Infants and Their Educators in a Nature-based Educational Context

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Abstract

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Justine Pronovost

Nature-based education appears as a powerful response to the increase of an indoor and sedentary lifestyle. Nature-based education refers to a practice where nature is central to children's daily experiences, such as routines, exploration, and play, and includes opportunities to connect and become comfortable with nature. It offers multiple benefits for children's whole development (e.g., Kuo et al. 2019). Literature on infants' experiences with nature is limited (e.g., Jørgensen, 2018; Monti et al., 2019). The present qualitative case study examined the experiences of infants younger than 18-months-old and their educators in two not-for-profit Québec daycares: one urban and one semi-rural centre that integrated regular nature-based practices into their curriculum. Observations examined 19 infants' experiences into the outdoor natural setting and with their four educators. Semi-structured interviews were conducted with each educator to investigate their perspectives on this approach with infants. Results demonstrated that the natural environment offered a rich context for infants' whole development in an integrated way: cognitive, social, language, and motor. Educators offered a secure base in a child-led pedagogy by being responsive, sharing joint attention, and supporting infants' learning experiences verbally and physically. They also held a strong vision of infants as active learners, which is crucial to a child-led pedagogy in a nature-based context. Still, the educators must display strong self-confidence, teamwork and organizational skills to overcome the invisibility of this age group in the guidelines, training, and information for outdoor practices. The findings have important pedagogical and policy implications for the well-being of Quebec's youngest citizens to make them more visible and to offer them a rich context to explore and learn.

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Contribution of Authors

Justine Pronovost conceived the study, coordinated and carried out the data collection and the analyses, drafted the manuscript, edited it and approved the final manuscript. Nina Howe, supervised the process, edited, and approved the final manuscript.

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Statement of the Problem

Is spending time in nature beneficial and needed? Most people would intuitively answer yes! Yet, what about research supporting this notion? How is nature beneficial for humans, specifically for children? In fact, research demonstrates multiple positive impacts and benefits for people's well-being and development in a large variety of populations and their contexts (Clements, 2004; Faber Taylor & Kuo, 2006; Kiviranta et al., 2024; Kuo et al., 2019). More specifically, in outdoor settings, children show a deep focus and joyful engagement in their exploration and play, use all their senses, manipulate natural elements with great fascination for small living creatures, collaborate with peers, exert problem solving skills, engage in more active play and develop awareness of their environment and of sustainability concepts (e.g., Faber Taylor & Kuo, 2006; Ulset et al., 2017; Yildirim & Özyilmaz, 2017).

Despite these benefits, access to nature and spending time in it has decreased in priority over time (Clements, 2004; Faber Taylor & Kuo, 2006; Louv, 2006). Children today spend less time outdoors and in contact with nature than previous generations (Clements, 2004). Popularized by an influential journalist, Richard Louv (2006), this nature-deficit disorder would result from: the fear of traffic, the fear of crimes against children if let free to play outdoors; the lack of time from parents to supervise their children's play outdoors; the fear of physical harm, an increase of structured programmed activities for children to the detriment of outdoor free play and the high presence of screens in daily lives (Clements, 2004; Davies, 1996; Ebbeck et al. 2019; Faber Taylor & Kuo, 2006; Louv, 2006; Maynard & Waters, 2007). Despite parents recognizing the benefits of outdoor play for their children (Clements 2004), it does not seem to weight in enough to counter at least some of the obstacles.

As children spend more time than ever in childcare services (Dalli & White, 2017), daycares and preschools share concerns around outdoor play. Research, policies, and practices are emerging to respond to this nature-deficit phenomenon, hence there is an increase of nature-based approaches and programs. According to Bronfenbrenner's (1979) ecological theory, the interaction between a developing person and their environment is crucial. Daycares are an essential part of children's microsystems along with the family and the physical environments offered in daycare. The latter has a strong influence on children's development. Thus, focusing on how much nature is present or not in children's environments can be impactful for their development and health.

Most studies on nature-based education concern children aged 3-6 and older. However, infants are increasingly attending early childhood settings (Dalli & White, 2017). In the Quebec province of Canada, 68.3% of children in daycare started attending a daycare before age 18 months (Observatoire des tout-petits, 2021). During infancy, children's perceptual sensitivity develops in a high variety and simultaneous ways. It is closely associated with their motor development, as children's ability to interact physically with their environment through movement and locomotion is evolving at an impressive rhythm from zero to two years old (Johnson & Hannon, 2015; Stiles et al., 2015; Adolph & Robinson, 2015). Research promotes on how the domains of human development is woven together and how a rich and changing environment can impact "the development of a wide range of brain structures and functions" (Stiles et al., p. 30), thus enhancing children's array of potential actions and explorations. Infants need to be considered as active agents, as infants are in fact always actively observing, analyzing and learning. This is why, investigating infants' exploration in a changing and rich natural setting can be interesting.

However, literature is still sparse about infants' specific experiences in natural settings. Nevertheless, a few studies indicate strong benefits for all aspects of infants' development, play experiences, and health with an increase in movement, sensory stimuli, challenges, attention, and the development of a sense of belonging (e.g., Da Costa et al., 2021; Jørgensen, 2018; Monti et al., 2019; Veselack et al., 2015). Moreover, infants tend to be invisible or absent from guidelines and practices in curricula and pedagogical approaches, including in outdoor play and nature-based frameworks (e.g., Davis et al. 2015; Kemp & Josephidou, 2021).

While benefits and the learning potential of outdoor natural settings are well established, such knowledge can be insufficient to support changes in educators' perspectives and practice of implementation of nature-based experiences in daycare centers (Ernst, 2014; Vander Donk, 2023). Furthermore, training, and available knowledge of early childhood is still greatly dominated by valuing indoor environments (Blanchet-Cohen & Elliot, 2011), especially for caring for infants (Kemp & Josephidou, 2021).

The purpose of this study is to identify daycare educators' practices and perspectives that support the implementation of nature-based play for infants below 18 months old. Findings will have important pedagogical and policy implications for the well-being of Quebec's youngest citizens.

In the following pages, nature-based education's definition will be detailed through existing curricula and programs as well as its affordances and benefits. Then, the focus will be on infants, first in overall early childhood education (ECE) curricula, policies and legislation as well as specific outdoor play curricula, followed by their place in nature-based education and the benefits they might have for such practices. Finally, the pedagogical approach use by educators and their perspectives on nature-based education will be examined.

Nature-Based Education in Early Childhood Education

As curricula and approaches are being refined over the years, nature is promoted or not depending on cultural practices and beliefs of a society. Indeed, Scandinavian countries are recognized to have embedded the importance of nature into their culture and it is reflected in their early childhood practices and programs as well (Bentsen & Jensen, 2012; Jørgensen, 2018). In Western countries, some examples of nature-based approaches and programs exist as well: Forest and Nature Schools in England and in Canada, Reggio Emilia in Italy, and nature-schools in the United States. In the North American context, nature-based education can also be connected to Indigenous visions of education. Indeed, nature is a major lens in Indigenous social and political views and educational approaches. However, Western curricula, frameworks, research and practices around outdoor play and nature-based play are mostly built around European and Scandinavian visions while Indigenous ones are mostly absent (Child and Nature Alliance Canada, 2021; James et al., 2019). Given that Indigenous communities have a long-lasting relationship with land and nature, Eurocentric frameworks could learn a great deal from Indigenous communities.

In Canada, a survey reported that around 50,000 children took part in a nature-based program in 2018-2019 (Hardwood et al., 2020) which represent less than 1% of the 5,150,150 children aged 0- 12 in Canada in 2021 (Statistics Canada, 2023). Amongst these, 27% of the programs mentioned that they accommodate 0–2-year-olds; however, they did not specify what those accommodations were. As most programs were addressed to 3-12-year-olds, the practices are perhaps not concentrated on younger children. Also, Hardwood et al. (2020) reported that most of those programs are based on a pedagogy using emergent, child-centered, and play-

centered approaches, highlighting the fact that nature-based experiences are often merged with a specific pedagogy.

When I was a pedagogical counselor at the Association québécoise des centres de la petite enfance (AQCPE), a daycare association, I actively worked with daycares on a project called Alex – Education par la nature. Inspired by different pre-existing approaches, research, experiences and resources, the project aimed to support the implementation of nature-based education in the Quebec ECE context. A research-based Reference Guide materialized based on this project named Alex – Reference Guide: Nature-based early childhood education (Leboeuf & Pronovost, 2020/2023). As I worked on the project and co-wrote the reference guide my curiosity was sparked to go further on the topic. Specifically, the interest of educators working with infants pushed me to explore this question as the lack of examples and information we had on the matter was manifest.

What is Nature-based Education?

In this study, nature-based education refers to a practice where nature is both a space to live in, a leverage for learning, exploration and play, and an occasion to connect with nature and develop comfort and attachment with it. It also includes a vision of a capable, strong, and active child agent in their environment and development, hence an emerging pedagogy where free play and high-quality interactions from educators is expected (Leboeuf & Pronovost, 2020/2023).

Nature-based education also takes root in a place-based approach defined as "the process of using the local community and environment as a starting point to teach concepts (…) across the curriculum. Emphasizing hands-on, real-world learning experiences" (Sobel, 2013**,** p. 11). Indeed, starting by knowing what the local community has to offer will greatly influence the

experience of a group of children depending on the type of environments, nature, and installations to which they have access.

Änggård's (2010) ethnographic research looked at the ways nature was used by two daycare centers' with groups of children aged 1 ½ to 6 years old in Sweden. The author summarized clearly these different uses: (1) "Nature is a place in which to *learn*" (p. 16), through exploration with the senses, inquiries, hypotheses and questions; (2) "Nature is a place in which to *be*" (p. 17) like a home where coziness and routines take place; and (3) nature as an enchanted and fairyland place where creativity and imagination can flourish. Änggård also pointed out the duality that can exist in the uses of nature in an educational setting: on one hand, comfort, coziness, hominess, and soothing aspects are used to described being in nature and on the other hand wilderness, building resistance and competences to face unpredictability and different kinds of weather are also part of the experience, especially if a daycare wants to attain frequent and long sessions in nature in all weather conditions.

While daycares are drawn to the simplicity and beauty of nature, they also have legislation to respect and group dynamics and expectations to meet. There is a need for guidance and support to attain such goals. The Alex – Reference Guide: Nature-based early childhood education (Leboeuf & Pronovost, 2020/2023) suggests eight principle to guide daycares through their implementation of such practice in all its dualities:

1 First principle – **A different approach to time**: slowly, often, regularly, for long periods, at all times;

2 Second principle – **An environment rich in biodiversity, loose parts, and open-ended materials**: fertile ground for exploring, learning, and putting down roots;

3 Third principle – **Emergent curriculum centred on exploration and play**: recognizing

children as competent and holistic;

4 Fourth principle – **High-quality educational interactions**: enhancing children's Experience;

5 Fifth principle – **A close partnership with parents**: acknowledging, discussing, sharing power, valuing diversity, networking;

6 Sixth principle – **Close collaboration with the community** : placing nature-based education at the heart of a community project;

7 Seventh principle – **A balanced approach to risk and safety**: enhancing the role of appropriate risk-taking;

8 Eighth principle – **Fostering nature connectedness**: encouraging a rewarding relationship with nature (p.39).

Those principles illustrate how nature-based education is a multifaceted practice interrelating time, place, people, pedagogy and ecological values.

Benefits of Nature-based Education for Young Children in an Educational Setting

Studies indicate multiple benefits for children's whole development when they spend time in a nature-based context with room to take leadership, explore, and play freely within the natural environment (Canning, 2013; Faber Taylor & Kuo, 2006; Jørgensen, 2018; Kuo et al., 2019; Yildirim & Özyilmaz, 2017). Most of these studies report findings on 3-6-year-old children as research on infants in natural settings is still sparse. The present section will explore general benefits for children and, later, a section will focus on infants' experiences.

First, nature-based education offers active and physical play experiences, which are very rich, unique and in sync with children experiencing the world through their body and senses. Indeed, studies demonstrated benefits of nature-based education on children's overall physical

health (leaner body, longer night sleep), mental health (less stress level), and motor (gross and fine) development (Cooper, 2015; Gray et al., 2015; Kuo et al., 2019; Meyer, 2017; Söderström, 2012). However, as Davies (1996) expressed, "it is imperative that the potential of this setting to promote physical development does not detract from other developmental outcomes that can occur through outdoor play" (p. 38).

Indeed, nature-based education offers opportunities such as running, climbing, jumping, carrying heavy elements like rocks, tree trunks or big branches while also manipulating sticks, pebbles, leaves, dirt, water and all sorts of small natural elements or carrying fragile little creatures like bugs. On top of physical benefits, all the latter offer children a rich setting for children's whole development such as social interactions, new and rich vocabulary, creativity, cooperative play, and problem-solving opportunities (Canning, 2013; Cooper, 2015; Faber Taylor & Kuo, 2006; Jørgensen, 2018; Wojciehowski & Ernst, 2018; Yildirim & Özyilmaz, 2017). Specifically, studies indicate children can attain a better focus and enhance their capacity to pay attention when frequently taking part in nature-based experience sessions (Faber Taylor & Kuo, 2006; Kuo et al, 2019; Ulset et al. 2017). Furthermore, self-regulation abilities and more positive social behaviour are reported in natural settings (Carrus et al. 2015; McCree et al., 2018;). Carrus et al. demonstrated that when toddlers went outside everyday, they showed a decrease in their stress level compared to children who stayed indoors. The authors explained how nature can act as a buffer for toddlers' stress management as they are spending long days in a group dynamic with high social stimuli. Also, studies demonstrated that outdoor and nature-based play often enhanced free play opportunities (Carrus et al., 2015; Faber Taylor & Kuo, 2006), which according to Carrus et al. can part take in reducing stress and allowing children to make choices and match their needs. As their study focused on toddlers, Carrus et al. stated that

younger children are highly sensitive to external stimuli, which reminds us about the importance of looking at the types of environments offered to our youngest ones and the way they perceive and use them, which has been described and identified as the concept of affordances (Gibson, 1979/2015).

Affordances and Nature-based Education

The concept of affordances was described and popularized by Gibson (1979/2015) to highlight the relation between objective characteristics of an environment and the subjective individual perceptions of what this environment offers, affords them, and how they could use it. Interestingly, the concept of affordances has been reused in different settings, but Gibson originally used the term mostly for outdoor and natural settings in his examples by describing nature and a child-led context as offering rich and diverse affordances to children.

With this affordance lens, outdoor settings are considered to enhanced experiences compared to indoor settings or traditional playgrounds where opportunities are often considered poor. Multiple studies report an increase of imaginative and creative play amongst children playing freely in natural settings (Canning, 2013; Faber Taylor & Kuo, 2006; Jørgensen, 2018; Wojciehowki & Ernst, 2018). Brussoni et al. (2015) criticized the use of what they called "Kit, Fence, Carpet playgrounds" (p. 6427) that are costly on behalf of security and "have been rated as having inferior opportunities for promoting children's emotional, social, physical and cognitive development" (p. 6427). Moreover, such playgrounds do not demonstrate a decrease in serious injuries "despite drops in children's use of playgrounds as they have become less enticing" (p.6427).

Risk-taking Opportunities. Security issues are often part of questions and worries from parents, educators, and policy makers. Indeed, a natural environment is more unpredictable, and

the outdoors is where most risky play can take place (Brussoni et al., 2015; Sandseter, 2009). However, multiple studies point out the importance of risk-taking during play for children's health and overall development such as confidence, self-regulation, problem-solving skills, and increasing autonomy facing real-life dangerous situations (Brussoni et al., 2015; Cordovil et al., 2015; Murray & Williams, 2020; Sandseter, 2007; Sandseter, 2009). Planning and close adult supervision are crucial in those situations. Nature-based curricula recommend close and caring observations from adults in order to support children's risk exploration and interactions promoting the development of children's ability to self-assess risks and dangers (Leboeuf & Pronovost, 2020/2023).

Why Does Nature Provide Such Benefits?

Being outdoor provides more opportunities for physical activity, which impacts children's positive physical and mental health, partly due to better air quality and more natural light (Ulset et al., 2017). Furthermore, Kuo et al.'s (2019) literature review explored the question: Do experiences with nature promote learning? hence all the developmental benefits reported. Their answer unequivocally was yes, as natural settings "appears to provide a calmer, quieter, safer context for learning; a warmer, more cooperative context for learning; and a combination of "loose parts" and autonomy that fosters developmentally beneficial forms of play" (Kuo et al., 2019, p.1). These results also corroborate with Bjørgen's (2015) findings indicating how outdoor settings allow increased opportunities for challenges, a variety of experiences, autonomy, and social relationships, which all positively impacted 3-5-year-old children's well-being. Furthermore, with higher regularity and frequency of nature-based experiences, benefits of the latter appear to be greater: the more time spent in nature, the more benefits (McCree et al., 2018; Ulset et al., 2017).

Despite all the demonstrated benefits of outdoor and nature-based experiences, nature-deficit is still an issue. An examination of early childhood playgrounds, environments, curricula, and quality evaluation scales, indicates that outdoor and nature-based play are still underused, sparse, and underprioritized (Cooper, 2015; Faber Taylor & Kuo, 2006; Josephidou & Kemp, 2022). Perhaps, individuals working in ECE settings still need more guidance and research on practical and exemplary practices. Finally, some questions remain: How early in life can children be exposed to, and partake in nature-based experiences? Are they expected to do so in curricula in an early childhood setting? What do these experiences look like? The present study seeks to explore these questions in particular concerning infants.

First, the following section will address how infants are represented and portrayed in some early childhood curricula and how their needs are addressed in outdoor play recommendations and frameworks. Then, the few studies examining the encounter between infants and nature in an educational setting will be presented.

Infants: A Distinctive Reality

As nature-based education mostly operates around child-centered and play pedagogies, can it be coherent with the ways infant rooms operate and with curricula that are being used with infants? What are the recommendations about infants in those curricula and outdoor practices recommendations?

Infants in Curricula, Policies, and Legislation

As the importance of the first years of life are being defended and increasingly recognized in research and social policies, ECE curricula also needs to follow suit and adapt or make sure infants and toddlers are represented in different frameworks and legislation (Cheeseman, 2017; Dalli & White, 2017; Davis et al., 2015). While some curricula in the world

(e.g., England, New Zealand, California) made a step in the direction of making infants visible and prioritized in their curricula, in other ECE curricula infants tend to be invisible or excluded because the curriculum focuses only on children aged 3 to 5 (Dalli & White, 2017; Davis et al., 2015). Indeed, Dalli and White (2017) argued in their book about policies and pedagogy for children under age three that policies are still tainted by "historical perceptions that pre-school only starts at 3 years" (p. 3). Furthermore, they remind readers how policies are often tied to funding and priorities in different governments, such as the type of parental leave available to families (Dalli & White, 2017).

Davis et al. (2015) analysed the way infants and toddlers are referred to in the Australian curriculum, based on the assumption that infants and toddlers tend to be invisible in ECE curricula. Indeed, while the word 'children' was present 518 times, babies and toddlers were present only eight times. Davis et al. recognized the stance of the program's authors to choose "children" as an inclusive term for all children and to not 'otherised' babies and toddlers. However, Davis et al. explained how this choice can also have the opposite effect, exclusion, and that educators in infant rooms do not feel recognized in the framework, according to interviews with the latter. As infants' and toddlers' development and the practical reality in educative settings can be quite different from older children, Davis et al. stipulated that these groups and realities should not be invisible or leave educators with the challenge of figuring out how to adapt recommendations and examples of older children to their age groups. Perhaps a similar phenomenon is observed with the Quebec's curriculum, *Accueillir la petite enfance – Programme éducatif pour les services de garde à l'enfant* (Ministère de la Famille, 2019), which also refers mostly to 'young children' (1,865 times) and, proportionally, a few times to 'babies' (97 times).

Furthermore, in the Australian curriculum, whenever babies and toddlers are mentioned, the vocabulary carries narratives about infants being more passive, and as recipients of interactions and actions rather than active learners capable of being communicative and engaged in mental and verbal learning processes (Davis et al., 2015). Indeed, infants and toddlers tend to be set aside in educational settings and perceived as only needing care and protection, rather than being active learners and social partners (Cheeseman, 2017; Dalli & White, 2017; Davis et al., 2015; Hall et al., 2014; Veselack et al., 2015). Cheeseman's narrative analysis corroborated this perception. While arguing that responsiveness is a largely conveyed role when working with infants, it tends to be specifically tied to infants' needs, attachment, and protection without including their whole learning experience as instigators and active learners. Cheeseman invites educators to shift their perceptions of infants "as having needs" (p. 64) to infants as active learners. Dalli and White (2017) added the importance of conveying a more complete and complex vision of infants "beside custodial and physical care" (p. 6). In studies about infants in a nature-based setting, this switch of perception appears as essential to consider working in nature with infants since unpredictability, risk, and autonomous exploration are important parts of such play experiences (e.g., Hall et al., 2014; Veselack et al., 2015).

This distinction or invisibility in curricula can also be reflected in legislation. For example, in Portugal, there is no legislation mandating trained staff to take care of infants (Tadeu & Lopes, 2021), while both in Australia and China regulations for children under age three are not as developed as for older children (Li et al., 2017). Furthermore, while there is often recognition of the importance of the first years of life in research and societal discourse, in contrast the recognition of the educators' role with the youngest children does not seem to be equivalent. Indeed, working conditions and training expectations for early childhood educators

with infants and toddlers does not mirror this pointed importance (Dalli & White, 2017; Davis et al., 2015; Li et al., 2017; Tadeu & Lopes, 2021).

Infants and Outdoor Play

Interestingly, this distinction between curricula for younger and older children in the early years and invisibility for infants and toddlers extends to outdoor play as well. Indeed, Kemp and Josephidou (2021) pointed how the youngest children are absent from curricula when talking about outdoor play. The authors' narrative review suggested that infants are meant to play indoors according to the implicit narratives in curricula and research and that outdoor environments are reserved for walking children. Cultural beliefs and narratives can be strong around what is deem appropriate and safe for young children, hence impacting the way outdoor spaces are designed and what children are allowed to do (Cevher-Kalburan & Ivrendi, 2016; Cordovil et al., 2015; Kemp & Josephidou, 2021).

Furthermore, Kleppe (2018) observed how routines such as napping, meals, and getting ready to go outside take the most space in the youngest children's schedule hence diminishing their time spent outdoors. This fact relates to Kemp and Josephidou's (2021) argument that non-walking infants spend most of their time indoors. Therefore, how could educators be supported to spend more time outdoors with infants under 18 months? For more outdoor experiences, Kemp and Josephidou suggested that the youngest children explore affordances that would be sensory engaging, movement related, and that would allow children to sleep outside. Natural elements (e.g., water, sand, different terrains) as suggested by Kleppe (2018) seem like an interesting avenue for sensory and movement experiences with potential risk taking for younger children as the factor of unpredictability and the unexpected are greater than indoors. However, natural elements can still be perceived as dangerous in some quality or jurisdictional evaluation

scales and regulations (Josephidou & Kemp, 2022), which reflects the strong narrative around (over)protecting infants (Kemp & Josephidou, 2023).

