2014). Growing Up Green: Naturalization as a Health Promotion Strategy in Early Childhood Outdoor Learning Environments. *Children, Youth & Environments*, 24 (2): 168-191. doi: 10.7721/chilyoutenvi.24.2.0168

Morrissey, A., Scott, C., & Wishart, L. (2015). Infant and toddler responses to a redesign of their childcare outdoor play space. *Children, Youth & Environments*, 25:1, 29-56. doi: 10.7721/chilyoutenvi.25.1.0029

Moser, T., & Martinsen, M. (2010). The outdoor environment in Norwegian kindergartens as pedagogical space for toddlers' play, learning and development. *European Early Childhood Research Journal,* 18:10, 457-471. doi: 10.1080/1350293X.2010.525931

Naess, A. (1989). *Ecology Community and Lifestyle*. (trans) David Rothenberg, Cambridge, United Kingdom: Cambridge University Press.

Norwegian Directorate for Education and Training (2017). *Framework Plan for Kindergartens*. Retrieved from https://www.udir.no/globalassets/filer/barnehage/rammeplan/framework-plan-for-kindergartens2-2017.pdf

Office for National Statistics (ONS) (2011). *Rural/urban classifications: The classification systems used to produce a rural/urban view from government statistics*. Retrieved from https://www.ons.gov.uk/methodology/geography/geographicalproducts/ruralurbanclassifications

Olivos-Jara, P., Segura-Fernández, R., Rubio-Pérez, C., & Felipe-García, B. (2020). Biophilia and Biophobia as Emotional Attribution to Nature in Children of 5 Years Old. *Frontiers in Psychology*, 11: 511. doi: 10.3389/fpsyg.2020.00511

Organisation for Economic Co-operation and Development (2019). *Family Database. Social Policy Division - Directorate of Employment, Labour and Social Affairs*. Retrieved from https://www.oecd.org/els/soc/PF3_2_Enrolment_childcare_preschool.pdf

Orr, D. (1992). *Ecological literacy*. New York: State University of New York Press.

Pyle, R.M. (1993). *The thunder tree: Lessons from an urban wildland*. Boston, MA: Houghton Mifflin.

Reunamo, J., Hakala, L., Saros, L., Lehto, S., Kyhala, A., & Valtonen, J. (2014). Children's physical activity in day care and preschool. *Early Years,* 34:1, 32-48. doi: 10.1080/09575146.2013.843507

Rouse, E. (2015). Mixed-age grouping in early childhood – creating the outdoor learning environment. *Early Child Development and Care*, 185:5, 742-751. doi: 10.1080/03004430.2014.953138

Tourula, M., Polkki, T., & Isola, A. (2013). The cultural meaning of children sleeping outdoors in Finnish winter: a qualitative study from the viewpoint of mothers. *Journal of Transcultural Nursing*, 24:2, 171-179. doi: 10.1177/1043659612472200

Table 1: Respondents/non-respondents by IMD and geographical location

Index of multiple deprivation				Type of location		
IMD Decile		**% (n) respondents**	**% (n) non-respondents**	**Urban/Rural Category**	**% (n) respondents**	**% (n) non-respondents**
Least-------- deprived-------- Most	1	3.8% (2)	6.2% (5)	Urban major conurbation	7.5% (4)	8.4% (7)
	2	-	9.6% (8)	Urban city and town	52.8% (28)	66.3% (55)
	3	7.5% (4)	12% (10)	Rural town and fringe	13.2% (7)	13.3% (11)
	4	11.3% (6)	13.3% (11)	Rural village	11.3% (6)	8.4% (7)
	5	17% (9)	10.8% (9)	Rural hamlets and isolated dwellings	9.4% (5)	1.2% (1)
	6	15.1% (8)	3.6% (3)			
	7	7.5% (4)	18.1% (15)			
	8	11.3% (6)	13.3% (11)			
	9	13.2% (7)	7.2% (6)			
	10	7.5% (4)	6% (5)			
Location non-identifiable:		*5.6% (3)*			5.6% (3)	
Total		*100% (53)*	*100% (83)*	*Total*	*100% (53)*	*100% (83)*