Another legislation issue is mentioned in Ebbeck et al.'s research (2019) in Singapore. Their study about urban outdoor play with children aged 2 months to 3 years old pointed out how the regulation of a mandatory 30 minutes outdoors daily, which is already not much, does not apply for children under 12 months. In Quebec, regulations state that children should go outdoors everyday, except if the temperature "is inclement" (Québec, 2021, article 114). This statement appears interpretable as what is considered "inclement" can highly vary from one person to another, specifically in the eyes of infant educators who might have protective narratives towards infants. Furthermore, while supporting children's whole development indoors *and outdoors* is part of the regulations for all ages in ECE settings, daily outdoor time has been reported as less common amongst nursery groups for infants (Kemp & Josephidou, 2021; Kleppe et al., 2017).

As some legislation and curricula can be unsupportive or contraining for outdoor and nature play for infants, some daycares still manage to succeed in such experiences as the following examples indicate.

Benefits of Nature-based Education for Infants

Despite the small literature on infants and their experiences with nature in an educational setting, some researchers suggested that the benefits of nature-based experiences demonstrated in many different settings, with a multitude of different populations and groups, are likely transferable to other groups that have received less research attention (Faber Taylor & Kuo, 2006), perhaps like infants in educational settings. The few studies on infants and nature do corroborate this idea and answer the simple question of whether this practice is possible by providing rich examples of its feasibility.

Infants' Whole Development. First, the benefits of the natural environment for infants are demonstrated in a study comparing developmental improvement from ages 1 to 3 in naturalized playgrounds versus standard non-natural playgrounds. Monti et al. (2019) followed infants and toddlers in four different nurseries in northern Italy: educators in two programs were trained and experienced in outdoor education whereas those in two more traditional programs were not. They investigated children's development in eight areas including the "domain of body function, awareness of the surrounding environment, social and emotional development, play, language, cognitive development, gross and fine motor skills" (p. 871). Teachers were trained by researchers to use a developmental scale with children in their groups in January (T1) and then again in June (T2) of the same year. Results showed that when provided increased time outdoors in all weather and more diverse activities in play, children in the outdoor education programs improved significantly more on all eight areas than infants and toddlers in the traditional programs.

Veselack et al.'s (2015) case study in a Californian daycare corroborated those results. The study included 126 teachers' notes about children's experiences in nature in four classrooms of infants and toddlers aged 4-35 months. Children were divided by age range (1 classroom for youngest infants, 1 for older infants, 1 for younger toddlers, 1 for older toddlers/younger preschoolers). One of the main recuring themes in the notes was the profusion of skill development within each child's experience as well as the interrelations between multiple skills within one experience. The skills analysed in the teachers' notes were kinesthetic, visual-spatial, intrapersonal, mathematics, science, language, social, construction, and engineering. The authors noted that in each note, children's experience demonstrated the intersection of at least 6 to 8 skills at the same time. These developmental findings support the multiples benefits of nature

and outdoor experiences already demonstrated for older children and are in line with Faber Taylor and Kuo's (2006) theory of transferability of these findings.

Infants' Attention and Focus. Another main theme emerged from Veselack et al.'s (2015) analysis about infants and toddlers' development: children's ability to maintain focus and attention on the same exploration or repetition of it. Indeed, they noted a persistent misconception about younger children not being able to keep focus for several minutes at a time. Their observations of young infant's focus debunked that idea and the authors pointed out how adults need to be able to perceive and capture those highly focused exploration moments with the youngest children. Jørgensen's (2018) findings also pointed to the competency of the youngest children to concentrate and focus on little details and small materials and animals. Veselack et al. reported multiple examples of such focus, such as a 5-month-old child exploring mud by touching, smelling, feeling, and tasting it for 20 minutes. While this case study is based on teachers' notes, is not longitudinal, and lacks a standardized evaluation of children's attention and a comparison group, it still echoes Ulset et al.'s (2017) findings of the benefits of nature for children's attention capacities. Perhaps, this positive impact of natural settings starts as soon as infancy.

Infants as Part of a Group and Belonging. Jørgensen (2018) studied children aged 0-6 in two nature kindergartens in Norway and examined how children created a group dynamic, a 'clan', depending on the way they used natural settings. The author shared how fascinating it was that "even the youngest ones could connect and be part of a group" (p.503). Natural settings provided openness for children's creativity and imagination, which would create a connection amongst them, based on their common interests and imagination. This openness and richness of the environment was also pointed out by Veselack et al. (2017) as creating a positive group

dynamic and decreasing conflicts amongst children. It echoes Little and Stapleton's (2023) findings about risky-play opportunities encouraging group rituals amongst toddlers and enhancing their sense of belonging to the group.

Infants Sensory Experience is Key. A main theme emerging from research about infants and their interactions with nature and the outdoors is the importance, omnipresence, and globality of sensory experiences. It is highly relevant as developmental theories around infants accentuate the primary role of perceptual/sensorial development in the first two years of life (Johnson & Hannon, 2015; Piaget & Inhelder, 1966). Hall et al.'s (2014) study is a field report of a whole year of observation by a researcher-teacher in an infant group in Colorado. According to their observations and documentation of infants' experiences, the powerful sensory stimuli natural outdoors offers to children is much richer than indoors and stimulates multiple senses simultaneously. Indeed, outdoor environments are less controlled, more unpredictable, and evolve with weather and the elements, while indoor environments are highly controlled and predominantly stimulate the senses of seeing and hearing. Furthermore, the authors in multiple studies emphasized that younger children intensively perceive stimuli around them that adults tend to not capture anymore (Hall et al., 2014; Jørgensen, 2018; Veselack et al., 2015). This reiterates the importance of a child-lead pedagogy associated with nature-based settings where adults need to be able to see what infants are experiencing and bring those sensations to life, nourish them, and let them be rather than interrupting them when adults fail to perceive such subtle sensory experiences (Hall et al., 2014; Jørgensen, 2018; Veselack et al., 2015).

Nature-based Education: Not just about 'being in nature'

Nature-based education is not just about contact with nature, but it is also about the pedagogy in place and the ways adults let children interact and encounter nature. More structured

adult-led activities versus unstructured child-lead exploration and play will greatly influence the way children will interact in natural settings and the benefits they can get out of it (Canning, 2013; Jørgensen, 2018; Meyer et al., 2017; Yildirim & Özyilmaz, 2017).

Monti et al.'s (2019) and Veselack et al.'s (2015) findings support outdoor nature-based experiences for infants' development. In both studies, the authors noted the importance of a pedagogical curriculum designed for the outdoors and specific training for educators. Indeed, in the Italian study, free play was more present in the outdoor program than the standard one. It reflects the association between outdoor nature play and child-led free play pedagogy. Furthermore, Veselack et al. explained that it is crucial to perceive young children as active agents and learners in their experiences, in order to fully grasp the potential of outdoor play. Hall et al. (2014) also emphasized that children are "naturally keen observers" (p.193) and note "how very carefully infants are studying the world" (p.195), hence the importance of being able to follow and support children's initiative while offering them natural environments and contexts. Indeed, Morrissey et al. (2015) pointed out in their study of infants' and toddlers' responses to a naturalized redesign of their playground, how changing only the environment was insufficient to fully facilitate their development. Indeed, teachers were not trained nor fully comfortable with the changes in the playground, therefore they were hindering children in their use of the new spaces and natural materials.

In sum, outdoor-nature-based programs seem to require support from the organization, training, planning, and teamwork. There needs to be a pedagogical vision where the child is seen as competent, active, and able to lead their own exploration and play (Hall et al., 2014; Jørgensen, 2018; Veselack et al., 2015). Furthermore, beside Jørgensen's (2018) study, all the studies including infants took place in a daycare playground with natural elements. The latter are

still highly controlled by adults compared to wilder natural settings outside the daycare walls and fences. It highlights the potential challenges and obstacles that might restrain educators of infants to wander beyond the daycare territory into a less controlled environment. It seems necessary to explore educators' perceptions of nature-based education in the section below to highlight those challenges as well as exemplary practices.

Educators' Perspectives on Outdoor Play and Nature-Based Education

Educators' perspectives seem to influence their practices about outdoor and nature-based practices. Practical experiences and training appear as key aspects to educators' perceptions, comfort, and ability to apply and transition into such nature-based practices.

Traditional Perspectives about Outdoor Play and Space

Although nature-based education is a growing practice, perceiving outdoor natural space as a rich learning environment is not shared by all educators. Indeed, educators who are not engaged in any kind of outdoor program or nature-based experience tend to prefer indoor settings as a learning environment and use outdoors more as a recess period for children to let off steam (Davies, 1996; Ernst, 2014a; Hunter et al., 2019; Maynard & Waters, 2007; McClintic & Petty, 2015; Wishart & Rouse, 2019). Also, perceiving outdoor settings as a recess space seems to impact the type of interactions leading to a less active role by educators when they are outside, as reported by educators in an early childhood center in Texas (McClintic & Petty, 2015), South Dakota (Hunter et al., 2019), and Wales (Maynard & Waters, 2007). Interestingly, minimal educator intrusion can also be justified by highly valuing child-led experience, while supporting the child-led play seems to be reserved for indoor spaces (Hunter et al., 2019). Davies (1996) reported this phenomenon in the 1990's where learning was perceived as a matter for the indoor

spaces and outdoor time and spaces were not prioritized in the schedule, budget, nor curricula despite evidence already highlighting benefits of outdoor time.

Furthermore, natural spaces can be overlooked by educators inexperienced with such settings (Ernst, 2014a; Maynard & Waters, 2007). In a study on the topic, 46 American educators and in-training educators had to choose preferred settings for play by looking at pictures of different spaces. They mostly selected traditional playgrounds without nature as the most conducive while natural settings as the least conducive even if the latter offered more diversity in the layout (different levels, vegetation, mud, etc.) and natural loose parts (sticks, rocks, pinecones, etc.) (Ernst, 2014a). Participants justified their choice with criteria of convenience and safety. However, Ernst (2014b) also questioned educators of 3- and 4-year-olds about their perceptions of outdoor natural settings as a learning environment and they "generally agreed with the importance of experiences in natural outdoor settings for children's cognitive, social, and physical development, as well with these experiences belonging within early childhood education" (p.742). Perhaps this clash in perceptions is due to the type of questions addressed to educators that seek different types of reflections. Looking at pictures and imagining your group in the setting may have brought out the practical side and educators chose a more known terrain. While in the second study, being questioned about ideas might have tapped into their vision, imagination, and hopes for children allowing educators to recognize the potential of the nature. A practical versus vision dichotomy seems to emerge between those studies, which is highlighted in Ernst's (2014b) second study since educators who perceived nature as beneficial reported going into natural settings only once a month. Indeed, the author explained that practical knowledge and organization regarding the natural environment might be lacking and recommended practical training to better support teams in deepening their understanding of

nature-based experiences. Educators' perceived obstacles to outdoor and nature-based experiences often are about availability and safe access of physical resources, size of outdoor spaces, and the possible free-flow between outdoor and indoor as well as weather and comfort reasons (Ebbeck et al., 2019; Hardwood et al., 2020; Maynard & Waters, 2007).

Evolving Perspectives: From Traditional to Nature-Based Experiences

Educators who took part in a transition from a traditional playground in their practice to a more natural one first held similar beliefs as described above; subsequently, their perceptions evolved. Hunter et al. (2019) studied that type of transition in a childcare center in the United States by observing educators' practice and interviewing them. The authors observed how the educators' role, despite their strong position about their unintrusive role outdoors, evolved into a more engaging one such as supporting spontaneous learning moments. Indeed, with a richer natural environment, children engaged in more diverse activities, and more learning opportunities emerged. Then, educators felt the need to plan more for outdoor play time as well as engaging more in children's play and exploration (Hunter et al., 2019). Interestingly, at the end of the study educators still highly valued child-led experiences and were reluctant to recognize the emerging need to engage more with children's play outdoors. The researchers highlighted the tension between their vision and their practice, echoing Ernst's (2014b) dichotomy in her study about perceiving natural settings as important for children yet not using them very much. Perhaps such coherence can be strenuous when educators have little experience and knowledge on the matter. It also relates to the fact that children's nature-based experiences are influenced not only by nature itself but also by the pedagogical approach in place.

To support a transition to a more natural setting, educators need to recognize the potential offered by nature in order to fully engage in the experience. Three Australian educators of 3- to

6-year-olds engaged in a training program about outdoor learning (Wishart & Rouse, 2019). At first, they only perceived limitations and security issues in their natural designed space, but time and experience induced a change in their vision. Nature perceived as "dead space" by the educators was actually being used by the children (Wishart & Rouse, p. 2290). Therefore, educators started to see how children were more active in this new environment, how their senses were more involved, and how children introduced natural elements into their play and exploration (Wishart & Rouse).

Fully Engaged in the Nature-Based Experience Perspective

Educators reporting the most benefits for children and perceiving the highest potential for learning, play, and exploration of nature appear to be those fully engaged in nature-based experiences, specifically in outdoor natural settings outside the childcare center's property limits. From Canada, Iceland, Singapore, United Sates, and Turkey, studies reported educators valuing outdoor experiences, describing the endless opportunities offered by such settings, and the multiple impacts of it on children such as: creativity, problem-solving, autonomy, awareness about nature, and their whole development (Bal & Kaya, 2020; Blanchet-Cohen & Elliot, 2011; Hall et al., 2014; Norðdahl & Jóhannesson, 2016; Strachan et al., 2017; Veselack et al., 2015). Furthermore, educators reported an impact on their own relationship with children such as more opportunities to interact with them and fully engage in a role of co-learner and co-designer of learning experiences (Blanchet-Cohen & Elliot, 2011; Strachan et al., 2017). More specifically, in Hall et al.'s (2014) study, educators reported feeling more active with infants when they started seeing the child's point of view and sensory experiences.

Security is often a concern for inexperienced educators (Ernst, 2014a; Morrissey et al., 2015; Wishart & Rouse, 2019); however, experienced educators reported how risk-taking can be

beneficial for children's abilities and courage and how that perception overpowers the fear of risk (Blanchet-Cohen & Elliot, 2011; Norðdahl & Jóhannesson, 2016). In those studies, educators had at least a year of experience in natural settings and were part of a program supported by training. It appeared to enable a more coherent and comprehensive description of their own practice and beliefs. Training was mentioned as essential by both educators and researchers in most studies with experienced and inexperienced educators (Blanchet-Cohen & Elliot, 2011; Ernst, 2014b; Hunter et al., 2019; McClintic & Petty, 2015; Norðdahl & Jóhannesson, 2016; Strachan et al., 2017; Wishart & Rouse, 2019). Another contributing element experienced educators mentioned is the importance of a collaborative system within their team and with the community including parents and outdoor environment managers (Blanchet-Cohen & Elliot, 2011; Strachan et al., 2017).

As the preceding pages detailed, nature-based education is a recognized practice offering a variety of benefits for children. Although research about infants in natural settings and their benefits are sparse, the few studies and the potential generalizability of multiple findings on the topic are promising for infants' and educators' experiences in nature. The following pages will focus on the present study that intends to highlight our youngest ones and their educators, as they are currently invisible or set aside by a number of curricula, legislation, and research in education.

The Present Study

The present study aimed to identify the experiences of infants younger than 18-months-old with nature-based play outdoors in two daycare centers and their educators' successful practices and perspectives of nature-based education in the Canadian province, Quebec. In the latter province, in 2016, 40% of children enrolled in daycare started attending a daycare before

they were one year old while another 29% did so between 12-17 months (Observatoire des Tout-petits, 2021). As Quebec's parental leave usually lasts between 6 to 12 months, many infants between 0-18 months experience ECE settings. Yet, most studies about outdoor play and nature-based education focus on older children. The province of Quebec offers different types of childcare options: subsidized private or not-for-profit centre-based daycares, the latter called *Centre de la petite enfance* (CPE), home daycare, and private non-subsidized daycare. This research will look specifically at infants in two not-for-profit centre-based daycare settings, CPEs, where 0-18-month-old-infants are in a group with a ratio of one educator for five infants (Québec, 2021). A common practice in CPEs is to pair up two infant groups, therefore having two educators for ten infants.

This study is a qualitative case study. Two infant rooms in two CPEs, one urban and one semi-rural, were purposively selected to ensure that the centres had minimally implemented some nature-based practices both in the overall daycare and in the infant room. It allows for a comparison between different natural settings. Observations were conducted in each group to examine the infants' actions and interactions with the outdoor natural setting and with the educators (i.e., either on a playground with natural elements or a natural setting outside of the daycare perimeter). Then, the four educators who were observed also participated in semi-structured interviews.

The goal was to document, via observations and photographs, educator's practices, and infants' (younger than 18 months) experiences. Hence, three research questions were addressed: (1) What are infants' experiences in a nature-based context? (2) What are educators' practices in a nature-based education context with infants? (3) What are the educators' perspectives on nature-based play with infants in a daycare setting? For example, what are educators' philosophy

when working with infants and nature; what is helpful or works well in their practice versus what are the obstacles or what seems impossible? What are the benefits of nature-based experiences for infants? How is it beneficial? The data from both observations and interviews and the connection and a comparison between educators' perspectives and their interactions with infants' experiences in natural settings were analysed. By answering these questions, recommendations specific to Quebec's context were identified and available for educators around the province and elsewhere.

Method

To document and explore the research questions, I used a case study research design that included two infant groups and their educators. These infants and their educators were in a specific context of implementing a nature-based education approach in the province of Quebec; one case was conducted in an urban area and the other in a semi-rural location. The two groups can be considered as two cases bounded by their context as case studies seek an in-depth understanding of a bounded context with multiple sources of information (Cresswell & Poth, 2017), which I intended to do via observations, photographs, and interviews. Specifically, the participants for this study were the 20 infants enrolled in the two infant groups for 0-to-18-month-olds in two CPEs, which are not-for-profit centre-based daycares in the province of Quebec, Canada, and their four responsible educators.

Participants

Semi-Rural Daycare

The semi-rural CPE is located in a town of a little more than 15,000 residents in the southern part of the province of Quebec, Canada. The CPE is situated in a residential part of the city, a few blocks away from a commercial street. This daycare welcomes a total of 78 children from zero to five years old. Specifically, they have ten spots for infants younger than 18 months

and are divided into two groups of five children with one educator each. Since October 2022, the two infant rooms are located one in front of each other, sharing a little corridor that serves as a lobby for the two groups with cubbies for each child, and a changing table is available for the parents to use.

Most of the time, the two educators work together as one big group. They often leave the doors between their rooms open so the infants can go into both rooms, while also using the little corridor space that is protected by another door. Furthermore, they always go outdoors together. First, they work together to prepare the infants to go outdoors. One teacher goes out through the patio door directly connecting one of the infant rooms to their playground with the first few children that are dressed, and the other teacher dresses the others, one at a time, and passes them over to the other educator outdoors. It is a smooth transition, where infants who are ready can already go outdoors and the ones waiting indoors can still play or try to get dress by themselves. The two groups then play together outdoors, and the educators work as one group. Their usual winter-spring schedule looks like this:

- Around 8h45-9h00: Snack time indoors
- Around 9h00-9h20: Preparation to go outdoors – dressing up.
- Around 9h30: Usually go for a walk with the *Pouponbus* in the neighborhood.
- Around 10h00: Come back into the playground to play.
- Around 11h00: Go back indoors, change diapers, and prepare for lunch time.
- 11h30: Lunch time

They started to implement the nature-based education approach for all the groups in the CPE two years prior to my observations. A committee of educators and a pedagogical counsellor leads the implementation process in the daycare. Different actions and practices were put in place by the committee such as providing rainsuits for all the children in the daycare, including infants; reflecting on risk assessment and security with a questionnaire and checklist that educators can use to determine their level of comfort towards risks and to assess different settings they will use;

investigating natural materials to include in their rooms and playgrounds; and ongoing discussion and training sessions. The daycare also redesigned and renovated a playground into a nature playground for older children, and they have a planned project to do the same thing with the infant playground to pursue the development of the nature-based education approach.

In total, the whole daycare has four playgrounds: the infant playground, the nature playground for older children, the older children's regular playground, and the one for 18 months- to 3-year-olds (See map in Appendix A to see the plan of the 4 playgrounds). The infant playground is directly adjacent to the infant rooms and is accessible through a patio door. Besides a sandbox, the setting did not include natural elements. Indeed, the ground is covered with artificial grass, rubber or wood planking depending on the zones. There is a planned project to renovate the playground to incorporate more nature into it. Meanwhile, the educators brought natural and recycled materials and equipment in the playground: wood pieces, pinecones, milk crates, water in a water table, construction spools in wood and plastic, branches of different trees attached to the fence to explore texture and smells. As for other equipment, there is a mud kitchen next to a little playhouse, a bench, a plastic climbing structure in a shape of a tree, an elevated sand box, infant-sized picnic table, and other toys are rotated by the educators (see Photographs 1, and Map of Infant playground in Appendix B).

Photographs 1

Semi-Rural Infant Playground

The infant playground connects through a door in the fence to the nature playground. The latter has natural elements such as wood pieces, tires, a little hill, a wooden hiding structure, a mud kitchen, and actual mud and grass and mulch to cover the ground. It is accessible mostly to the older children through the third playground, a playground designed for older children with a play structure and water sets. Educators explained that occasionally, the infant groups can use the nature playground when the older children are not using it. See photographs 2.

Photographs 2

Nature Playground Occasionally Accessible for Infants




Finally, there is a playground for 18-months- to 3-year-olds, accessible through a door near to their rooms or via the other playgrounds. The infant groups do use this playground often with the 18-month- to 3-year-olds. The playground contains, a playhouse, few child-sized picnic tables, tires, a wooden platform, a mud kitchen with logs and pinecones, two sandboxes, a tunnel made of a big recuperated plastic cylinder, construction spools, and rocking toys. The ground is also made of artificial grass and rubber, like in the infant playground. See photographs 3.

Photographs 3

Playground for 18-months-3-year-olds often Used by Infant Groups




Finally, the infant educators also mentioned occasionally using an empty lot next to the daycare that has nature elements in it such a fallen trunk (See Photographs 4); the school playground next to the daycare that has a big hill and more natural elements than the infant playground; and a little bridge near by with a little river under it where they go and throw rocks in the river. Finally, see the list of all the natural elements and loose parts used by children during my observation in Appendix C.

Photographs 4

SR-CPE Occasional Off-site

Urban Daycare

The urban daycare is also a CPE situated in a city of about 500,000 residents within a larger metropolitan region of the province of Quebec, Canada. The daycare can welcome 80 children from zero to five years old. They have two double infant rooms for a total of 20 infants. For the present study, only the infant room actively involved in nature-based practices was selected, one double group of 10 infants with their two educators. The daycare is located within the limits of a municipal park of about 60,000 square meters. The park includes two soccer fields, a baseball field, two tennis courts, two hills with trees, a wide plain area with more natural spots with tall grasses and trees, a children's playground, and other empty areas with paths all over the park to connect the different areas. See the park map and destinations of the outings in Appendix D. The two infant rooms are one next to each other in the daycare. They each have a patio door that gives direct access to their common infant playground. The immediate surface vis-à-vis the patio doors is covered with a roof, and the area is separated in the middle with a little fence, so each infant room has its covered area to eat or play. There is also a little fence

separating the shaded area from the play area that is covered in artificial grass with a minimum of natural elements such as wood pieces and a mud kitchen. Finally, there is a sandbox area. To be noted, the observation for the present study focused on the outings at the park and not in the playground.

Their usual schedule when going to the park:

- Around 9h: Snack time indoor
- Around 9h30-9h45: Preparation to go outdoors.
- Around 9h45 to 11h: Outdoor time
- Around 10h45-11h: Go back indoors (or in the playground) and preparation for lunch time
  11h15: Lunch time

The daycare is part of a program about active and health habits as well as a sustainable development certification program, which led them to join a nature-based education implementation initiative supported by their municipality. Hence, two years ago the daycare started their implementation of this approach. As it appeared through my observation and through the educators' explanation in their interviews, at this stage, each group seemed free to implement as much of it as they are willing to do without common goals or regular scheduled moments. The daycare provides rainsuits for all children, including infants. Recently, the daycare installed a changing table outdoors, in the infant playground. The infant group in the present study go outdoors twice a day in their playground, and at least once a week outside the perimeter of the daycare building and playgrounds. They go to the park next to the daycare in areas with natural elements like a border area with long grasses that separates official areas such as soccer fields from baseball fields or they go to the hills with trees. See Photographs 5 and see the list of all the natural elements used by children during my observation in Appendix C.

Photographs 5

Spots Used in the Park

Trees, manhole and tall grasses by the baseball court


The Hills and Trees


The Tall Grasses and Open Space with Picnic Tables Area


On the Way Back to the CPE

They recently started to eat outdoors when possible and sleep outdoors too. To do so, they bring all their materials and equipment such as tables and chairs, highchairs for the younger infants, and then mats and cribs outside under the covered area. See Photographs 6.

Photographs 6

Lunch Time and Nap Time Outdoors

Educators

I observed and interviewed a total of four educators from two different groups in two different CPEs. See Table 1 and the following paragraph for the demographic information about the educators.

Table 1

Demographic Characteristics of Educators

Pseudonym	Age in years	Gender	CPE	Years of experience	Years in infant room	Training
T1	54	F	Semi-Rural	25	6	BA in Child Studies
T2	44	F	Semi-Rural	23	13	DCS-ECE
TB	22	F	Urban	4	2	DCS-ECE
TA	29	F	Urban	5	2	DCS-ECE

Note. BA = Bachelor; DCS-ECE = Diploma of college studies – Early Childhood Education

T1 and T2 from the semi-rural CPE are experienced educators who both have worked in the daycare and with infants for multiple years. They are both White Canadian and one speaks French and the other French and English. The interviews were conducted in French. They were

both working with this group since September. T2 was part of the semi-rural CPE's committee on the topic.

As for the urban CPE, both TA and TB are younger educators with two years of experience with infants. TA had been with the group since September, and TB joined the group during the year around the end of January. I decided to accept the group for my data collection even though TB did not meet the criterion of being with the group since September. The reasons why I made this decision were, first, recruiting an urban daycare ended it up being harder than expected, and second, since both educators were highly motivated, I thought I could adjust that criterion. TA's ethnicity is Asian and TB is from the Barbados and Lebanon. TA speaks French, English and Lao, and TB speaks English and French. TA's interview was in French and TB's in English.

Infants

According to Ministry regulations, infant rooms are legally composed of a maximum of five children (0 to 18 months) for one educator (Québec, 2021). A common practice is to have a double group with 10 infants and two educators working as one group. In the present study, I observed two of those groups, for a total of 20 infants. However, during all my observation sessions, one infant was always absent, so I excluded him from my data analysis. Furthermore, as my observation sessions took place in April and May, the mean age of children was quite high (16.8 months) since it was closer to the end of the year. Indeed, many daycares, such as the two in the present study, follow the school year to form their groups. Therefore, in September the groups are formed, and they usually stay the same until next year. In this case, it is very likely that some infants will exceed the 18-month-old limit age within that year. In some cases, they will transfer them in older groups during the year. For example, BB10-25m, 25 months old, was

in an integration period into an older children's group when I did my observation, so he was spending some time in the older group and some in the infant group. Otherwise, it is expected that older infants stay in the infant room until the next group is formed in September.

For confidentially reason, all the infants in the present study received a code following this logic: BB(number 1 to 17)-(Age in months)m (for months). For example: BB1-14m, is BB first in my list and is 14 months old. Three infants are coded as *Not obs.* because they were absent on some or all of my observation days and I did not have notes about them. Also, other infants either from other groups or a previous year that educators spoke about are referred as BBx. There is an extended list of the 20 infants in Appendix E.

Table 2 reports descriptive statistics about age, sex assigned at birth, and the time they were in the CPE.

Table 2

Description of Infants Demographic Information

CPE	Age when observed (in months)		SAAB		Amount of months at the CPE	
	M	*Range*	Girls	Boys	*M*	*Range*
Semi-Rural	16.9	12-22	5	5		4-10
Urban	16.6[a]	11-21 [a]	2	8		1-12 [b]
Total	16.8 [a]	11-22 [a]	7	12	8,4	

Notes. SAAB = Sex assigned at birth;

[a] These numbers exclude information of an absent child, a child in integration with an older group (25 months) and an older child (33 months) with a derogation to still be in the infant room.

[b] This range excludes a child with a derogation in his second year in the infant room (21 months).

In the semi-rural daycare, children were mostly White, yet some demographic data were missing from the parent questionnaires. They were all in a French-speaking home, except for one child who was in a bilingual French-English home. As for the urban CPE, it was more ethnically

diverse with some Latino, Black, and White children, but again some data were missing as some parents left that question blank in the questionnaire. As for the language spoken at home, five children were in a bi- or tri-lingual home including French, English, Spanish, Italian and sign language. The others were mostly in a French only or English only home. In both daycares, the families were mostly in the middle-class income[1] range; only one family had a low income, while 10 out of 20 families earned more than 100,000$ a year. Finally, one child in the urban daycare had Down syndrome and one had the CHARGE syndrome, each letter representing the most common symptoms of this disease: coloboma, heart defects, atresia choanae, growth retardation, genital abnormalities, and ear abnormalities. These two children received a derogation to stay in the infant room for a second year.

Educators at the SR-CPE described their group as curious, sensitive, and joyous (lines T1-25-29). T1 and T2 both mentioned that they built a strong trusting relationship and that "y'adorent vraiment être dehors" (lines T1-29; 35). As for their interest, T2 mentioned that they were enjoying "jouer au bébé" and that symbolic play is flourishing right now while the younger ones are still observing and imitating more (lines T2-22-34; 39-45).

Educators at the U-CPE described their group as "very energetic", "un groupe qui bouge beaucoup", "[qui] dépense beaucoup d'énergie" (lines TB-26; TA-18-19). Overall, they consider their group with a great dynamic, "the dynamic in the group is working very well" (lines TB-32-33) with some infants that are a little more insecure in the opinion of TA (lines TA-26). TA also described each child individually in detail and really appeared to have created a personal relation with each of them.

Procedure

[1] Median after-tax income in Canada was 68,400$ in 2021 (https://www150.statcan.gc.ca/n1/daily-quotidien/230502/dq230502a-eng.htm)

Recruitment

For these cases studies, I decided to purposively recruit participants so they would fit my criteria. The criteria were that the CPE was engaged in a nature-based practices/program for at least a year prior to my study with both the older groups and with the infants. This means that the infant rooms I sought have implemented at least some minimal nature-based practices and play such as extended and/or regular outdoor play time with the addition of natural materials and elements in their playground. Furthermore, the recruited educators were expected to be in the same infant group since at least September 2022 to ensure a stable experience for the children in the same group. Also, the educators needed to have at least two years of experience with infants overall without regard to the approach used.

First, I tried recruiting CPEs through contacts I created with daycare centres when I was working at the Association Québécoise des centres de la petite enfance as a pedagogical counsellor prior to this study, and through recommendations from previous colleagues still working on the nature-based project at the association. Once I received ethics approval for this study, I contacted the directors or pedagogical leaders of the identified CPEs in both urban and rural/semi-rural areas in the province of Quebec via phone and email. After a lack of responses, I also posted a notice on Facebook groups aimed at educators and other daycare workers enthusiastic about nature-based education. When I reached leaders of interested CPEs, I questioned them about their implementation of a nature-based approach to see if they fit the criteria mentioned above (see Appendix F). If the CPE met the criteria, I shared a one-page recruitment invitation explaining the context and purpose of the research with them; this invitation mentioned the fact that the participation is voluntary, and that it is for my thesis in a Masters program (see Appendix G). To be noted, most of the potential CPEs are francophone, so

the materials used in this study addressed educators and parents (questionnaires, consent forms, interview questions) were prepared in French and translated into English, if needed.

Finally, after seeing my Facebook post, a pedagogical counsellor contacted me from a semi-rural CPE. We talked on the phone so I could ask her my recruitment questions and she then asked her educators and shared their emails with me when they accepted to participate. I then planned my visits and the interviews with the educators with the support of the pedagogical counsellor to have someone to replace them in the classroom during the interviews. As for the urban setting, it was also via the Facebook post that I recruited them when one of the two educators of the group directly contacted me. I did the recruitment meeting over the phone with her, and she then confirmed with her colleague and director.

Once they accepted, I sent the leaders the consent forms and demographic questionnaires for the parents of the infants to be observed (See Appendices H and I) and to the educators for the observation and interviews (See Appendices J and K). The setting for the data collection was at their daycare centers for the observations conducted first, and then the interviews were held in person for the urban CPE educators and via a videoconference for the semi-rural CPE educators. I chose to do the interviews after the observations so I could ask educators questions related to the observations if needed and enrich my follow-up questions.

Observation and Documentation of Infants' and Educators' Experiences

The observations were planned according to the infant group's schedule and the educators' agreement. As both groups spent about an hour to an hour and a half outdoors when I did my observations, two observation sessions in each setting were enough to collect the data needed. First, I did a more general observation of the groups. It allowed me to get to know the group and let children acclimatize to my presence. I noted context and physical environment

information, took some photographs of the latter, and identified potential focal children for more in-depth, subsequent observations. Appendix L presents the focal infants, group or educator that were observed and the number of codes for each. I used the running record method with pen and paper to capture their experiences with nature, their play, and interactions with peers and the educators. I also took time to focus specifically on the group dynamics and the educators' actions and roles.

During the observation, I was sensitive to infants' reactions to my presence in the group and I respected nonverbal expressions and behaviours when needed. For example, I stopped one of my focus observations because a child frowned at me few times and then asked for the educator. I did not want to make the child feel distressed, so I changed my focus. Infants appeared sensitive to me watching them; it happened a few times during my observation where I had to stop or be more subtle in my observing techniques.

To support the written observation, photographs were taken before or during the focus observations. The focus of the observations and photographs were: natural materials, challenges or risk-taking by infants, evidence of the use of senses by children, and educators' support of infants in play or exploration. Also, during their interviews, I invited educators to share photographs, if they had some, to support their examples and stories told during the interview. Not long after each observation session, I wrote a clean version of my observations on the computer, ready for later analysis and joined photographs to them. Table 3 summarize the conditions when I did my observations.

Table 3

Conditions During Observation

	SR-CPE		U-CPE	
	Obs. 1	Obs. 2	Obs. 1	Obs. 2
Month	April	April	May	May
Time	9h35 to 11h	9h20 to 11h	10h to 11h15	9h47 to 11h05
Weather	Grey spring day, about 6C, little rain here and there.	Grey spring day, about 7C, post-rain weather, the sun came out around 10h45	13C, little rain at first, then active rain at the end of the observation	14-15C, sunny not a single cloud

Interviews with Educators

I conducted semi-structured interviews with the educators. First, I verbally reiterated their consent at the time of the interview. Their interview was audio recorded or audio and video recorded if online, with the participant's consent. The interview started by showing gratitude for their participation, reminding them of the context and purpose of the research as well as validating their consent and welcoming any questions. I also reminded them that we could stop the interview at any time and that they did not need to answer any questions they would prefer not to answer. Three interviews were conducted in French and one in English with TB. Some specific questions, mostly open-ended ones were prepared, but the flow of the interview was led by the educators as I adjusted my questions and their order based on their answers as the interview went along. As the interview was being recorded, I adopted the role of listener and learner. Furthermore, I adopted an analytic role to allow me to adjust the order of the questions, therefore, my notetaking was minimal, with some first impression memos at the end. See Appendix M for the prepared questions.

Positionality

Reflecting on my researcher's positionality (Hellawell, 2006 as cited in Hays & Singh, 2012), I would consider myself both an insider, for my knowledge and experience in nature-based implementation, and an outsider since I am not an educator, nor did I support infant groups. Indeed, I had prior knowledge and experience with the nature-based education approach with older group (3- to 5-year-olds). I held a positive bias towards nature-based education based on those rewarding experiences of supporting groups in outings in the forest and different natural settings. Still, I tried to not only focus on the positive aspects in my research. The other way I was influenced by my prior work experience was in the way I answered my research questions. As a pedagogical counsellor, I also used to support CPEs in the quality of their environment and knowledge about child development. I think those two angles influenced my analysis as I answered my research questions about infants' experiences with a developmental lens rather than just their overt behavior. Furthermore, I was sensitive to the interaction between the environment and infants taking into consideration that I have a background in assessing the quality of the environment.

Results

Analysis

First, I analysed my observational data using coding cycles to identify the main themes that answered my research questions about educators' and infants' experiences outdoors. I used a clean version that was transcribed close in time to the collection of the raw data for my first cycle. I coded using mostly process coding that represented actions and concrete experiences, as well as emotional coding, In Vivo coding, and open coding. Also, I categorized the different sequences giving them labels such as "The dandelion: picking it up, tasting it, dropping it", and I associated the code sequence to the focus child or educator who was observed. In the second cycle of coding, I used axial coding and organized the 1204 codes from the first cycle into main

categories: infants' actions, interactions, senses, emotions, natural elements present and used, and educators' actions and group organization. Within each main category, subcategories were also identified. Some subcategories ended up having multiple codes, meaning this type of experience was frequent within the observation. Finally, my third cycle of analysis was about identifying themes that emerged from all my subcategories. Those themes are meant to reflect the most frequent experiences observed and to convey meaning to those experiences. I organised those categories in a preliminary figure (See Appendix N) that led to the writing of my results section about my observations. During the writing process, I inserted photographs I took while recording my observation notes.

Secondly, I did a similar analysis process with the data from the interviews. I transcribed the interviews, two done with a revised automated transcript from TEAMS as the interviews were realized online, and two with the free version of Descript using an audio recording that I revised afterwards. The first coding cycle used mostly In Vivo, emotional, process, and open coding. In my second cycle, I categorized all my codes in an Excel table based on categories relating to the interview questions: What is nature-based education with infants for you?; Barriers; Solutions; Emotional State; etc,. After that, I started a third cycle using color coding trying to regroup or underline important subcategories and let themes emerge from that table. I still had numerous themes, and some were more applied while others more abstract. I discussed the themes with peers and with my supervisor until I finally decided to merge my observational data with my interview data as themes from both were overlapping. Therefore, I did another round of axial coding trying to organize the themes from the interviews with the observational ones. After several different schematic options, I ended up organizing my data based on: (1)

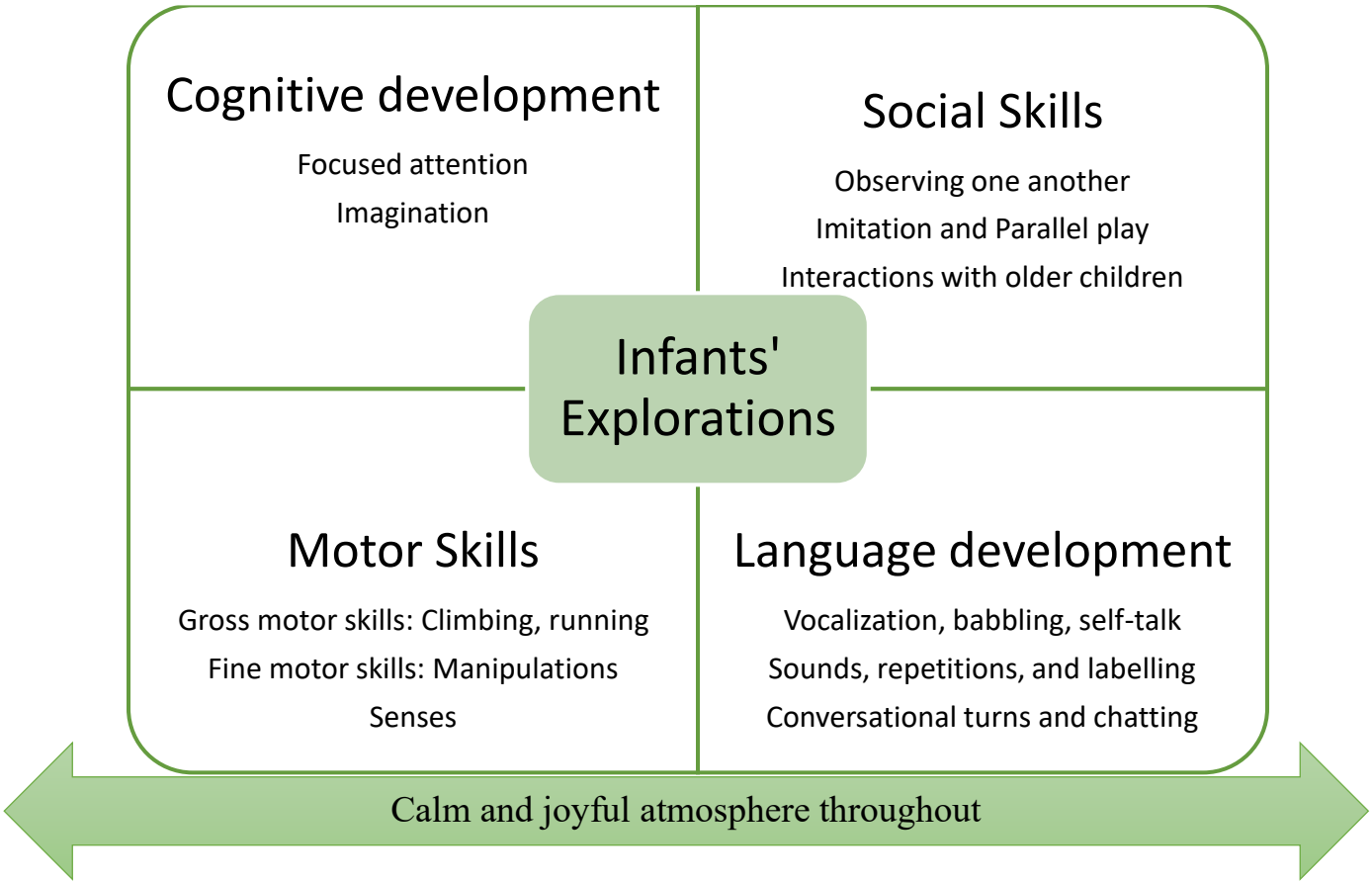
Infants' experiences (see Figure 1), (2) Educators' practices (see Figure 2) and (3) Educators' perspectives (see Figure 3).

Trustworthiness was ensured through analytic memos all along the process. Also, the interview transcriptions were sent to the educators for member checking strategy. They gave their approval to pursue my analytic work. Finally, along the process, I often did debriefing sessions with my supervisor to support my reflections and theme selection.

Infant's Experiences in a Nature-Based Educational Context

Figure 1

Infant's Experiences Main Themes



In the following section, I will describe how infants' exploration and play outdoors facilitated their whole development in the four main domains: (1) cognitive (2) motor, (3)

language, and (4) social. The developmental aspect emerged from both my observations and educators' perspectives and examples from the interviews. First, within the (1) cognitive domain, I will describe how infants explored the natural elements and their outdoor environment with notable focused attention, followed by the educators' perspectives on how children use their imagination. Secondly, (2) motor wise, I will describe how their entire bodies were engaging in the explorations through fine and gross motor experiences. I will also describe here how infants were engaged with all their senses as it is closely related to their fine motor manipulations. I will follow with (3) the multiple language opportunities that were observed and also reported by educators; and, I will expand on (4) the social aspect through their peer interactions. It will be followed by the section about the calm and joyful atmosphere underlying their whole experiences.

Cognitive Development

Focused Attention. During my observations, infants' outdoor experiences included numerous instances where their attention was focused on a natural element and/or their action or movement. Infants looked at different natural elements, seemed to analyse them by staring at them, observing, and manipulating them. Also, when the infants were attempting to engage in a task or an action, they demonstrated concentration, curiosity or appeared to be careful. For example, while carrying rainwater scooped into a cooking spoon, BB2-14m would stare at his spoon, holding it as straight as possible in front of him to try to keep the water from spilling, in vain. Interestingly, a garbage truck distracted him from that scooping water experience for a moment, but he quickly refocused on his exploration (Obs. SR-2A; lines 258-262). Another example comes from the youngest infant of all those observed, BB11-11m. She found a twig, started shaking it in the air in front of her, staring at it, then pushing it into the ground with the

pointed end. She was looking at her hands and her movements during the whole sequence. However, it was quite brief given the fact that her mother picked her up right after, because she is still being integrated into the group (Obs. U-1A, lines 406). Multiple other examples happened. Indeed, most of the examples presented in the next sections about other developmental domains also demonstrated that infants were often focusing their attention while manipulating, touching, and exploring different elements. Natural elements attracted their attention, as well as some other elements such as garbage or construction trucks. See the exhaustive list of all the elements children interact with during the observations (Appendix C). Additionally, observing one another also occurred quite often, which will be discussed in more detailed in the social development section.

Moreover, educators mentioned during the interviews that infants appeared “interessés” (line T2-185) or “fascinated” (line TB-226) and even mentioned their sense of wonder (line T2-258) when outdoors and in contact with nature. They also described experiences where children were fully engaging in their exploration, which necessitated focused attention. For example, TA describe an outing in the park where a large puddle of water accumulated on the grass and children were fully engaging in the exploration of the water: “les enfants étaient vraiment en full exploration!” (line TA-160).

Imagination. During the interviews, educators mentioned how infants’ exploration and play outdoors were stimulating their imagination. They also described children’s creativity in their play. They mentioned that infants use open-ended materials such as branches to do anything with it. TB also explain how seeing the real live things was probably enhancing their imagination and experiences more than just seeing pictures indoors:

> There's a bunch of stuff, like they see a lot of things too, which also helps their development more instead of just having pictures. Well, they see it right in their face. Oh, it's a bird. Oh, look, I see a bird. Oh look, I see a dog. (Lines TB-211-215)

Moreover, T2 also noted how infants' play evolves over the year with natural elements and how they develop symbolic play over time such as using pinecones or rocks to put in their pots and pans and stir them to play pretend cooking (lines TB-521-545). T1 also added: « Leur imagination là, juste ça là. Il va prendre une roche, puis ils vont faire d'autres choses avec, c'est pas juste une roche. Une branche aussi, ça va être d'autres choses ça développe leur imagination » (T1-lines 350-353). To summarize, educators did observe children's development of their imagination with natural materials.

Motor Development and Sensory Experiences

Fine Motor Skills and Senses. Various manipulations were recorded with natural elements and complementary materials that engaged sensory experiences such as touching, feeling, observing, tasting, and smelling. Different manipulations also involved fine motor skills: peeling, pushing or pulling, aiming a pinecone into a hole, scooping, gathering pinecones in their arms, shaking, and spraying. In the SR-CPE, infants explored pine twigs and their needles as well as pinecones with their hands, mouth, and nose. Once they found some pinecones and branches, educators gave one piece to each child. Then, they carried them for most of the walk in the *pouponbus* around the neighborhood (Obs. SR-1C, Lines 88-150; Obs. SR-2A, Line 239). In an example from the U-CPE, BB16-18m explored the tall grass that included senses and motor experiences:

> TA says "Ça chatouille" and touches the grass. BB16-18m touches it too, gently at first and then grabs it and pulls it. She then offers it to TA who takes it but is busy with BB13-

> 21m. BB16-18m continues to rummage with her hand in the grass and finds dead leaves, grabs one and examines it with great interest. (Obs. U-2B, lines 520-521)

Later on, in the same sequence (see photograph 7): “BB16-18m observes other children who are coming to join them in the tall grass area while still touching, stroking, and pulling gently on different grasses” (Line 524).

Photograph 7

BB16-18m Exploring the Tall Grasses

Furthermore, trying to put natural elements into different holes happened in both daycares (see photographs 8). For example either children put pinecones into the middle hole of a construction spool (Obs. SR-1D, lines 187-192), into the opening of a plastic bottle (Obs. SR-2C) or, a child tried to put a spoon full of water through a fence opening (Obs. SR-2B, line 261); or children put twigs and leaves into openings in a manhole in the park (Obs. U-1B, lines 433-

435). Children showed great interest and attention in doing the latter, which also required fine motor skill. Picking up elements from the ground, carrying them or gathering them happened quite often.

Photographs 8

Putting Natural Elements into Holes

The educators also reported experiences of rich motor and sensory experiences and explained how children touched and manipulated in different ways trying to peel, tear or crumple, and also transferring elements into different containers (e.g., lines T2-99-102). For example, TA told this anecdote:

> Il y avait des flaques d'eau dans ce coin-là. Donc là c'était vraiment, les enfants étaient vraiment en full exploration. Ils tapaient dans l'eau, ils couraient dans l'eau, ils jouaient dans…dans la boue, puis tout, puis on voit qu'ils sont vraiment en train de faire plein de choses. C'est très sensoriel, c'est très, très genre moteur aussi. (lines TA-158-163)

Gross Motor Skills. As for gross motor movement, most of the time infants were walking, moving on their hands and knees, or standing, while the rest of the time, they sat.

Overall, they moved freely and engaged with their full bodies in their exploration. Infants would often walk with purpose, to join other children, to reach a natural element, and to carry an object. BB8-16m is a good example of how children walked around and covered a big trajectory in only 10 minutes, while carrying a pinecone in his hand and then in a bucket, tasting it, and exploring his environment (Obs. SR-2D, See Appendix O for the map of BB8-16m's trajectory).

Educators also associated gross motor opportunities outdoor with the possibility of letting go of excess energy and for the children to be free to move as needed: TB mentioned: "they want to go climb, they want to go fall, they want to roll, they want to do stuff" (lines TB-45-46). TA also discussed how children who are non-walkers or have physical limitations in her group are observing natural elements a lot, touching the natural elements near by and they have the space they need to move as they want and can (lines TA-67-72, 86-87).

Rare Risky-Play. During my observation, I was watching for evidence of some risky-play, since this is reported in the literature, but I only recorded two instances. One instance was when a beginner walker, BB17-14m, struggled to walk up hill in the park (Obs. U-1C, lines 449-454, 457-460; see photographs 9), and another time where BB10-25m went close to a small drop off a rock wall (about one to two meters) and the educator immediately stopped him (Obs. U-2C, line 569; see photograph 10).

Photographs 9

Struggling on the Hill

Photograph 10

The Small Drop

Language Development

Through the observations, there were numerous instances of different language expressions and explorations such as (a) vocalizing, babbling, self-talk; (b) repeating, imitating sounds; (c) conversational turns and chatting; and (d) labelling different natural elements. Infants would either engage in self-talk while playing with a rock or a pinecone, or they would repeat after one another or after the educator by labelling or narrating what was going on. Infants would sometime produce sounds: “aaah, aaaah” (e.g., Obs. SR-2A, line 223), other times a close version of a word: “Côcô ” (cocotte) (Obs. SR-1D, line 189) or a full word “roche, roche, roche”

(Obs. U-1B, line 420) or an action “ça tatouille” (ça chatouille) (Obs. SR-1C, 146). As for conversational turns, they were mostly brief, but infants would vocalize, repeat, and even initiate conversation with educators. Here are examples of the latter that also display some labelling, repeating, and babbling:

T2 during the pouponbus walk in the SR-CPE:

> One of the infants points and says “ça”. T2 points at each flower and says the colors. The same infant then goes “l’aut’e” (l’autre) and points at different ones. While T2 repeats the color of each flower the infant points. (Obs. SR-1C; lines 121-123)

BB1.14m during the pouponbus walk:

> He then looks down and seems to look at another puddle and vocalizes: “eeeh ÔÔ”” and points at the puddle. T1 answers with a soft voice, “De l’eau [BB1-14M], oui de l’eau". T1 then points at the flowers. BB1-14M “eee ôÔ”. T1 “De l’eau encore” “Des fleurs aussi” and points at the flowers again. (Obs. SR-1C; lines 204-208)

BB9-12m exploring on hands and knees and finds a rock:

> [BB9-12m] still holding the rock and moves on hands and knees towards TA, then sits close by her, arches his back, lifts his head and pulls his hand up babbling “tou tou”. TA’s face brightens when she sees him and exclaims “une roche!”. She squats to his level “tu as trouvé une roche”. BB9-12m goes “tou tou” again babbling. TA repeats “roche”. BB9-12m continues to babble. (Obs. U-1B; lines mid-412-415)

Educators also mentioned observing the children’s language development when they are outdoors. TB explained: “if you’re in the classroom he’s not gonna start saying these words, it’s because he sees them constantly outside …. They’re like, the dog, the dog, the tree, the birds, the plants, everything” (lines TB-220-226). She added later that she feels that she can go in depth

and use more words with children outdoors than indoors where they mostly manage the group and have to say “doux doux, on frappe pas” (lines TB-795-797) all the time. Moreover, T1 explained how they talked about nature a lot with them when they are outside and TA too, said how she would explain and verbalize more with children: "je vais plus loin dans mes mots… dans mon dictionnaire de la nature"(lines TA-451-452). This aspect will be detailed in the Educators’ Educational Practices section below.

Social Development

During the observation, infants interacted with one another multiple times. First, they observed one another on numerous occasions, pointed at one another, and in some cases joined or imitated each other. Some parallel play happened as well. For example, in the playground of the SR-CPE, BB2-14m explored rainwater that had accumulated in a rocking toy: “[BB2-14m is] touching the water again, putting his hand up and looking at the water on his hand. BB8-16m comes and join him, they both repeat the same movements next to each other” (Obs SR-2B, lines 250-251). In another example from the U-CPE:

> BB9-12m and B17-14m are now at the manhole. They are next to each other, and both put their hands and fingers in the openings and then try to put twigs and leaves in them. They do not look at each other’s faces, but they look at each other’s hands and movement. (Obs. U-1B, line 435)

In both examples, one of the infants joined the other one and they focused their attention on the same experience, the same exploration and engaged in it next to each other. In some cases, multiple infants joined an exploration, and a majority of the group gathered around a common exploration. For example, when educators found pinecones in the spool, most infants came to look in the hole, put pinecones back into it or put their hands into the holes (Obs. SR-1D, lines

176-192, see photograph 11). This phenomenon of gathering together happened more frequently in the SR-CPE infant's playground than in the U-CPE.

Photograph 11

Gathering Around the Pinecones and the Spools

Another important social aspect observed outdoors was the opportunities for interactions with older children and in some cases with siblings and cousins. It was observed either at the park with the U-CPE or in a shared playground at the SR-CPE. It was also interesting to see 4-5-year-olds being gentle and careful around the infants and taking a sense of responsibility around them (Obs. U-2C, line 560). Furthermore, when offsite of the daycare perimeter, people from the community could more easily interact with the group. For example, during the walk with the *pouponbus* at SR-CPE, a grandmother passed by in her car, stopped by to chat with the educators and to greet her two grandchildren (Obs. SR-2A, lines 209-210).

Finally, I observed only two brief instances of conflict between children. Both happened in the playground at the SR-CPE and the disagreements were about shared space or objects. For example:

> She [BB7-19m] turns abruptly towards the other construction spool next to her with a wood piece that another child put there and pushes the wood piece on the ground vigorously with one hand. A child next to her pushes BB7-19M firmly with their hand

> but with little strength, so BB7-19M lets out a little “inh”, and BB7-19M falls slowly into a sitting position. T2 not too far away, walks towards them and with a calm voice: “ooh qu’est-ce qui se passe?”. BB7-19M cries, still sitting on the ground. T2 gives back the wood piece to the other child and comforts BB7-19M by stroking her back. (Obs. SR-1B, lines 35-38)

Other than the two conflict events, parallel play and observing one another were definitely the majority of interactions observed compared to conflict situations. This raises the issue of the general atmosphere of the group, before moving on to educators’ practices and perspectives.

Calm and Joyful Atmosphere Throughout the Outdoor Experiences

The overall climate of both groups throughout my observations was positive.

Calm and Joyful Tone of Voice. Educators’ voice tones were always either calm and caring, or joyful and enthusiastic. Specifically, educators kept a calm and caring vocal tone even when they had to intervene in the two conflict instances mentioned above or when children would put things in their mouth: “He puts back the pine twig in his mouth while vocalizing ‘Taaha aah’ with a happy tone. T1 makes a disgust face and says softly to BB1-14M ‘C’est pas bon, on le met pas dans la bouche’” (Obs. SR-2A, lines 225-226). The same approach was used by the U-CPE:

> He then puts his hands towards his mouth and put the tip of the rock in his mouth.
>
> TA notices it, goes towards BB9-12m, squats to his level and says with a gentle voice and an exaggerated disgust expression, “Wash, pas dans la bouche”. BB9-12m stops putting the rock in his mouth and looks at it while having a disgusted face trying to push the mud/rocks bits off his mouth. (Obs. U-1B, lines 418-419)

Shared Moments, Smiles, and Laughter. Also, children and educators smiled regularly, shared laughter and attention about diverse experiences. For example, while playing with the pine twigs: “T2 tickles BB6-22m’s boots with the “petit balai” and laughs. BB6-22m smiles and stares at her feet” (Obs. SR-1C, line 150). At the U-CPE, here is an example of a shared attention moment with laugher and smile from TB: “A bird chirps and BB11-11m turns towards the noise. TB exclaims joyfully ‘Aaah les oiseaux!. C’est des oiseaux. Y’a un chien aussi’ TB laughs and smiles, calm and patient” (Obs. U-2-A, lines 500-501).

Slow Pace Respectful of Infants’ Rhythm. Moreover, the pace of the groups was mostly slow. Educators showed patience and respect for each child’s pace. During the walk, the groups and I could sense that atmosphere when we got to the first spot in the park with the U-CPE:

> All the groups are slowly walking/wandering towards the tree area, TA leading the way. TA is holding B11-11m in her arms, walks slowly while waiting for all the other infants walking towards her. She walks slowly backwards so she sees all the group. (Obs. U-1A, lines 405)

Another example is during the pouponbus walk with the SR-CPE where I often mentioned excerpts like this one in my observation: “The walks continue slowly and calmly” (Obs. SR-2A, line 219). I recorded hearing a lot of birds as well, which would add to the calm and contemplative atmosphere.

During the interviews, educators also commented on how infants seem to feel when outdoors: “je pense sont plus calmes” (lines T1-347), “ils sont contents” (lines T1-339), “Like every time we go out and explore, like you just see that they’re having fun” (lines TB-246-247).

Moreover, TA mentioned, “Quand on revient, je trouve qu’ils sont plus calmes. Ils ont tellement dépensé leur énergie, que, là, ils sont plus calmes, sont plus... ils sont prêts à boire leur lait, à faire leur dodo ou ils peuvent s'asseoir, manger’’ (lines TA-403-406).

Less Conflict Outdoors. Beside the two conflict instances mentioned above, there were only a few times when children cried or whined. This behavior was mostly observed when children were facing a challenge, were not able to complete something, or near the end of the outings at the park when educators mentioned that children might have been tired. Also, it was mostly the same few infants who displayed some crying and whining, including two infants recently integrated into the group. Here is an example of a frustration moment:

> BB7-19m is trying to put the pinecone in the bottle. She tries the first time, but her aim is not exact, but quite close. She tries again a few times and then the bottle slips and falls. She then grunts and let out a short and high pitch little scream, she seems frustrated that she cannot do it. (Obs. SR-2C)

In the interviews, all four educators mentioned how during outdoors there are fewer conflicts and that they do not have to intervene as much as indoors. It was repeated and emphasized by all of the educators, leading me to think that the outings I observed would be representative of most of the excursions with their groups. Educators also discussed the differences with indoor play time, and mentioned how infants tend to climb on each other more indoors (lines T1-36-37), hit, push or bit each other and how the adults’ interventions focused more on stopping and redirecting those behaviours. In contrast, while outdoors the educators do not have to do that as much. TA mentioned:

> Quand mes enfants sont dans la nature, je trouve que… il y a moins de chicanes. …. Quand on est à l'intérieur du local, je trouve, ils [certains enfants] se frappent tout le

> temps, ils se cherchent, puis ça pousse, ça frappe mais quand on est à l'extérieur, je fais moins d'interventions. (lines TA-386-392)

Also, when I asked about the educators' opinions about impact of going outdoors on the infants, T2 first responded: "je vois que y a moins d'interventions … il y a moins de chicane … c'est plus facile, tu sais, moi je trouve c'est plus facile d'observer les enfants, y'a moins de conflits, sont plus intéressés" (lines T2-172-185). TB also explained how indoors there can be a domino effect when a child cries another child will start, while outdoors, there is enough space to cater individually to a child without other children being disturbed (lines TB-515-528).

Why outdoors facilitates the calm atmosphere? Educators all mentioned how the vast space was a wide contributor: "[There is] so much space too, they are able to explore where they want to explore without somebody coming and getting involved. You know? Or they can come together and be like, 'Hey, look what I found'''(lines TB-786-789). The educators also mentioned the abundance of materials such as branches and pinecones. Moreover, they mentioned that there are fewer restrictions compared to the indoor environment and the children can move freely and have more opportunities for motor development. They also mentioned the natural aspect of the outdoors: the air flow and sunlight, colors and brightness, fresh air, light sounds, and peacefulness. Finally, some educators mentioned that children appear more interested outdoors than indoors and advanced some hypotheses of why that would be:

> [Les enfants] sont plus intéressés. Tu peux leur offrir les plus belles…, les plus beaux jouets, là, les belles autos, les tondeuses puis tout là, mais ce n'est pas ça qui les intéresse tant que ça, c'est plutôt la découverte, le nouveau, tu sais? (lines T2-184-188)

TB mentioned: “They're like, the dog, the dog, the tree, the birds, the plants, everything. They're, they're fascinated by it. It's, it's also probably the colors too. And you know, it's bright outside, so all that stuff takes part too” (lines TB-225-228). TA stated :

> Je pense que c’est ça, c'est vaste, il n'y a pas d’enclos, il n'y a pas de restrictions, c'est vraiment libre, sont un peu plus libres, ils font plus leur décision, à part le fait qu'ils doivent rester proche de nous, mais pour vrai ils sont un peu plus libres, puis moins contrôlés disons. (lines TA-418-422)

In conclusion for this section about infants’ experiences, my observations as well as educators’ examples and anecdotes highlighted how infants’ experiences outdoors facilitated children’s whole development: cognitive, social, language, and motor, often simultaneously. The calm and joyful atmosphere also appeared to be a major aspect of their outdoor experiences both for infants and educators. The experiences described above are directly related to the educators’ experiences and their perspectives, which are detailed in the following section.

Educators’ Practices within a Child-led Pedagogy

Based on my observations and the interviews with the educators, their practice seems to align with a child-led pedagogy. First, during the interviews, educators discussed their vision of infants, or it transpired through their anecdotes and statements. They shared a vision of infants as active learners and as capable, which is a central element to a child-led pedagogy. Secondly, my observation of their concrete practices confirms their statements as their actions and interactions with infants reflected a child-led pedagogy. They showed responsiveness, availability, shared moments of attention, and provided both verbal and physical support. Figure 2 below illustrates the two main themes: (1) Vision of infants as active learners and (2) Educational practices

representing their child-led pedagogy. These quotes from TB and T2 also clearly summarize their vision and practice with infants. TB said with passion:

> Like every time we go out and explore, like you just see that they're … having fun. They're … able to just explore it by themselves. Like, all we have to do, all we play part in this is just to observe them. We observe them, see what they're interested in. Okay. Oh, well this, BB16-18m, she likes, she likes … dandelions. There you go. Yeah. She likes dandelions. Oh look, she's picking them. You know, like, and then you just add to it, 'oh, you're picking up the dandelions' [with a joyous voice]. You know, like, and it helps her like, 'oh yeah, I'm picking up the dandelions'. (lines TB-246-255)

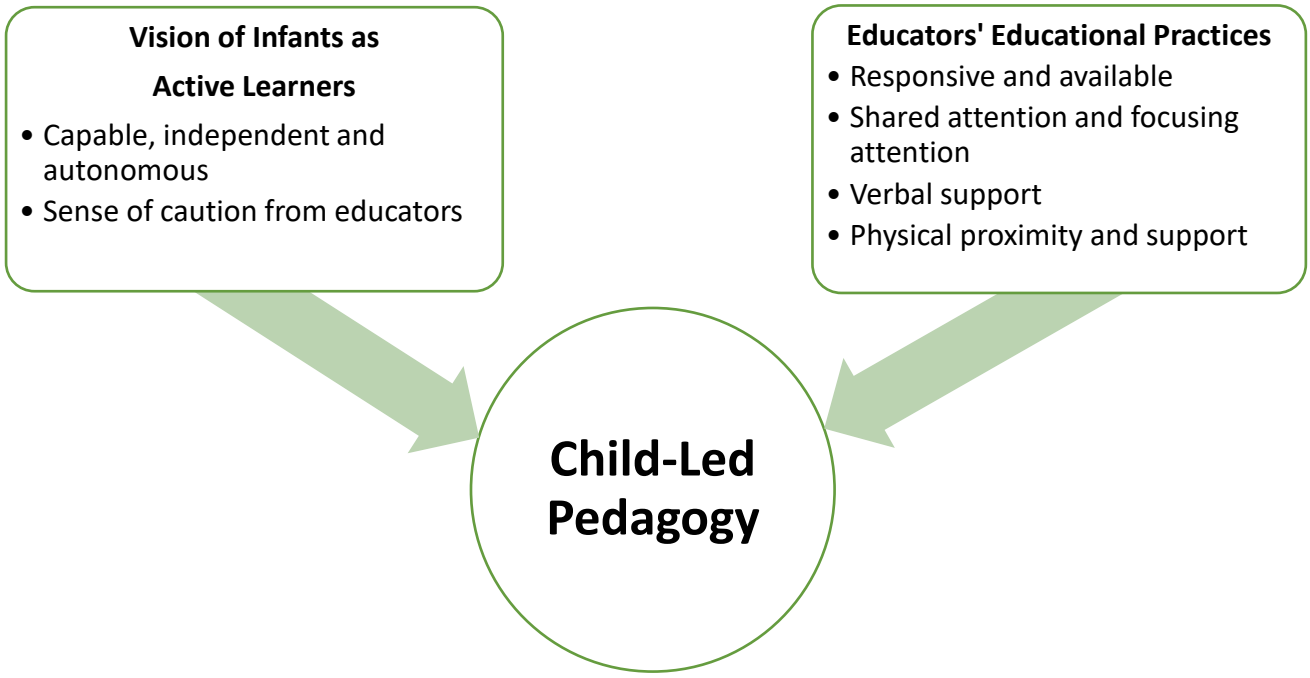
As for the SR-CPE, T2 told an anecdote about their outings on a little bridge:

> C'est comme un pont au-dessus d'une rivière, il est pas tellement large. Faque nous, qu'est-ce qu'on fait, on met les pouponsbus à chaque bout du pont. Puis là, on les laisse explorer, on amène des petites roches qu'on a recueillies en chemin, on les laisse explorer, ils lancent des roches dans l'eau et tout, on bloque les accès, c'est sûr, là, pour la sécurité, puis c'est comme une sortie, on les laisse explorer, regarder l'eau, écouter. Tsé, tout ça. Et quand on a fini, on les rembarque et on retourne au CPE. (lines T2 382-390)

The latter quote exemplifies this idea of letting the children explore and being there for them while also suggesting an action such a throwing rocks in the water by gathering rocks and making them accessible. These quotes are good examples of how both teams, at the U-CPE and the SR-CPE, put forward the importance of children's lead in their exploration and how educators can be there to observe and support infants' experiences.

Figure 2

Themes about Educators' Practices



In the following sections, I will first detail their vision of infants, followed by the section describing their concrete practices and exemplify them based on my observations and some anecdotes from educators' interviews.

Vision of Infants as Active Learners

Capable, independent, and autonomous. An important aspect contributing to the observed child-led pedagogy is the educators' perception of infants as active learners. This perception mainly transpired during the interviews when they were telling anecdotes or giving explanations. They all seemed to actualize a vision of infants as capable, independent, and autonomous. Indeed, TB explained:

> They [other educators] are like ‘babies, ah, we can't bring them outside.’ ‘Oh, we can't do this.’ You know, like, but we could, we could do anything with them. And that's what you're experiencing when we bring them outside, is that they're able to do the same thing as older kids and they're able to develop faster. (lines TB-115-119)

She clearly thinks that infants are capable, and she encourages children to be autonomous. For example, she supported BB11-11m to explore by herself and build confidence to walk by herself. I observed this during the observation:

> TB has BB11-11m in her hands, puts her on the grass, standing, and says “tu es capable de marcher” [you can walk] with a smile and a gentle tone. TB tries to let go of BB11-11m hands to let her go by herself, but BB11-11m goes “aaanh aaaanh aaannh” and holds on to TB hands strongly. TB reassuringly says “ok” and leaves her hands in hers and stays next to her. TB lets go of one hand and goes next to her to walk side by side holding hands. TB and BB11-11m start to walk hand in hand. (Obs. U-2A, lines 481-482)

This excerpt from my observations resonates with TB’s comments about her desire to encourage independence in the infants: “She [BB11-11m] often had people like pick her up and move her around. …. So I feel like that's like her, her default right now, we're trying to let her be independent” (lines TB-633-636). TB seems to perceive the child as capable and therefore she encouraged her autonomy.

Furthermore, T1 mentioned how she really appreciated observing children being proud of what they accomplished: “Tu vois qu'ils sont fiers juste à regarder dans leur visage” (line T1-296). Being able to observe confidence and pride from someone is perceiving them as able and having feelings about their achievement. In that example, it is the ability of T1 to see that climbing a hill or sledding down is a challenge and a learning experience for those children. All

four educators, by showing a great interest in children's exploration and experiences, really displayed that vision of children as complex and complete active agents.

Sense of Caution. On the other hand, they are also conscious of the reality of infants' routines and needs, and they also have some insecurities, or some notion of the fragility infants convey. Indeed, T1 mentioned that, "avec les bébés des fois, c'est plus… hum, c'est plus inquiétant, je te dirais" because of security reasons (line T1-100-101). Meanwhile, TA also explained how at first, she had a reluctant reaction when two new non-walkers were integrated into her group. Indeed, all the other children knew how to walk by then. She still gave nature-based education a try with this new group configuration and realized that "Finalement, les petits bébés ils sont capables de nous suivre. Ils sont juste comme à quatre pattes autour de nous [Rire doux]" (line TA-123-125). Despite a first impression of non-walking infants being more of a challenge and perhaps even a setback in her outdoor practice, she decided to try it with them. This impacted her vision of young babies as capable, including non-walkers in a nature-based education context. Overall, they all had a sense of caution, while also perceiving infants as curious, active beings: "They wanna go see what's happening!" (line TB-500).

The following section is about educators' concrete observed practices. It demonstrates how they apply their vision of infants as active learners in the day-to-day practice by being responsive and tuned-in to children's experiences.

Educators' Educational Practices

First, the pedagogy observed in both groups appeared to be child-led. Free play and exploration were the main activities offered. Indeed, the educators, apart from choosing the schedule and location, were not imposing any specific play activities on the infants in the outdoor settings. Educators seemed to observe them and follow their lead to offer support when

needed while also making suggestions and guiding their exploration process by focusing their attention, sharing and/or narrating their experiences. The educators' role, presence and intervention seemed to play an important and positive role for infants' experiences. Four main sub-themes transpired from the observations and interview data. As illustrated in Figure 2, educators appeared as (1) *responsive and available* to children. The educators were attentively observing children and being responsive to them when infants asked for their attention, approached and showed them something, or when infants seemingly needed support. Furthermore, educators displayed many moments of (2) *shared attention*, shared interest and discovery in the environment while also actively showing different natural elements to children and *focusing their attention* on the items. Also, educators (3) *verbally offered support* either to enhance language development or by giving encouragement and labeling diverse natural elements, or what they could do with it, and they also offered choices. Finally, educators appeared in (4) *physical proximity and support*, such as squatting down to their level or giving them a hand to walk or to be leaned on were frequently observed. Also, most infants mostly gravitated around one of the educators in their exploration of the environment. While these four main themes represented all four educators, each team of educators demonstrated more strength in some of them than others and the four themes transpired differently in the practices of each educators' team. In the following sections, I will detail each theme for each group.

At the Semi-Rural CPE. During the observations, T1 and T2 offered rich *verbal support* to children's exploration and learning. It appeared as a way for them to be *responsive* to children's interests and lead, while also guiding them in their exploration of the nature around them. During their interviews, T2 described their role this way: ‘‘On [les] accompagne dans leur découverte, puis tout’’ (lines T2-269-270); while T1 explained: ‘‘Souvent avec les bébés on

[leur] parle souvent, puis on les anime. Puis on, tu sais, on est là pour eux autres là'' (lines T1-422-424). They mentioned this idea of being a support, "les accompagner" and also the idea of talking with them, "les animer". Based on the observation, it seems to mean *sharing moments* with them and showing them natural elements, while offering a language model and support. Furthermore, T1 expressed the aspect of "being there for them", which also reflects following the children's lead and being responsive when they need it. Here are examples from my observations that support their perception of their role.

The educators were responsive to children's attempts to communicate as they repeated, extended, and rephrased most of children's expressive language, either vocalizations or approximate words or correct words. For example: "BB2-14m points at pinecones in a yard close by and says "'hocottes". T1 "Tu as vu des cocottes". T2 and T1 see them and go pick them up and give one to each child" (Obs. SR-1C, lines 88-90). In this excerpt, T1 was attentive to BB2-14m's approximate saying of the word 'pinecone' and extended her verbalization. Both T1 and T2 used BB2-14m's verbalization as an idea to pick up the pinecones, which can also be an example of them following a child's idea. Next, is another example where T2 extended a child's verbalization and idea by suggesting singing: "BB6-22m comes towards the children piling the wood pieces and exclaims with a smile and pointing at the pile 'Gâteau'. T2 'Ah, vous faites un gâteau? On chante bonne fête?' and starts to sing Happy Birthday" (Obs. SR-2F, lines 377-378).

Furthermore, the educators narrated and described their own actions and the children's actions or situation on many occasions, putting words to what they were experiencing. For example, during the walk in the neighborhood: "T2 squats next to BB7-19m who was still walking next to her. 'Qu'est-ce que tu regardes BB7-19m? Le gazon?' BB7-19m repeats 'zon'" (Obs. SR-1C, lines 134-136). Later on, "T2 'oh regardez le gros écureuil là-bas, il mange la

nourriture des oiseaux'. It was under a bird feeder" (line 139). Finally, one more example: "T2 'On dirait une symphonie aujourd'hui' speaking of all the birds singing" (line 140). In those examples, we can see how T1 and T2 provided *verbal support* that often led to moments of *shared attention*, and also showed their *responsiveness* to children's attempts to communicate.

Moreover, T1 and T2 made suggestions to infants by showing something to them, so *focusing children's attention* on natural elements and community elements. It mostly happened during their walks in the neighborhood, for example looking at a bird: T2: "'Un petit oiseau. Il saute. Il mange sur le gazon' while pointing and showing it to the children" (Obs. SR-1C, line 85); a construction truck (line 57), pointing at a squirrel (line 139), looking for cats (Obs. SR-2A, line 229), or making splashing noises while walking in a puddle (line 201); see photographs 12).

Photographs 12

Walking in a Puddle

As mentioned in the positive atmosphere section, children often played around the educators, or joined when the educators played or supported a peer in their exploration. Educators at the SR-CPE offered (4) *physical proximity* during infants' exploration and on multiple occasions T1 and T2 joined a child's or children's exploration or play and (2) *shared their experiences*. For example, they were observed at the children's picnic table playing with wood pieces (Obs. SR-2F, lines 364-366) or around the spools playing with pinecones (Obs. SR-1D, lines 184). Furthermore, on some occasions, the presence of the educator and their shared

attention seemed to be inviting as more infants joined the educator and other infant(s). This regrouping phenomenon happened mostly in the infant playground while playing with the pinecones at the spools: “Almost all the infants and T1 gathered around the spool” (Obs, SR-1D, line 177); when T2 was playing with an infant piling up wood pieces (Obs. SR-1D, line 160; Obs. SR-2F, line 370); and when T2 joined infants in the puddle in the corner of their playground, jumping and dancing in it (Obs. SR-2E, line 344).

In summary, SR-CPE’s team showed responsiveness to children’s initiatives through verbal responses and cues to create moments of shared attention. They also used children’s ideas and followed their lead by joining their play and narrating their actions. The educators’ vision of their role seemed to be in sync with their observed practices within a child-led pedagogy.

At the Urban CPE. The educators at the urban CPE demonstrated their responsiveness towards children mainly through their (4) *physical proximity* and presence to their group as well as their (2) *shared attention* and experiences with them. Given that they were at the park with no fences, it was interesting to observe how infants were gravitating around either TA or TB. Specifically, TA and TB discussed who would care for the younger and less mobile infants versus who would follow the children who could run in other areas of the park (Obs. U-2A, line 480). Furthermore, they displayed (4) *physical proximity and support* with the ones who needed it multiple times. Indeed, they were often squatting and being at children’s level, and they often offered physical support such as carrying, holding hands, letting children lean on them, walking while holding their hands and encouraging them to walk, specifically with the children who were beginner walkers. Here is an example of proximity and physical support: “TA walks back towards BB9-12m, squats next to him and gently and joyfully says ‘c’est intéressant l’herbe’.

BB9-12m looks at TA, crawls towards her and pull himself up, holding on to her legs" (Obs. U-1B, 425). Here is an example of comforting BB17-14m who struggled on the hill:

> BB17-14m stands up and keeps whining and walks towards TB reaching his arms up to her. She then picks him up in her arms with a big smile. Hugs him gently and then pushes him up in the air smiling and exclaiming a joyful "Aah!!" BB17-14m smiles. (Obs. U-1C, line 460)

The photograph 13, also illustrates an example of TB sitting down at the infants' level for a long period of time with a child still being integrated into the group who needed her presence and support more at that time.

Photograph 13

TB in Proximity with BB11-11m and the Beginner Walkers

TA and TB's way of (2) *focusing infants' attention* was through their suggestions and encouragement when joining their play and exploration. Indeed, multiple (2) *shared moments* were observed such as when TA explored the long grass with BB16-18m, BB13-21m and BB17-14m (Observation U-2B, Lines 518-520). Another example of TA engaging with the environment to encourage children is when TA ran up hills with most of the group (Obs. U-1C, lines 444-446). Meanwhile, TB was encouraging and supporting BB17-14m in his challenge to go up hills (Obs. U-1C, lines 449-454). Both TA and TB were actively engaged in children's

exploration, observing them, playing along side, and supporting them in a complementary way. Educators also offered (3) *verbal support*, even if it was less pronounced than the T1 and T2 team. Yet, TA and TB still seemed to value the importance of language development as they both mentioned it in their interviews as expressed by TB:

> We can observe more stuff together. We can be like, oh look, look, we're looking at the grass. Oh look, we're looking at the small ant passing. You know? Like we can see different things and we can, like go more into it, you know, like more depth about what this is, and giving them more words, you know, instead of just 'doux doux on frappe pas' you know. (lines TB-792-798)

And TA:

> Je vois que je suis comme la guide, l'explorator. Ok ben 'garde ça, c'est une feuille.' Après ça, je trouve que je fais des études, je prends des pamphlets [d'informations] puis comme regarder c'est quoi vraiment le nom de ce qu'on voit : 'Ça c'est du gazon', … 'ça, c'est un insecte', … 'ça c'est une fourmis', 'ça c'est une chenille', tsé je veux dire. Je vais plus loin dans mes mots, hum… dans mon dictionnaire de la nature, mais je trouve que je suis plus comme…hum… comme une exploratrice. Je les laisse explorer. Je trouve que mon côté professionnel, je fais en sorte qu'ils découvrent une, comme la nature. (lines TA-445-456)

In these quotes, both TA and TB gave examples of verbal support and ways they can enhance children's vocabulary and exploration. It also demonstrates TA's perception of her professional role as an 'explorator'.

Finally, the U-CPE team of educators appeared to be responsive through their proximity and physical and emotional support to children and by joining their exploration and enhancing it with encouragement and suggestions and some verbal cues.

In summary, both teams of educators demonstrated their ability to follow children's lead in their explorations while also offering scaffolding by encouraging, suggesting, reformulating, and extending their experiences. The SR-CPE team of educators engaged in more verbal interactions with their group than the U-CPE team. They showed responsiveness mostly verbally and displayed physical proximity when sharing exploration with children by guiding and narrating verbally their common actions and the environment. As for the U-CPE, TA and TB displayed their responsiveness and availability through their physical proximity, support, their shared attention, and shared experiences. Indeed, the U-CPE group had more infants still learning to master walking than at the SR-CPE, therefore, physical support occurred more in their group than at the SR-CPE. They were also more supportive through their actions than verbally as it was the case at the U-CPE. Through their concrete educational practices, we could see how they were applying their vision of infants as active learners and as capable by letting them explore, engaging in moments of shared attention with them, and encouraging them in their autonomous experiences. Therefore, on multiple levels, it was apparent that these two groups followed a child-led pedagogy. In the following section, I will detail educators' personal perspectives about nature-based education: their motivation, their own interest and well-being to engage with that practice, their flexibility and adaptation over time with the approach, their fears, and barriers as well as the solutions and the helpful aspects of their practice.

Educators' Perspectives on Nature-based Education with Infants

The following and last section of the results is about each educator's personal perspectives on nature-based education with infants. What is their motivation towards this practice? How do they feel when they are outdoors with their group? What represents a barrier or which fears do they have in relation to their practice? And what is helpful or appears as a solution in their practice? These are the questions I will answer in the four main themes represented in the Figure 3 below to better understand why and how educators engaged in nature-based education with infants. Indeed, they were willingly engaging in this approach as models although representations of infant room experiences are near to absent in their training and they do not have an external obligation to engage in this practice. Therefore, understanding better their beliefs, motivation, and ways of implementing nature-based education with the younger groups is pertinent.

Figure 3

Themes and Examples of Educators' Perspectives

Motivations - Discovery and adventure - Nature is good for children - Solution-oriented and intrinsic motivation - Well-being at work	"It's so cool to experience something different"
	"Tu sais que tu fais une bonne job … quand tu vois les enfants heureux, puis toi t'es heureux"
	"J'adore être dehors"
	"J'ai pas de stress"
Flexibility and Adaptation - Group needs and dynamic - Seasons, bond, and routines - Infants with different abilities	" il faut que tu t'ajustes de groupe en groupe "
	" Parce que le début de l'année-là, c'est aussi l'attachement "
	" Mais ça nous a pas arrêtés pareil. On a quand même décidé d'aller dans la nature, dans le petit boisé "
Barriers and Fears - Security issues - Unsupportive team members	"La sécurité des enfants ça passe toujours avant"
	"not too much of a barrier, but like, just precautions"
	"C'est comme, je dois me défendre"
	"It's their [colleagues] fears ... we don't have those fears"
Helpful Elements - Dyads, teamwork and director support - Materials, equipment and organization - Relationships with parents	"vraiment aidant c'était d'avoir une partenaire qui est motivée"
	"la clé c'est la préparation puis la planification de tout ton matériel ... pour passer toute la journée dehors"
	"[Les parents] étaient vraiment comme 'oh wow! Vous êtes vraiment allés dehors, vous êtes cool!"

Educators' Motivations

This section addresses the different elements that seemed to motivate and drive educators to implement nature-based education with infants. First, the novelty of the practice seemed to

motivate them with elements of discovery and adventure as they appeared to have personalities that are open to new experiences. Second, the belief that nature is good for children appeared as a strong motivation for their practice. Third, they seemed to have personalities that are solution-oriented, as well as having an intrinsic motivation to go beyond obstacles. Finally, they mentioned feeling better themselves when outdoors, which is also driving them to go outdoors as much as possible.

Discovery and Adventure. All four educators discussed or demonstrated how proud or excited they were about trying a new practice based on the discovery of nature and the outdoors. For them, it appears to be a new adventure, and it is exciting to explore the outdoors. They mentioned how it opens new opportunities for themselves in their practice and for children's exploration and play. It appeared as if the novelty and challenges nature-based education represent is motivating for them. Examples: "J'ai le goût de faire d'autres choses de nouveau à chaque fois" (line TA-788); "C'est agréable parce qu'on faisait pas ça avant. On voit la différence" (line T1-98-99); "Faire changement pour eux autres [les enfants] …. Mais pour nous autres aussi" (lines T1-329-334). It appears to be motivating for the educators as they seemed to have personalities open to new experiences and they are nourished by their experiences. For example, the SR-CPE team were already going outdoors a lot with their group, so it made sense to push further and add the nature lens. T2 explained: "Dans le fond, qu'est-ce qui a changé c'est notre façon de voir … le matériel à apporter aux enfants dehors, les choses à leur faire découvrir …. on apporte plus de choses de la nature" (lines T2-637-650).

Nature is Good for Children. Furthermore, the educators all mentioned or projected the idea that nature-based education is good and necessary for children, even more so, it is better: "going outside is better for them. They need that air, they need that movement. They need to be

free" (lines TB-287-288). The educators seemed convinced about this idea based on their own experiences. Here is an example: "Je pense à long terme, je suis comme 'ok là je fais quelque chose de bien, ils sont biens'" (lines TA-436-437). Perhaps they also based their belief on the knowledge they acquired via training and references in the literature as they discussed participating and learning through different training experiences. On the other hand, this training did not offer much information or models about the realities of working with infants outdoors. Indeed, despite their beliefs, T2 expressed doubt on some occasions: "c'est tu bon pour eux tsé" (line T2-320). She indeed cared a great deal about children's well-being and wanted to make sure to do well by them and appeared to be seeking external validation from experts or references. Overall, they were still mostly convinced that nature and the outdoors were important for children's well-being despite a few doubts.

Solution-Oriented and Intrinsic Motivation. They also appeared to have personalities that are solution-oriented and ready to do hard work to attain their goals and match their beliefs. Specifically, team U-CPE showed great enthusiasm: "Oui je travaille fort, mais au moins eux ils s'amusent à glisser …. je trouve qu'il n'y a aucune raison de ne pas être dehors" (lines TA- 481, 497-498). The U-CPE educators also demonstrated the need to go outside: "We honestly end up going outside somehow" (line TB-533). Team SR-CPE mentioned how they personally enjoy being outdoors: "J'aime ça être dehors moi. …. si on a une attitude positive quand on va dehors, bien les enfants ils vont aimer ça aussi je pense" (lines T1-1051,1058-1059). The educators' motivation seemed to be intrinsic and really appeared to be coming from their own interests and excitement about the practice. It was an intrinsic motivation as they were not necessarily inspired by an existing practice with the infants, or it was not imposed or specifically encouraged by their organization. Indeed, T2 mentioned : "C'est ça l'obstacle que je trouve là, c'est le blocage, on

n’a pas assez de formation ou d’exemples” (lines T2-289-290). She also added : “je me rappelle la première impression. ‘Bon, encore une affaire pour les grands’. Nous, comment on va amener ça parce qu'on veut suivre aussi. Tu sais, on veut s'impliquer” (lines T2-691-694). Meanwhile, TA explained:

> Quand j'allais dans les formations, des colloques … c'était comme ah ben finalement j'apprends, mais des enfants plus vieux, mais il n'y avait pas grand-chose sur la pouponnière. Mais souvent, c'était comme moi qui était comme: ‘moi j’'ai essayé ça. J’ai fait ci.’ Je trouvais que je donnais plus de conseils que j'en recevais. (lines TA-902-908)

Indeed, both the SR-CPE and U-CPE were orienting their pedagogy towards nature-based education, but they are both in the first two years of implementation and did not appear to make it mandatory as TA mentioned “Quand je suis arrivée ici au CPE, c’était en place [l’éducation par la nature] mais pas en place intensément” (lines TA-241-242). Specifically for infant groups, at the U-CPE, the other infant rooms did not implement any nature-based education approach before they were slowly being convinced by TA and TB: “Then we were telling the other side, we're like, ‘Hey, you should really try it. It's really cool.’ So then now they're incorporating it too” (lines TB-101-103). Also, as I will describe below in the barriers, a significant number of their colleagues did not apply the approach to the same extent as TA and TB as the latter received judgmental comments and criticism from their colleagues. As for the SR-CPE, T2 mentioned above that she was the one who raised her hand and wanted to be part of the project as they would not have necessarily included the infant group if they did not want to participate.

Well-being at Work. All four educators mentioned how this practice is good for them too. It makes them feel good, less stressed, and less tired. TB could not even find something stressful when outdoors: “Stressful. I’m not that stressed outside [Laugher]” (line TB-842). They

also mentioned that it takes a lot of organization, and it can sometime be quite a physical workout, but they all seemed to think it is worth it. TA explained:

> C'est quand même beaucoup de préparation avant, qu'on sorte donc, tu sais, je suis fatiguée parce que je prépare les poupons, amener les poupons, les crémer et tout. Et après ça, quand je sors à l'extérieur, je suis comme 'ok là je peux respirer, là'.… J'ai pas de stress, je pense que c'est moins de stress parce que je suis là comme 'ok là Ils vont dépenser leur énergie'. (lines TA-427-435)

The educators also seemed to feel satisfied to know that children are happy and well, they shared the present moment with them, knowing infants can expend their energy, or knowing they are not restricted in their movements but are free. For example, T2 mentioned: "Ben moi je me sens… je suis comme avec eux-autres là. …. Leur faire découvrir des choses, puis voir leur petit visage s'émerveiller quand ils voient des nouvelles choses, ouais, c'est pas mal ça! " (lines T2-249, 257-260).

To summarize theme 1 (motivations), all the educators showed great personal and intrinsic motivation towards nature-base education with infants through some personal interest like enjoying the outdoors, while also displaying an adventurous side that pushed them to be willing to try this new practice. Their motivation also tapped into their belief that this practice is beneficial for children, which encourages them to pursue their goals despite the lack of models to inspire them. It is also a practice that is personally good for them, because they feel less stressed when outdoors with the children. T1's ending quotes from her interview capture it all very well:

> C'est de voir les enfants heureux dehors, c'est ça… tu sais que tu fais une bonne job … quand tu vois les enfants heureux, puis toi t'es heureux dans qu'est-ce que tu fais. Je

> pense que c'est ça qui est le bonbon. Là, tu veux venir travailler. C'est l'fun. (lines T1-1078-1082)

In the next section on the second theme of flexibility and adaptation, I explain how educators take into account infants' reality and their specific needs.

Flexibility and Adaptation

During the interviews, educators' statements reflected the importance of being flexible and showing adaptability in their practices. They discussed how they adapt to each group's needs and dynamic, as they follow the seasons, bond with the children, develop a rhythm of routines, and include infants with different abilities.

Group Needs and Dynamic. The educators mentioned following the pace of their group and the different dynamics over the years. T2 explained:

> C'est des essais-erreurs. Essayer de voir, qu'est-ce qu'ils vont faire avec et si ça marche avec le groupe aussi. Là, il y a des groupes qui sont plus tough, puis avec d'autres qui vont être plus explorateurs, il faut que tu t'ajustes de groupe en groupe. (lines T2-472-475)

Seasons, Bonding, and the Rhythm of Routines. Meanwhile, the educators also follow the rhythm of integrating the infants into the group, their needs over time, and the reality of each season. Indeed, educators discussed the creation of the bond with infants at the beginning of the year (September), while also dealing with routines. Giving infants milk and ensuring nap time are more frequent when infants are younger. T1 mentioned that usually, in the fall, when children join the group, they do not go outside as much: "Parce que le début de l'année-là, c'est aussi l'attachement qu'on… Et tsé, c'est les bébés, on les prend, on les berce, c'est plus… C'est ça, on fait les liens avec eux autres. …. Donner les bouteilles dans les bras'' (lines T1-642-646). T2

also mentioned how they were not going out into nature as much at the beginning of the year because of the time needed to create the bond with the infants (lines T2-1193-1194).

Furthermore, the educators also have to settle into the routine of going outdoors, including dressing the children, and travelling to the destination with the pouponbus. TA commented:

> À l'automne. C'est sûr que c'est plus difficile parce qu'on rentre dans la routine. Donc c'est vraiment comme il faut qu'ils s'habituent à moi, s'habituer au local, après s'habituer dans la cour, puis après ça ça dépend de si j'ai trop d'enfants insécures ou pas, c'est comme, ok est-ce que je peux vraiment aller à l'extérieur [de la cour] ou pas? Mais je l'essai quand même. (lines TA-622-627)

Here again, TA mentioned the importance of creating a bond with each child and establishing routines both with infants integrating into the group while also getting used to going outdoors regularly. Her practice then evolves over the year, taking into consideration the different aspects. Interestingly, TB also discussed the idea of creating a bond with the child but from another angle:

> They know that you trust them because you're letting them go and explore … yeah, going outside shows them that you trust them because you're letting them, you know, instead of restricting them, restricting them, restricting them [with an insistent voice]. (lines TB-449-454)

Furthermore, educators need to follow each child's developmental abilities and be aware of the range of abilities within a group and this in relation to the seasons. For example, some children crawl, and others walk already. These physical abilities will also be impacted by the snowsuits and snow during winter. T1 commented about non-walkers who might want to stay in the sled a

little longer in the winter (line T1-194), or who are asking to be held more (line T1-152). She mentioned that it appears to be more challenging for babies to move in the snow, which TB also mentioned: "for babies it's probably a bit harder because of the suits. The suits are very heavy" (lines TB-553-554). Hence, they will use the sled or shorten the length of their outings.

Regardless of these challenges, T1 shared later that they still spent, on average, an hour outdoors during the winter (line T1-213). Then, it gets easier in the spring and the duration of outdoor time lengthens (line T1-207). Indeed, as discussed by three of the educators, winter can represent a challenge and necessitate adaptation depending on the routines (e.g., heating milk bottles, diaper changes, dressing up) and children's agility to move in the snow. Still, TB described how much fun they had during winter: "we've had some really good time outside" (line TB-555), for example climbing a hill of snow, sledding, going to the park with older kids, mentioning how "adventurous" (578) and "really cool" (565) it was and how it was a challenge for infants (lines TB-555-593). She ended her example with an emphasis on "the kids just hav[ing] so much fun" (line TB-591). So, despite the challenges that winter can present, educators still adapt and find ways to enjoy nature in the cold season such as illustrated in the photographs 2 and 4 shared by T2 in the method section above.

Infants with Different Abilities. TA and TB also discussed going to the park with infants with different abilities:

> Il a le syndrome de CHARGE c'est comme un acronyme de plusieurs trucs donc il y a une déficience intellectuelle. Puis, il ne marche pas non plus, mais il rampe à quatre pattes. Mais avant il ne rampait pas à quatre pattes, il voit d'un œil en plus. Mais ça nous a pas arrêtés pareil. On a quand même décidé d'aller dans la nature, dans le petit boisé. (lines TA-74-80).

TB also explained how they use the “chariot” (line TB-966) to install a special chair to bring children with different abilities to the park. Both TA and TB seemed to be driven by the importance of nature-based education for all children and figured out ways to make it work.

In conclusion to theme 2 (flexibility and adaptation), all four educators shared a variety of ways to adapt to their group’s reality as well as each child’s needs in relation to their environment and the seasons. They shared challenges that required them to be adaptative and flexible, which show how they follow the children’s rhythm and lead. The next section will address their barriers and fears and how they faced them.

Perceived Barriers and Fears

Despite all the positive points they raised about their experiences, implementing a new practice in a new environment that is less controlled like the outdoors, can bring its share of challenges and barriers. Two main barriers were mentioned: Team SR-CPE discussed security issues, while U-CPE team explained how critical judgements from reluctant colleagues was a barrier.

Security Issues. Security was a main focus for T1 and T2: “La sécurité des enfants ça passe toujours avant” (line T1-453). T1 explained how they always inspected the places where they go to make sure they are safe, for example looking for waste, holes, and branches they could trip on (lines T1- 465-467). Choking hazards came up quickly during the interviews. T1 and T2 were the ones who discussed it as a main concern. T1 explained: “Mais c’est sûr que quand on les voit avec quelque chose dans leur bouche, on les enlève” (lines T1-479-480). She then mentioned that they do let them put items in their mouth, but they monitor and often repeat ‘pas dans la bouche’, ‘c’est pour regarder’, ‘dans les mains’ (lines T1-499-500). Despite this fear, during my observation, both T1 and T2 were calm, and I could see those strategies applied. I

mentioned it during the interview to T1: “Justine: C’est ce que j’ai vu, … vous restez calmes aussi, … je pense que ça aide – T1: Oui oui oui, il faut pas s’énerver parce qu’ils … vont ressentir ça les enfants que on est inquiètes” (lines T1-505-517). Therefore, they seemed to be conscious and cautious about that issue, but in their practice, they stayed calm and used different strategies to face it. Furthermore, they mentioned how going to spaces without fences and a clear delimitation can be a challenge because children of that age do not understand physical markers to set a limit on a terrain. T2 specifically expressed that she was scared that the children would scatter in all directions (lines T2-905-924). Overall, T2 explained that despite her willingness to try things out, navigating through this new practice could be stressful for her and that she was scared to “perdre le contrôle! [rire]” (line T2-904). She explained how she was also scared to go too far and not respect children’s limits (line T2-316). She wants to do well by them, which is probably why she mentioned the need for more training and guidance (lines T2-939-940).

On the other hand, TA and TB were not stressed about security issues, but were conscious of the responsibility it required. TB explained how security is “not too much of a barrier, but like, just precautions” (line TB-838). Their main strategy was about observation and being well positioned: “we do need to observe them in case like, yes, we let them be free, but we need to see how far they're going” (lines TB-821-822); “Make sure you're in a good position” (line TB-826). Working as a dyad appeared as a major facilitator, which I will detail more in the next section about helpful elements. TA also did not seem stressed with security and shared that “de toute façon pour moi les bébés ils ne vont pas trop vite là, c’est quand même facile aller les rattraper” (lines TA-315-317). It appeared that TA and TB focused on the benefits of the practice rather than the risks and fears.

As for the choking hazards risk, the U-CPE educators mentioned it, but more as a fear that colleagues shared with them. Both TA and TB were not stressed about that and explained why:

> C'est sûr que je pense que certaines personnes avaient peur que les enfants mangent des trucs dans la terre et tout, mais surprenamment, ils prennent pas trop dans leur bouche les enfants. Je trouve que oui y mettent un peu dans la bouche, mais après ça ils n'aimaient pas ça donc ça recrachait. (lines TA-307-312)

As for TB, she explained that it is part of their learning experience like with food:

> They learn by themselves. …. If I put a [inaudible] in my mouth, 'yaark', disgusting, I'm not gonna do it again. …. We don't always have to like say 'no' for everything. Just let them learn on their own too, you know? …. They're gonna realize, 'ah, this is disgusting. I don't like this', … you know, like even when you give them food, they're gonna tell you what they like and what they don't like. (lines TB-879-895)

During my observation, the U-CPE team had a similar attitude as the SR-CPE team, calm and giving reminders like T1 and T2 explained.

Overall, security issues are definitely part of the experience regarding the space, the limits, and choking hazards. However, it appears to vary depending on each group, the environment and the educators' own fears and concerns, as mentioned by some educators in the interviews (e.g., lines T1-951-955). It also did not seem to stop them, specifically the U-CPE team, while the SR-CPE team might stay in their playground more because of those fears and barriers. Indeed, T2 mentioned that:

> C'est plutôt ça avec les bébés, c'est d'emmener de la nature vers eux plutôt que d'aller découvrir. Parce que dans la nature, là allez découvrir, je suis moins à l'aise parce que y'a

> plus de petits morceaux. Il y a plus de risque d'étouffement. Tandis que quand tu apportes, tu peux gérer dans le fond qu'est-ce que tu leur montres, qu'est-ce qu'ils ont le droit de toucher, puis tout ça là. (lines T2-56-62)

Unsupportive Team Members. The main barrier mentioned by TA and TB from the U-CPE was the reluctance and critical judgments they received from their colleagues. TA mentioned: "mon obstacle c'est les autres collègues de travail. Je trouve que parfois ils ont trop de jugements" (lines TA-465-466). She explained how it impacted her practice: "Parfois ça me donne pas le goût de sortir, mais au moins quand je sors, je les entends plus [rire]" (lines TA-471-472). She understood though that everyone has their own limits, but she wished she would not have to defend herself: "C'est comme, je dois me défendre" (line TA-475). Constant criticism impacts her despite her strong belief in her practice and the chosen pedagogical direction of nature-based education for the whole CPE and the support of the Director. TB mentioned the same aspect and added that she felt like others were putting personal preferences before children's needs: "you see they [colleagues] have their preference based on what they want. We're not necessarily looking at what the kids want" (lines TB-281-283). She mentioned that it is hard to hear such comments from her colleagues when she is doing things well and when it goes positively outdoors (lines TB-315-316). TB wished they would not worry for them: "It's their fears. Their fears they are trying to put on us, but we don't have those fears!" (lines TB-331-332). Fortunately, TA and TB found each other and work well together, which will be detailed in the Helpful Elements section below.

On another level, TA and TB also mentioned teamwork's frustrations with the kitchen, mostly about the schedule. Indeed, TA mentioned "Il faut qu'on revienne à 11h, sinon on se fait chicaner un peu" (lines TA-212-213). TB explained that there is a time restriction because the

workers in the kitchen need to get the dishes back in a timely manner to clean them quickly, but it does not leave a lot of flexibility for the group to go out and adjust when they will come back inside. Furthermore, the educators are discussing the possibility of having lunches to go and eating at the park, which also met some resistance from the kitchen workers, but slowly, they were finding compromises (lines TB-958-964).

In summary to theme 3 (barriers and fears), despite their high motivation, the critical judgments of their U-CPE colleagues appeared to affect them a great deal. They felt like they have to defend themselves most of the time and found little support from colleagues. The Director of the CPE is supporting the implementation of the practice, but the gap between application from one group to another seemed to be an issue. In the last section, the fourth theme of helpful elements will be addressed.

Helpful Elements

Dyad, Teamwork, Support from a Chosen Pedagogical Direction and Director. Both dyads, T1 and T2 as well as TA and TB, strongly agreed about the importance of their daily collaboration. Indeed, they felt like they were complementary, both motivated, and sharing the same interest in nature-based education practice. T2 explained that their complementarity was precious: “y’a comme un équilibre, moi qui veut, et woops, elle a dit ‘woh’ elle me fait réfléchir [rire]” (lines T2-889-890). Meanwhile, TA and TB seemed to have become a good team. TA was waiting for a partner as motivated as her: “vraiment, vraiment aidant c’était d'avoir une partenaire qui est motivée … qui n'avait pas peur, vraiment. C'est vraiment ma partenaire qui était, comme willing avec moi ‘Ouais, ça, ça l’air fun’. Et puis autant d'énergie” (lines TA-794-797). TB described the moment they decided to have lunch outside for the first time: “So immediately we're outside. We look at each other, we're like, [whispered]: ‘let's do it’. I'm like,

‘yeah, let's do it’” (lines TB-144-145). These excerpts demonstrate their shared excitement about their collaboration, their enthusiasm and compatibility. In both teams, I did observe this important teamwork that was at play both in the organization, that will be described more below, and their shared energy during the outdoor experiences.

In the SR-CPE, they also benefited from organizational support from the Director and the pedagogical direction of nature-based education chosen for the CPE. They work with a collaborative and motivated pedagogical counsellor (lines T2-799-801) and created a committee for implementing nature-based education in which T2 takes part. From that teamwork and organizational support, they used common tools such as a risk assessment chart to help differentiate risks from danger. Furthermore, they benefit from discussions and support to question their fears, their needs, and reflect about nature-based education practices (lines T2-341-357). They also shared their playgrounds or provided materials such as cutting wood pieces for everyone. Helping each other and working together seemed to be present and valued at the SR-CPE (lines T1- 744-769) contrary to the U-CPE. The latter also implemented nature-based education in the full CPE, and received support from the Director, but the chosen pedagogical direction did not seem to help them to the same level as the SR-CPE team described.

Overall, the daily dyadic teamwork appeared as crucial to their practice. Meanwhile the chosen pedagogical direction and whole team support is helpful to the SR-CPE but limited at the U-CPE.

Materials, Equipment, and Organization. The educators all mentioned the aspect of organization as important to enjoy their experiences when they are outdoors. The feeling of knowing they have everything they need once outdoors seemed to help:

> On amène toute. Moi le matin quand j'arrive là, je prépare toute toute toute mon matériel pour la journée. C'est plus que j'arrive plus de bonne heure, puis je planifie. Tu sais pour pas arriver ah il me manque ça, ah il me manque ça … je trouve que la clé là c'est la préparation puis la planification de tout ton matériel que tu as besoin pour passer toute la journée dehors. (lines T2-555-572)

However, all the educators mentioned that creating the list of what they need did not happen overnight. Indeed, they mentioned trial and error, and that it was not perfect the first time they went outdoors:

> C'est juste comme beaucoup de préparation. …. C'est des essai-erreur, mais après ça je trouve qu'on apprend plus de fois qu'on essaye d'y aller à l'extérieur. C'est là qu'on apprend, c'est là que je suis comme 'ok il faut que j'amène les bouteilles d'eau parce que les enfants ont soifs'. Avant on n'amenait pas les bouteilles d'eau, on n'avait pas les lingettes, on n'avait pas de kleenex. Comme là, mon pouponsbus est rempli de kleenex, rempli de gants, … ça a pris plusieurs fois de faire comme ok faut que j'amène tout ça. (lines TA-644-680)

Then, the educators mentioned different materials and equipment that are useful for them. First, the waterproof suits provided by the CPE for each child were a must for both groups. They saw waterproof suits as helpful as the group can be independent and go outdoors in every weather condition knowing that all the children can keep dry (e.g., lines T2-748-749). Also, TA and TB mentioned the diaper change table installed outdoors just installed in their playground. It is quite useful when coming back from the park and preparing to eat outdoors as it allows for smooth transition (lines TB-938-939). TB also mentioned their wagon: "We have our chariot …. I love that …. you put like pretty much anything inside" (lines TB-966-971). At the SR-CPE, T1

and T2 also mentioned different elements they bought for the CPE: ice grips for shoes and boots for the educators, tools for older groups, and wagons (lines T2-767-788). The budget can sometimes be a barrier (lines TA-550-553), so they are slowly equipping themselves over time. As for the pouponsbus, it was stated often in their anecdotes and stories about their practice and it seemed practical, yet they also mentioned how it can be quite heavy, and hard to manage during the winter, on the grass (lines TA-602-603, 543-544), or on slopes (lines T1-983-984): "It's a big workout, but if you're willing to do it, why not?" (line TB-586).

Relationship with Parents. This last aspect was mostly mentioned by TA, and a little by TB. TA explained how important it was to discuss her approach with parents: "Dans l'intégration aussi, il faut vraiment que j'explique aux parents que je vais vraiment à l'extérieur avec les bébés. On va jouer dans le sable, dans la boue, puis, ça se peut qu'ils reviennent sales" (lines TA-643-646). She commented on how she also shared photographs with parents to show them what it looks like. She said they were happy and even impressed by their practice:

> Les parents étaient contents. Je pense qu'à chaque fois qu'on a envoyé des photos à l'extérieur avec un beau background de verdure, pis tout, ils étaient vraiment comme 'oh wow! Vous êtes vraiment allés dehors, vous êtes cool pis tout'. Je ne sais pas, ils sont même jaloux qu'on mange dehors, qu'on fait dodo dehors. Certains parents m'ont dit ça. (lines TA-654-659)

Both TA and TB mentioned how parents are happy about their practice and impressed by their organisation. TA also explained how important it is for her to go outdoors with infants, since in her opinion, most parents would not necessarily go outdoors with their infants very much (lines TA-143-145). Overall, the relationship between the educators and the parents seemed beneficial and supportive of their nature-based education practice.

Conclusion of the Educators' Perspectives. This last section of the results was about each educator's personal perspectives on nature-based education with infants. Their strong and intrinsic motivation drove them to engage in nature-based education despite the non-mandatory aspect of it. Furthermore, they also realized that they benefited themselves from being outdoors with their groups and trial and error helped them adapt and organize their practice following their group and children's needs and pace. While security and reluctant colleagues appeared as some potential barriers, they were resourceful enough to move on into providing nature-based experiences for the children. They relied on the complementarity and compatibility of their team member, their organization skills around materials and their motivation and beliefs. Overall, the educators are willingly to engage in this approach despite the absence of models and representations of infant experiences in nature-based education during their own training. Thus, they developed their own approach and tailored their practice around their group, their strengths, and their needs.

Discussion

The present study addresses infants' and their educators' experiences in a nature-based educational context. Broadly, I explored how early in life children can be exposed to and partake in nature-based experiences in an educational setting, and what does it look like? Specifically, my research questions were: (1) What are infants' experiences in a nature-based context? (2) What are educators' practices in a nature-based education context with infants? (3) What are the educators' perspectives on nature-based play with infants in a daycare setting? The goal was to document, via observations, photographs, and educators' point of view, both educators' practices and infants' (younger than 18 months old) experiences.

How Early in Life Children Can Be Exposed to and Partake in Nature-Based Experiences?

The two infant room case studies demonstrated that infant groups and their educators can integrate outdoor nature-based education daily into their program. My findings are in line with Vander Donk's (2023) case study with infants and toddlers in an immersive nature play program in Australia. They concluded that it is possible to integrate this practice with the younger children "when educators are brave enough to take risks and experiment with alternative pedagogical approaches" (p.459). The four educators in the present study displayed personalities that were motivated by exploration, a willingness to try new things, and a solution-oriented approach, which echo this idea of bravery and taking professional risks to try something new, something different. Indeed, with the rare representation of models and guidelines for their age group (Davis et al., 2015), educators are left with the challenge of building knowledge and practices on their own (Kemp & Josephidou, 2023). The educators mentioned the need for more representation of infants in curriculum, training, and guidelines, which is in line with the literature about the invisibility of infants in curricula and nature-based guidelines.

Furthermore, my two case studies indicated that the implemented nature-based practices can vary depending on different aspects of each group such as: the different kind of spaces educators can access, their teamwork, their materials and equipment, and their motivation to do it. Their practice will also evolve over a year based on changes within the seasons, the group dynamic, the children's mobility and abilities, and the bond and trust relationship between infants and the educators (Da Costa et al., 2021; Dendarie, 2022). Therefore, how early in life can children be exposed in a nature-based educational setting will depend on those factors. The educators did mention that with younger children who do not walk yet, it can be difficult in the winter, for example, and therefore they will adjust the length of their outings. Yet, the educators added that it is still achievable and fun during the winter too. Flexibility and adaptation from the

educators and the settings were crucial to the implementation of this approach to find new ways to do things and proactively address challenges (Kemp & Josephidou, 2023).

What do These Experiences Look Like?

On top of being possible and achievable in various ways, through my observations as well as the educators' reports, multiple benefits were evident for children's whole development. Indeed, the evidence is still sparse about the benefits of nature-based play for infants, yet my findings add to other studies pointing at developmental benefits (e.g., Da Costa et al., 2021; Jørgensen, 2018; Monti et al., 2019; Veselack et al., 2015). Faber Taylor and Kuo (2006) discussed benefits and learning opportunities outdoors for children 3 to 12 years old. They advanced the idea that nature probably offers benefits to all populations given the vast research findings on different populations in different contexts demonstrating positive impacts of contact with nature. Therefore, not only is it possible, but nature-based education in the two infant groups I observed offered rich experiences for infants and educators. One of my key findings was how nature-based education facilitated all of the children's developmental domains: social, motor, cognitive, and language, in integrated ways. As Monti et al. (2019) and Veselack et al. (2015) pointed out, outdoor nature-based play is beneficial for children's whole development in an interrelation and intersection of all the developmental domains in each experience.

When discussing infants in contact with natural elements, sensory experiences are often centered and prioritized (e.g., Hall et al., 2014; Jørgensen, 2018; Veselack et al., 2015). Indeed, natural spaces offer rich sensory experiences and we easily associate these concepts: infants-nature-sensory experiences, which makes sense considering the central role of perceptual and sensory development for infants (Johnson & Hannon, 2015; Piaget & Inhelder, 1966). As I focused on sensory experiences during my observations, I also realised that infants' experiences

with natural elements go beyond only sensory experiences. When infants observed, touched, felt and tasted for example, they were also intrigued, curious and pushed into decision-making about what to do next. How to manipulate such element? Do I join this other child in their exploration? I would speculate that sensory experience, beside the quality of the experience itself, is an entry point to infants' exploration and it drives them to activate all aspects of their development at once: gross motor in their posture, their movement, then fine motor in their manipulation, followed by language opportunities trying to label what they touch or hear as the educator narrates their actions, while exploring in parallel play with another child. Therefore, the present study provides evidence on how nature-based experiences are rich and beneficial for infants' integrated development. Moreover, the educators mentioned observing the emergence of infants' imagination as reported in the literature (Änggård, 2010; Canning, 2013; Faber Taylor & Kuo, 2006; Jørgensen, 2018; Veselack et al., 2017; Wojciehowki & Ernst, 2018). This was enhanced by the possibilities of nature offering multiple loose parts such as pinecones, twigs and branches, wood pieces and rocks. The natural environment is likely offering rich affordances to infants (Gibson, 1979/2015) as I will discuss further in the environment section below.

Another key finding from the two case studies and in line with the literature is that in outdoors natural settings children and educators share a calm and joyful atmosphere (Bento & Dias, 2017). As Kuo et al. (2019) and Veselack et al. (2017) also demonstrated, conflict amongst children almost disappears when outdoors as it was apparent in my observations too. The lack of conflict was even more evident when it was an open space off-site from the daycare, which offered a wider space compared to the playground. Bento and Dias (2017) explained that in open outdoor spaces, children can choose to interact or not with others and have more space for their exploration, which diminish the constraints and the obstacles of a more confined space such as a

playground. Children, as mentioned by educators and as observed, were engaged, curious and interested, which also facilitated them to focus and be calm (Dendarie et al., 2022). Educators in my study mentioned those elements, specifically in the U-CPE where they pointed out that the park, a wider open-space offered more freedom to children, therefore conflicts occurred even less frequently than in the playground where I observed at the SR-CPE daycare. Furthermore, the outdoors with loose-parts and hands-on experiences seems to enhance the focus and attention infants displayed during my observations (Bento & Dias, 2017; Dendarie et al., 2022; Jørgensen, 2018; Ulset et al., 2017; Veselack et al., 2015). Thus, my findings are in line with the literature and also provide further evidence that nature-based experiences facilitate infants' and educators' well-being, support infants' holistic and integrated development. In the following section, I will discuss my findings in the light of preexisting nature-based education principles.

The Eight Principles for Infants' Context

Outdoor and nature-based education reference guidelines and curricula are more detailed for older children and mostly excluding infants (Dalli & White, 2017; Davis et al., 2015; Kemp & Josephidou, 2021). My findings can provide a better understanding and a more detailed version of guidelines for outdoor nature-based play applied to infant groups. The two CPEs' educators' practices I observed were trained and informed by the *Reference Guide: Nature-based early childhood education* (Leboeuf & Pronovost, 2020/2023), along with other relevant information. The reference guide is not different from other guides and curricula that only include some information and a few examples about infants. Therefore, here is my contribution to each of the eight principles based on the two case studies.

First Principle: Time

The first principle is “A different approach to time: Slowly, often, regularly, for long periods, at all times” (Leboeuf & Pronovost, 2020/2023, p. 48). In the two infant groups observed, the approach of time seemed to follow the infants’ pace. Indeed, they were not rushed and children had time to explore, rest, observe, and engage in play and with others. Moreover, the two teams of educators implemented a regular schedule of outings. However, a crucial aspect to this age group would be the slow evolution of their practice over a year with a same group. Indeed, based on the integration of infants, the group dynamic, the routines and the weather, they slowly integrated practices of nature-based education. They mentioned going less outdoors in the fall considering the new relationship between infants and educators. Then increasing the regularity of outings during the winter while always adjusting with the weather and comfort of children as well as considering their mobility. Finally, the spring appears to be the season where most children gain more mobility crawling, cruising or walking, more comfort with being outdoors and a deeper trusting relationship with the educators allowing for longer periods outdoors. The educators even integrated routines outdoors such as eating lunch and napping. Da Costa et al. (2021) discussed “a temporal logic” (p. 50) to introduce the youngest infants to the outdoors and its wide spaces and nature describing a similar progress in time to gradually following infants' rhythm and abilities over a year. The present study did not focus on care moments and routines such as diaper changes, meals and nap time, yet routines take more time in infants’ day than in older children’s (Kleppe, 2018) and are important in the development of the infant-educator bond. Future research could focus on how routine aspects can be integrated into a nature-based education approach with infants. For example, some daycares already have permanent facilities to have nap time outside like the CPE Au Coeur Enfantin explain in a video (Emmanuelle Roy, 2023) while the educators in the present study were setting up temporary nap time space and

lunch space in their playground. According to one educator, in that way, routines did not take as much time away from being outdoors and it also facilitated the transition from an activity to another because it all happened in the same space. It would be interesting to explore that context in more depth.

Second Principle: Environment

The second principle is: "An environment rich in biodiversity, loose parts, and open-ended materials: Fertile ground for exploring, learning, and putting down roots" (Leboeuf & Pronovost, 2020/2023, p. 60). For the two infant groups, the natural elements were key in children's exploration. Indeed, the observations demonstrated that natural elements and outdoor environments can offer rich affordances to the youngest children. Affordances are the interrelation between an environment and the perceived interest or use from an actor such as an infant (Gibson, 1979/2015). Infants demonstrated curiosity, interest, and focused their attention and exploration on different elements in the natural environment such as pinecones, rocks and long grasses. Furthermore, topographic variability appeared as appealing and rich for children's motor development, which tend to be absent in regular playgrounds for infants (Bento & Costa, 2022). On the other hand, in both groups the biodiversity was still quite poor. An urban park is rarely rich in biodiversity as it is being maintained and the infant playground at the SR-CPE was not naturalized. Yet, the educators provided natural materials and loose parts, which were crucial to children's experiences. For future research, it would be interesting to observe the affordances and experiences of infants in a richer and wilder natural environment even if access to those environments is still a challenge for most daycares (Ernst, 2014b; Josephidou & Kemp, 2022; Maynard & Waters, 2007). On the other hand, it also indicates that infant educators can still integrate some nature-based education practices into their environment with minimal materials

and use what is accessible to them (a park, materials, etc.). The latter were indeed offering rich experiences to infants associated with quality interactions and a child-led pedagogy.

Third Principle: Emergent Curriculum

The third principle is "Emergent curriculum centred on exploration and play: Recognizing children as competent and holistic" (Leboeuf & Pronovost, 2020/2023, p. 81). My findings provide evidence for the central role this principle plays for the educators in infant rooms. Indeed, in order to consider nature-based education for this age group, adults need to assume a vision of the infant as an active agent, capable, competent, and holistic rather than just as "having needs" (Cheeseman, 2017, p. 64). Furthermore, engaging change in one's practice with infants and actualising the vision of them as capable, educators need self-confidence but have limited support from training and references. Indeed, Kemp and Josephidou (2023) and Vander Donk (2023) discussed the confidence needed to implement and even create knowledge from innovative practices deviating from mainstream narratives about (over)protecting infants. The four educators in the present study committed to this vision of infants as capable in the way they talked about infants in the interviews and also the ways they interacted and offered support during the observations. They displayed confidence in their practice during the observations despite sharing in the interviews that they were confronted either by colleagues' fears or their need to reassure themselves that they were doing right by the infants in this new practice.

Additionally, the educators were engaged in a child-lead pedagogy, which corresponds to the principle of emergent curriculum where children's free play and exploration are the center of the experiences. Studies report that the type of pedagogy used influenced the benefits and type of experiences children will have in natural settings (Canning, 2013; Jørgensen, 2018; Meyer et al.,

2017; Veselack et al., 2015; Yildirim & Özyilmaz, 2017). Indeed, hands-on opportunities led by children will enhance their experiences (Kiviranta, 2024), as was evident in the observations.

Fourth Principle: Interactions

The fourth principle is "High-quality educational interactions: Enhancing children's experience" (Leboeuf & Pronovost, 2020/2023, p. 99). The educators' interactions with infants were essential in infants' experiences. Indeed, the educators displayed diverse high-quality interactions such as being responsive, sharing attention, supporting language, and offering physical proximity and support. Moreover, the educators demonstrated some reflexive thinking on their role as educators in this context in their interviews. The educators perceived the outdoors and natural materials as a rich learning setting for infants rather than just a time for recess and to let go of steam as studies showed that educators with less than a year or no experience in nature-based education held such beliefs (Hunter et al., 2019; Maynard & Waters, 2007; McClintic & Petty, 2015). However, during the interviews, there was still a focus on how outdoor settings can expand infants' energy, but it appears to be related to the fact that infants have more freedom to move as they need and will do so in their exploration.

Furthermore, a key aspect with an infant group is the relation of trust that needs to be established between the child and the educator, and all educators highly valued it. They mentioned that the beginning of the year was dedicated to creating that relationship, therefore they would not go outdoors or into the natural settings as much as later in the year. One educator did mention that going outdoors and letting them explore is also a way of saying 'I trust you' and building that bond. In other studies (Da Costa et al. 2021; Dendarie et al., 2022), the authors also mentioned that at first, the groups do not go out in the wilder outdoor spaces as much either. The development of the significant educator-child relationship and creating a secure base with

educators would be an interesting topic to explore more in depth in future research and to incorporate in this principle: How can it be done in outdoor natural spaces?

Fifth Principle: Parents

The fifth principle is “A close partnership with parents: Acknowledging, discussing, sharing power, valuing diversity, networking” (Leboeuf & Pronovost, 2020/2023, p. 117). This principle was not discussed much by the educators, nor did I observe the specific involvement of parents. Yet, educators reported it was a positive relationship that was helpful and encouraging for them as parents were impressed and happy that their child got to engage in such experiences. Dendarie et al. (2022), Da Costa et al. (2021), and Bento and Dias (2017) mentioned how the partnership with parents is key in the development of their practice over time. It appeared as a way to broaden the horizon of the group to invite parents for the first outings in the wilder environment, beyond the adjacent playground. Also, parents' presence at the outings allowed the latter to adjust to this approach and be on board with the practice. Furthermore, if educators want to go beyond the protection narrative and contribute to enhancing the narrative about infants as capable, a strong partnership with parents can be a key aspect (Kemp & Josephidou, 2023) and would need more attention in future research. Specifically knowing that for some parents, it can be their first experience with a daycare and also a nature-based program so adjusting to that may take time and support from the educators.

Sixth Principle: Community

The sixth principle is “Close collaboration with the community: Placing nature-based education at the heart of a community project” (Leboeuf & Pronovost, 2020/2023, p. 129). This principle may be the least represented in my findings. Educators did not specifically discuss this topic. Relations with community members might be a responsibility that directors and

pedagogical leaders deal with rather than educators themselves, which was not on of my research questions. It would be an interesting angle for future research. On the other hand, in both CPEs, they went on outings in their neighbourhoods, such as at the park or taking a walk in the streets. The neighbourhood is part of their immediate community. Circling back to Bronfenbrenner's (1979) ecological theory, the neighbourhood is in the second level of children's important environments. Therefore, the educators are contributing to children's active integration and participation in their neighborhood by bringing them into it, getting to know this environment and acknowledging that infants have their place in community spaces. Furthermore, going outdoors beyond the infant playground also takes infants out of their protected bubble and brings them into the real world, allowing hands-on experiences, and opportunities to see older children, siblings, family and community members (Bento & Dias, 2017; Da Costa et al., 2021). Da Costa et al. (2021) and Kemp and Josephidou (2023) mentioned the importance of including children in their community instead of keeping them in an isolated, antiseptic and adult-centric rooms; they strongly advocated allowing for the inclusion of infants in their community and in the real world.

Seventh Principle: Risk-taking

The seventh principle is "A balanced approach to risk and safety: Enhancing the role of appropriate risk-taking" (Leboeuf & Pronovost, 2020/2023, p. 138). Risk-taking in the lens of infants' development and abilities needs more attention from researchers (Kleppe et al., 2017). Despite having an intentional focus during my observations, I observed almost no risk-taking exploration or play and only possible mild examples. I stayed with the reflection of what would risk-taking look like for infants. Indeed, infants' mobility evolves at a lightning speed during the two first years. A child learning to crawl, cruise or walk will fall a lot within a day (Adolph &

Robinson, 2015), which can already look ‘risky’ for them. Everything is new and things that might not be a challenge for a 3- to 5-year-old, might be for an infant. Beside the classic categories defining risk-taking such as speed, heights, elements, and tools (Sandseter, 2009), would there be others specifically focused on younger children? And if not, how well the classic categories can be applied to infants who are not yet able to recognize danger and risk and understand self-protection to the same extend as older children? Also, as a security concern, choking hazards were mentioned by the educators. Putting things in their mouth seem to be a risk in the educators’ vision, but is it really a risk for infants or a security issue for educators? I think there is much room for further research on risk-taking for infants as Kleppe et al. (2017) mentioned as well.

Eighth Principle: Nature Connectedness

The eighth principle is “Fostering nature connectedness: Encouraging a rewarding relationship with nature” (Leboeuf & Pronovost, 2020/2023, p. 159). This principle was mentioned only once by an educator when discussing the sense of wonder she liked to share with children. I think that the idea of discovery and learning about the outdoor environment mentioned multiple times by the four educators is related to this eighth principle. Indeed, in the chapter on this principle, the first steps towards nature connectedness and sustainability engagement is “wonder and curiosity” before supporting knowledge, concrete action, or responsibilities towards sustainability (p.162). The idea is to create this comfort and relationship, and from my observation and educators' interest, to bring infants into nature and introduce them to it, I argue that they are applying this principle. Overall, it might need more intentional reflection and action from the educators, but when focusing on infants' sensory experiences this

idea of wonder and curiosity is definitely present (Hall et al., 2014; Jørgensen, 2018; Kemp & Josephidou, 2021; Kleppe, 2018; Veselack et al., 2015).

In conclusion of the eight principles section, the evidence indicates that nature-based curricula should integrate more examples and guidelines directly addressing and including infants. Information about the pace of introduction of nature to infants might be an interesting addition while also discussing the ways and rhythm of the development of a trust relationship between child and educator in this approach. Furthermore, it is crucial to make infants visible when discussing the vision of a capable and holistic child, so educators do not have to guess if it includes infants or not. Infants can take part in their community and it can become part of their social and cultural environment so as to highlight different narratives than protective ones. Practical aspects specific to infants' reality around travelling with infants to a setting, routines and organizational pointers could be added too. Future research could expand on risk-taking for younger children, as well as the relationship with parents in this nature-based approach and on routines and seasonal specificities.

Educators' Perspectives

All four educators shared a strong intrinsic motivation towards implementing nature-based education. The opportunities this approach offers both for them and the children seemed to drive the educators towards discovery and adventure. They are also convinced by the benefits that nature and the outdoors represent for children and for themselves. These findings are in line with research about experienced educators with nature-based practices recognizing benefits of the outdoors for children (Bal & Kaya, 2020; Blanchet-Cohen & Elliot, 2011; Hall et al., 2014; Norðdahl & Jóhannesson, 2016; Strachan et al., 2017; Veselack et al., 2015). Still, fears around security issues such as choking hazards and open spaces were mentioned as barriers by the SR-

CPE team, which are also reported in other studies about educators of infants (Josephidou & Kemp, 2022). On the other hand, the U-CPE educators were not stressed about security issues, but rather felt unsupported by the critical judgments from colleagues and the feeling of having to defend themselves. Support from the team appeared as a helpful, perhaps needed, aspect, that was present at the SR-CPE for educators to discuss their practice and collaborate in the playgrounds. Both U-CPE and SR-CPE educators highly relied on and benefited from the strong teamwork within their daily dyads. It appeared as essential for their motivation, their organization and to ensure security during the outings. Teamwork is indeed one of the key elements reported by researchers studying nature-based education (Bento & Dias, 2017; Blanchet-Cohen & Elliot, 2011; Strachan et al., 2017; Vander Donk 2023). Yet, as my findings revealed, unsupportive colleagues can also hinder the application of a practice through their critical judgements. Furthermore, organization was key for all of the educators to feel ready with all the needed material and equipment when outdoors including proper clothing in regards of the weather (Da Costa et al., 2021). Overall, nature-based education with infant groups relies greatly on the educators' motivation to engaged in a new practice considering they are creating the pedagogy as they go (Kemp & Josephidou, 2023; Vander Donk, 2023). Thus, teamwork, training, their vision of infants and organizational systems are of utmost importance to support educators' motivation, and educators' self-confidence to overcome cultural, organizational, and pedagogical barriers they may encounter (Blanchet-Cohen & Elliot, 2011; Ernst, 2014b; Kemp & Josephidou, 2023; Vander Donk, 2023).

Limitations and Future Research

As for limitations, given my case study research design, the experiences discussed are specific to their context. It can inspire but are not intended to be generalizable. Also, the small

sample size cannot allow for statistical analyses even though it was not my purpose. The age range did not include many infants below 11 months of age, which should be addressed in future research. In future research it would be pertinent to have a comparison group who does not use natural settings. A valid observation tool to measure children's development over time would also allow more comparisons between different contexts such as an indoor room, a playground, a park, and a wilder off-site natural space. However, most of the existing tools have not been validated in outdoor natural contexts with infants. This explains why I chose an open and descriptive running record rather than a developmental scale or tool to capture the children's and educators' behaviors and language. There is a need for further research on infants in educational and outdoor settings. For example, it would be beneficial to observe groups in a longitudinal study that would include multiple observations over the different seasons. As the educators mentioned, each season offers different opportunities and demands specific organization while infants development evolves quickly and it would be interesting to capture these different situations.

Finally, focusing on only exploration and play experiences excludes a very important part of their reality of caring for infants, which are routines and care moments. Future research should include more of the daily schedule and beware of not dichotomising play and care because both are important to establish a significant relationship with the infants. Indeed, the present study does not intend to push for exploration and play in nature to the detriment of personalized care following each child's rhythm. My evidence provides insights to rethinking the environments offered to infants and invites us to include infants in the outdoor and social world at their pace. It also points to a vision of infants as able to engage with outdoor natural settings while still being supported by responsive educators and individualized and warm routines and care. Moreover, the

two centers were only two years into their implementation process of the approach, yet the experiences observed and reported were already rich and promising.

Recommendations

In the light of my evidence, I would recommend writers and decision and policy makers of curricula and outdoor play guidelines to actively include infants and nature in their documents using a vision of infants as capable and active learners. This can be achieved by:

- Including examples of infants manipulating, observing, and interacting together in natural spaces with natural materials and loose parts;
- Mentioning sensory experiences as a central experience and as an entry point for infants' whole development;
- Including people with diminished mobility, such as infants, in the outdoor spaces' narratives;
- Rethinking the architecture and design of outdoors spaces to be inclusive of infants;
- Offering free-flow indoor and outdoor spaces for infants to support a gradual exploration of the outdoor environment (Bento & Dias, 2017; Da Costa et al., 2021; Josephidou & Kemp, 2022);
- Adding more topographic variation, textures, objects children can carry with them and try to display different holes and openings;

As for educators, I would recommend:

- Finding allies in your team, your daycare, and your community for creating a nature-based program;

- Trusting infants in their exploration and let them show you what they are interested in, follow their lead.
- Integrating the practice at your own pace. It can be done anytime in a career, as the SR-CPE educators have implemented it later on in their career, while U-CPE educators did so in their first years.

Finally, I join my voice to the educators in my studies and recommend to other educators with infants to "just try it" "go outdoors", see what is out there for your group, for you, in your neighborhood, in your ecosystem.

Conclusion

This unique study about infants and their educators in an outdoor nature-based context contributes to the literature by making infants visible in their community and in the outdoor spaces. The current study presents a vision of infants as active learners, as capable, and as interested and curious about natural elements and outdoor spaces. The two case studies also demonstrated that it is possible to bring a group of infants into outdoor spaces on a regular basis and to interact with nature. While this nature-based approach is flexible and evolves over time, it offers rich experiences to infants and facilitates their whole integrated development. It also offers calm and joyful experiences to both infants and their educators. Infant educators are the ones offering those rich opportunities and experiences through all the quality interactions, organization, flexibility, and energy they are putting in to make those outings happen despite a lack of a practical model and representation in the literature. Therefore, educators need more support from training, curricula, guidelines, legislation, pedagogical consultants, and directors to strengthen their self-confidence and encourage them to try this approach with infants and contribute to making infants visible in the ECE narratives and literature.

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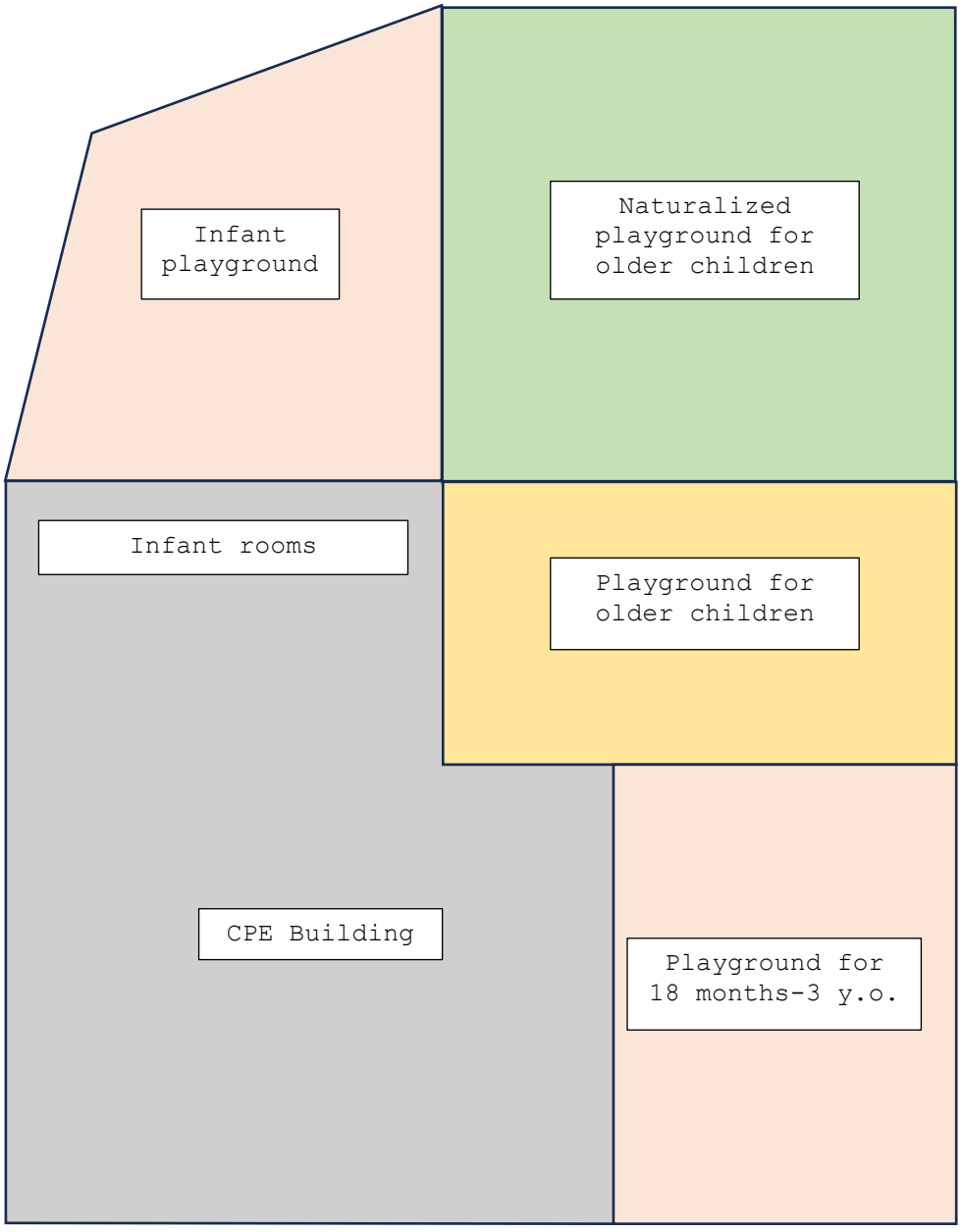
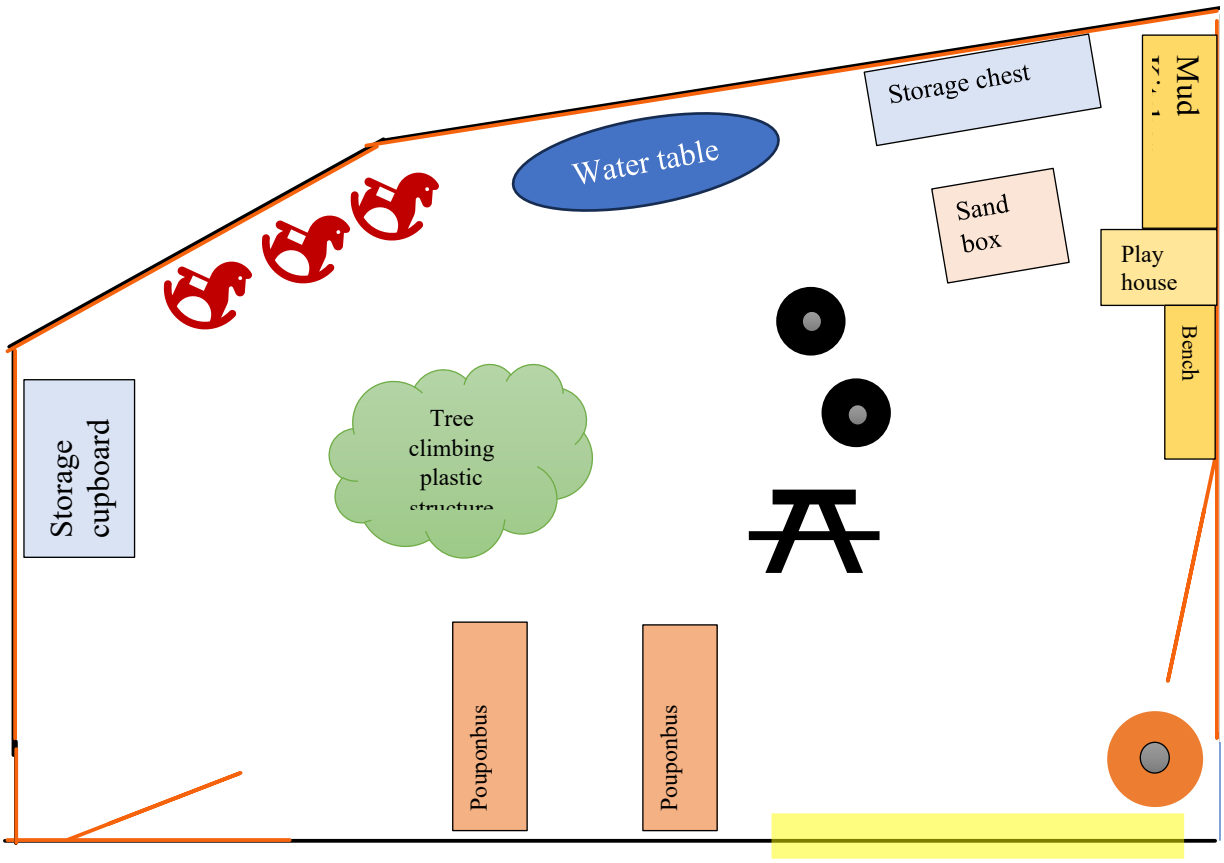
Appendix A

Map of the Semi-Rural CPE's Four Playgrounds



Appendix B

Map of the Semi-Rural CPE Infant Playground



The round pieces are the construction spool, the two black ones are made of plastic and the orange one is made of wood.

Appendix C

Natural Elements and Loose Parts Used by Children During Observations

Observed	SR-CPE- codes	Examples	U-CPE-codes	Examples
water table	0			
water	4, 226, 363, 571	in a spray bottle, at the bottom of a rocking toy (rain water)	X	Rain
flowers	177, 305	on the walk	913	Dandelion
pinecones	3, 491			
pine branches and twigs with needles	210, 317			
pine needles	467			
twigs and branches			776, 926b	
recycled plastic construction spool	41,57,222	222: used as a table		
round wood pieces (in numbers)	42,57, 223, 598			
Bark peeling off a piece	603			
Birds	101, 126, 205	crows, blackbird,	1071, 1115	
cats	350			
squirrel	202			
ants			1304, 1317	
Puddles	143, 189, 286, 300, 582			
Trees			760, 771, 1050	
Grass			792, 1052, 1303	
long grass			1050, 1157, 1203	
Fluffy part of grass			1208	
Rock			793	
Complementary material (non-natural)	225, 226, 389, 492, 557, 598	animal figurines, spray bottle, cooking spoon. Plastic bottle,	772	manhole

		bucket, milk crate		
hills/steep			949, 995	
Rain intensifying/active rain			961, 986	
gravel path			984, 1302, 1312	
dead leaves			1177	
construction truck/garbage truck	80, 397, 469			
People's car slowing down at our level/greeting us	119, 311, 312, 320, 321			
Soccer field			1043	running on it
picnic table at the park			1256	

Appendix D

Map of the Urban Park

Observation 1

Observation 2

Appendix E

Extended List of the 20 Infants During the Observations

List of the 20 Infants During the Observations

Obs 1	Obs 2	Pseudonym	Age when observed (in months)	SAAB
		Semi-Rural CPE		
18/04/2023	25/04/2023	BB1-14m	14	M
18/04/2023	25/04/2023	BB2-14m	14	M
18/04/2023	Absent	Not obs.	15	F
18/04/2023	25/04/2023	BB3-17m	17	M
18/04/2023	Absent	BB4-12m	12	F
18/04/2023	25/04/2023	BB5-19m	19	F
18/04/2023	25/04/2023	BB6-22m	22	F
18/04/2023	25/04/2023	BB7-19m	19	F
18/04/2023	25/04/2023	BB8-16m	16	M
Absent	25/04/2023	Not obs.	21	M
		Urban CPE		
24/05/2023	26/05/2023	BB9-12m	12	M
absent	26/05/2023	BB10-25	25	M
24/05/2023	26/05/2023	BB11-11m	11	F
24/05/2023	26/05/2023	BB12-33m	33	M
24/05/2023	26/05/2023	BB13-21	21	M
24/05/2023	26/05/2023	BB14-20m	20	M
Absent	Absent	Not obs.	41	M
24/05/2023	26/05/2023	BB15-20m	20	M
24/05/2023	26/05/2023	B16-18m	18	F
24/05/2023	26/05/2023	B17-14m	14	M

Notes. SAAB: Sex Assigned at Birth F: Female M: Male

Appendix F

Recruitment Questions for CPE Leaders

Question leaders about their implementation of a nature-based approach.

Criteria to check:

- Engaged in nature-based practices/program **for at least a year** prior to my study with both the older groups and with the infant room.
- Infant rooms have implemented **minimal nature-based practices** and play such as extended and/or regular outdoor play time with the addition of natural materials and elements in their playground.
- Educators in the **same infant group** since at least September 2022
- Educators with at least **two years of experience** with infants overall without regard to the approach

<u>Questions à poser à la DG ou leader pédagogique :</u>

- Pouvez-vous me décrire les pratiques d'éducation par la nature que vous pratiquez en ce moment?
    - Dans tous le CPE?
    - Et les **poupons**? Quelles sont les pratiques d'ÉPN avec poupons?
        - À quelle fréquence vont-ils dehors?
        - Combien de temps?
        - Quels types de matériels utilisez-vous avez les poupons?
- Depuis combien de temps avez-vous implanté ces pratiques?
- Est-ce que les ou l'éducatrice(s) en poste à la pouponnière y est depuis septembre 2022?
- A-t-elle au moins deux ans d'expérience en pouponnière peu importe l'approche?

Appendix G

Recruitment Invitation

L'ÉDUCATION PAR LA NATURE EN POUPONNIÈRE

À la recherche de participantes pour mon mémoire de maîtrise

But de la recherche:

Documenter l'expérience d'éducation par la nature des poupons et de leurs éducatrices lors de sorties extérieures.

Critères de participation :

- ✓ Être éducatrice à la pouponnière depuis au moins septembre 2022
- ✓ Avoir au moins deux ans d'expérience en pouponnière
- ✓ Votre CPE a implanté l'éducation par la nature dans tous ses groupes, incluant la pouponnière.
- ✓ Avoir implanté quelques pratiques d'éducation par la nature à l'extérieur à la pouponnière.

Procédure :

1. Contacter la chercheuse par courriel ou téléphone.
2. Remplir le formulaire de **consentement**.
3. Remplir un **court questionnaire** d'identification.
4. Participer à **une entrevue d'une durée de 45 à 60 minutes**.
5. Accueillir la chercheuse dans votre groupe pour 2 à 5 sessions d'**observations** lors de vos sorties à l'extérieur.
6. Si possible, **partager des photos** des environnements utilisés par le groupe (cour, milieu naturel, local) et d'expériences significatives pour vous.

Pour participer ou pour plus d'informations, contacter :

Justine Pronovost
Étudiante à la maîtrise en *Child Studies*
Département d'éducation - Université Concordia
justine.pronovost@mail.concordia.ca
438-872-6561

Image: AQCPE -Alex Éducation par la nature

La participation à cette recherche doit être volontaire.
Tout partage des résultats de cette recherche respecteront les conditions de confidentialité tel que signé dans le consentement.

Appendix H

Parent Consent Form

CONSENTEMENT ÉCLAIRÉ À LA PARTICIPATION À UNE ÉTUDE

Titre de l'étude : L'expérience des poupons et de leurs éducatrices en contexte d'éducation par la nature
Chercheuse : Justine Pronovost, étudiante à la maîtrise en *Child Studies*
Coordonnées de la chercheuse : justine.pronovost@mail.concordia.ca
438-872-6561
Professeur-superviseure : Dr. Nina Howe**,** Department of Education
Coordonnées de la professeur-superviseur : nina.howe@concordia.ca
Sources de financement de l'étude : Conseil de recherche des sciences humaines du Canada

Nous vous invitons à prendre part au projet de recherche susmentionné. Le présent document vous renseigne sur les conditions de participation à l'étude; veuillez le lire attentivement. Au besoin, n'hésitez pas à communiquer avec la chercheuse pour obtenir des précisions.

A. BUT DE LA RECHERCHE

Cette étude a pour but de documenter les expériences des poupons et des éducatrices en contexte d'éducation par la nature dans une installation de service de garde à la petite enfance ainsi que d'explorer les perspectives sur cette approche des éducatrices de pouponnières la pratiquant.

B. PROCÉDURES DE RECHERCHE

Si votre enfant participe à l'étude, vous devrez :

- Lire et signer ce consentement,
- Compléter un bref questionnaire d'identification sur votre enfant
- Accepter la présence de la chercheuse en tant qu'observatrice lors de deux (2) à cinq (5) séances d'observation de 30 à 60 minutes au CPE lors de moments d'exploration et de jeux à l'extérieur avec les poupons en contexte d'éducation par la nature. (L'horaire des observations pourra être déterminé avec la ou les éducatrices du groupe)
- Accepter la prise de photographies pendant ces observations (voir sections à cet effet pour plus de détails)

Somme toute, la participation de votre enfant s'étendra sur environ un mois dépendamment de l'horaire des séances d'observations.

En tant que sujet de recherche, votre enfant n'aura pas à interagir avec la chercheuse lors des observations, le groupe devra faire comme à l'habitude et ignorer le plus possible la présence de la chercheuse.

C. RISQUES ET AVANTAGES

En participant à cette étude, votre enfant pourrait être exposé à certains risques, y compris :

- Un malaise face à la présence de la chercheuse comme observatrice

Vous pourriez bénéficier ou non de la participation de votre enfant à l'étude. Les avantages éventuels seraient notamment les suivants :

- Contribuer à la formation d'une chercheuse.
- Contribuer aux récentes connaissances théoriques et pratiques sur la pratique d'éducation par la nature avec les poupons.
- Contribuer au développement de recommandation sur la pratique d'éducation par la nature avec les poupons.

D. CONFIDENTIALITÉ

Dans le cadre de cette étude, nous recueillerons les renseignements suivants :

- Votre nom et prénom et celui de votre enfant
- Le nom du CPE que votre enfant fréquente
- Quelques données démographiques sur vous et votre enfant (niveau de scolarité, âge, sexe, etc.)

Ceux-ci seront obtenus dans un questionnaire séparé du processus d'observation.

En tant que participant, vous permettez aux chercheurs d'avoir accès à des renseignements sur les actions posées par votre enfant lors de l'exploration et des jeux lors de sortie en contexte d'éducation par la nature avec son groupe. De plus, des photographies de certaines de ces actions pourront être prises si vous acceptez (voir dernière section). Ceux-ci seront obtenus via les observations.

Seules les personnes qui mènent cette recherche auront accès aux renseignements fournis. Nous n'utiliserons l'information qu'aux fins de l'étude décrite dans ce document.

Aux fins de surveillance de l'étude, des organismes de réglementation pourraient examiner l'information recueillie. À titre de participant, vous acceptez de leur donner accès à l'information.

Les renseignements recueillis resteront confidentiels. On ne pourra donc établir aucun lien entre votre identité ainsi que celle de votre enfant et l'information que vous fournissez.

Nous protégerons l'information fournie en utilisant des pseudonymes et en gardant les informations d'identification séparées des données d'observation. Les données et les informations d'identifications seront protégés par mot de passe. De plus, le cas échéant, le

Nous avons l'intention de publier les résultats de cette étude. Cependant, on ne pourra pas identifier votre enfant dans la publication.

Nous archiverons les données cinq ans après la fin de l'étude.

E. CONDITIONS DE PARTICIPATION

Vous pouvez refuser que votre enfant participe à la recherche ou l'en retirer à n'importe quel moment. Vous pouvez aussi demander que l'information que vous avez fournie ne soit pas utilisée; le cas échéant, votre choix sera respecté. Si vous prenez une décision en ce sens, vous devrez en avertir la chercheuse au maximum un mois après la dernière observation.

Nous vous informerons de tout nouvel élément d'information susceptible d'affecter votre volonté à ce que votre enfant poursuive sa participation à l'étude.

Vous et votre enfant ne subirez aucune conséquence négative si vous décidez de ne pas participer à l'étude, d'interrompre votre participation à celle-ci ou de nous demander de ne pas utiliser votre information.

F. CONSENTEMENT DU PARENT DE L'ENFANT

Je reconnais par la présente avoir lu et compris le présent document. J'ai eu l'occasion de poser des questions et d'obtenir des réponses. Je consens à ce que mon enfant participe à l'étude dans les conditions décrites ci-dessus.

PRÉNOM ET NOM DE VOTRE ENFANT (en majuscules)

_____

VOTRE PRÉNOM ET NOM (en majuscules)

_____

Concernant les photographies, cochez l'option de votre choix :

- ☐ J'accepte que mon enfant soit pris en photo avec son visage lors des observations et que son **visage soit flouté** le cas échéant.
- ☐ J'accepte que mon enfant soit pris en photo **sans que son visage** apparaisse sur la photo.
- ☐ Je **refuse** que mon enfant soit pris en photo lors des observations.

SIGNATURE _____

DATE _____

Si vous avez des questions sur l'aspect scientifique ou savant de cette étude, communiquez avec la chercheuse. Vous trouverez ses coordonnées sur la première page. Vous pouvez aussi communiquer avec son professeur-superviseur.

Pour toute préoccupation d'ordre éthique relative à ce projet de recherche, veuillez communiquer avec le responsable de l'éthique de la recherche de l'Université Concordia au 514-848-2424, poste 7481, ou à oor.ethics@concordia.ca.

Appendix I

Questionnaire Parent-enfant

Merci de compléter les informations suivantes pour soutenir les données démographiques de la recherche. Les informations fournies dans ce questionnaire resteront confidentielles.

Prénom et nom de **l'enfant** : _____

Prénom et nom du **parent** :_____

Nom et ville du CPE fréquenté : _____

Fréquente le CPE depuis (date : jj/mm/aaaa) : _____

Date de naissance de l'enfant (jour, mois, année) : _____

Lieu de naissance de l'enfant : _____

Sexe de l'enfant : _____

Langue(s) parlée(s) à la maison : _____

Groupe ethnique de l'enfant : _____

Handicap/enjeu de santé de l'enfant (le cas échéant) : _____

_____

Revenu familial moyen :

- 0 à 24 999$
- 25 000 $ à 59 999$
- 60 000$ à 80 000$
- Plus de 80 000$

Combien d'enfants avez-vous en tout ? _____

À quelle position est votre enfant dans la fratrie? _____

Appendix J

Educator Consent Form

CONSENTEMENT ÉCLAIRÉ À LA PARTICIPATION À UNE ÉTUDE

Titre de l'étude : L'expérience des poupons et de leurs éducatrices en contexte d'éducation par la nature
Chercheuse : Justine Pronovost, étudiante à la maîtrise en *Child Studies*
Coordonnées de la chercheuse : justine.pronovost@mail.concordia.ca
438-872-6561
Professeur-superviseure : Dr. Nina Howe, Department of Education
Coordonnées de la professeur-superviseur : nina.howe@concordia.ca
Sources de financement de l'étude : Conseil de recherche des sciences humaines du Canada

Nous vous invitons à prendre part au projet de recherche susmentionné. Le présent document vous renseigne sur les conditions de participation à l'étude; veuillez le lire attentivement. Au besoin, n'hésitez pas à communiquer avec la chercheuse pour obtenir des précisions.

A. BUT DE LA RECHERCHE

Cette étude a pour but de documenter les expériences des poupons et des éducatrices en contexte d'éducation par la nature dans une installation de service de garde à la petite enfance ainsi que d'explorer les perspectives sur cette approche des éducatrices de pouponnières la pratiquant.

B. PROCÉDURES DE RECHERCHE

Si vous participez à l'étude, vous devrez :

- Lire et signer ce consentement,
- Compléter un bref questionnaire d'identification
- Participer à une entrevue avec la chercheuse d'une durée de 45 à 60 minutes dans une salle tranquille sur votre lieu de travail ou un autre lieu approprié. L'audio de l'entrevue sera enregistré si vous le consentez le jour de l'entrevue.
- Au besoin, participer à une courte entrevue d'appoint.
- La participante recevra aussi la transcription de l'entrevue afin de donner ses commentaires si elle le souhaite.
- Accepter la présence de la chercheuse en tant qu'observatrice lors de deux (2) à cinq (5) séances d'observation de 30 à 60 minutes lors de moments d'exploration et de jeux à l'extérieur avec les poupons en contexte d'éducation par la nature. (L'horaire des observations pourra être déterminé avec la ou les éducatrices du groupe)

- Accepter la prise de photographies pendant ces observations (voir sections à cet effet pour plus de détails)
- Partager, si vous le souhaitez, des photos de vos expériences (s'assurer que les personnes apparaissant sur les photos aient donner leur consentement).

Somme toute, votre participation s'étendra sur environ un mois incluant les séances (entrevue et observations) ponctuelles ainsi que quelques échanges courriels ou téléphoniques.

En tant que sujet de recherche, vous devrez lors des observations, faire comme à l'habitude et ignorer le plus possible la présence de la chercheuse.

C. RISQUES ET AVANTAGES

En participant à cette étude, vous pourriez être exposé à certains risques, y compris :

- Des remises en question face à votre pratique comme nous explorerons cette dernière lors de l'entrevue et compte tenu que l'éducation par la nature est une pratique nouvelle avec les poupons.
- Un malaise face à la présence de la chercheuse comme observatrice
- Des réactions de la part des poupons face à la présence d'une inconnue dans le groupe.

Vous pourriez bénéficier ou non de votre participation à l'étude. Les avantages éventuels seraient notamment les suivants :

- Partager votre expérience et expertise sur l'éducation par la nature et à la pouponnière ainsi que prendre un temps d'arrêt réflexif sur votre pratique.
- Contribuer à la formation d'une chercheuse.
- Contribuer aux récentes connaissances théoriques et pratiques sur la pratique d'éducation par la nature avec les poupons.
- Contribuer au développement de recommandation sur la pratique d'éducation par la nature avec les poupons.

D. CONFIDENTIALITÉ

Dans le cadre de cette étude, nous recueillerons les renseignements suivants :

- Votre nom et prénom
- Le nom du CPE où vous travaillez
- Vos années d'expériences avec les poupons et en éducation par la nature
- Quelques données démographiques (niveau de scolarité, âge, sexe, etc.)

Ceux-ci seront obtenus dans un questionnaire séparé du processus d'entrevue et d'observation.

En tant que participant, vous permettez aux chercheurs d'avoir accès à des renseignements sur votre pratique auprès des poupons et votre opinion sur l'éducation par la nature. De plus, des photographies de certaines de vos actions pourront être prises si vous acceptez (voir dernière section). Ceux-ci seront obtenus via les observations et l'entrevue.

Seules les personnes qui mènent cette recherche auront accès aux renseignements fournis. Nous n'utiliserons l'information qu'aux fins de l'étude décrite dans ce document.

Aux fins de surveillance de l'étude, des organismes de réglementation pourraient examiner l'information recueillie. À titre de participant, vous acceptez de leur donner accès à l'information.

Les renseignements recueillis resteront confidentiels. On ne pourra donc établir aucun lien entre votre identité et l'information que vous fournissez.

Nous protégerons l'information fournie en utilisant des pseudonymes et en gardant les informations d'identification séparées des données d'entrevue et d'observation. Les données et les informations d'identifications seront protégés par mot de passe. De plus, le cas échéant, votre visage sera flouté sur les photographies lors d'usage à des fins de partage des résultats de l'étude.

Nous avons l'intention de publier les résultats de cette étude. Cependant, on ne pourra pas vous identifier dans la publication.

Nous archiverons les données cinq ans après la fin de l'étude.

E. CONDITIONS DE PARTICIPATION

Vous pouvez refuser de participer à la recherche ou vous en retirer à n'importe quel moment. Vous pouvez aussi demander que l'information que vous avez fournie ne soit pas utilisée; le cas échéant, votre choix sera respecté. Si vous prenez une décision en ce sens, vous devrez en avertir la chercheuse au maximum deux semaines après l'envoi de la transcription de l'entrevue et un mois après la dernière observation.

Nous vous informerons de tout nouvel élément d'information susceptible d'affecter votre volonté à poursuivre votre participation à l'étude.

Vous ne subirez aucune conséquence négative si vous décidez de ne pas participer à l'étude, d'interrompre votre participation à celle-ci ou de nous demander de ne pas utiliser votre information.

F. CONSENTEMENT DE LA PARTICIPANTE

Je reconnais par la présente avoir lu et compris le présent document. J'ai eu l'occasion de poser des questions et d'obtenir des réponses. Je consens à participer à l'étude dans les conditions décrites ci-dessus.

PRÉNOM ET NOM (en majuscules) _____

Concernant les photographies, cochez l'option de votre choix :

- ☐ J'accepte d'être prise en photo avec mon visage lors des observations et que mon **visage soit flouté** le cas échéant.

- ☐ J'accepte d'être prise en photo lors des observations **sans que mon visage** apparaisse sur la photo.
- ☐ Je **refuse** d'être prise en photo lors des observations.

SIGNATURE _____

DATE _____

Si vous avez des questions sur l'aspect scientifique ou savant de cette étude, communiquez avec la chercheuse. Vous trouverez ses coordonnées sur la première page. Vous pouvez aussi communiquer avec son professeur-superviseur.

Pour toute préoccupation d'ordre éthique relative à ce projet de recherche, veuillez communiquer avec le responsable de l'éthique de la recherche de l'Université Concordia au 514-848-2424, poste 7481, ou à oor.ethics@concordia.ca.

Appendix K

Questionnaire Éducatrice

Merci de compléter les informations suivantes pour soutenir les données démographiques de la recherche. Les informations fournies dans ce questionnaire resteront confidentielles.

Votre **prénom et nom**: _____

Âge : _____

Genre : _____

Langues parlées : _____

Lieu de naissance : _____

Groupe ethnique : _____

Nombre d'années d'expérience comme éducatrice: _____

Nombre d'années d'expérience à la pouponnière: _____

Formation (niveau et type) : _____

_____

Nom et ville du **CPE**: _____

Depuis combien de temps le **CPE** a-t-il commencé l'implantation de l'éducation par la nature:

_____

Depuis combien de temps la **pouponnière** a-t-elle commencé l'implantation de l'éducation par la nature:

_____

Appendix L

List of Focal Observations

List of Focal Observations

Potential Focus	Code Sequence
SR-CPE	
BB1-14m	281-359
BB2-14m	360-488
BB3-17m	
BB4-12m	interrupted round/no nature
BB5-19m	221-280
BB6-22m	
BB7-19m	1-70; 489-509 (anecdote)
BB8-16m	510-570; 597-750
Group organization SR-CPE	71-79
T1	
T2	80-220 and the walk
U-CPE	
BB9-12m	791-948
BB10-25m	
BB11-11m	759-790; 1048-1156
BB12-33m	
BB13-21m	
BB14-20m	
BB15-20m	
BB16-18m	1157-1266
BB17-14m	949-1047
TA	
TB	
General group obs. U-CPE	571-596; 1267-1336

Appendix M

Semi-Structured Interview Questions

Addressing research question (1) What are the educators' perspectives on nature-based play with infants in a daycare setting?

Prepared questions

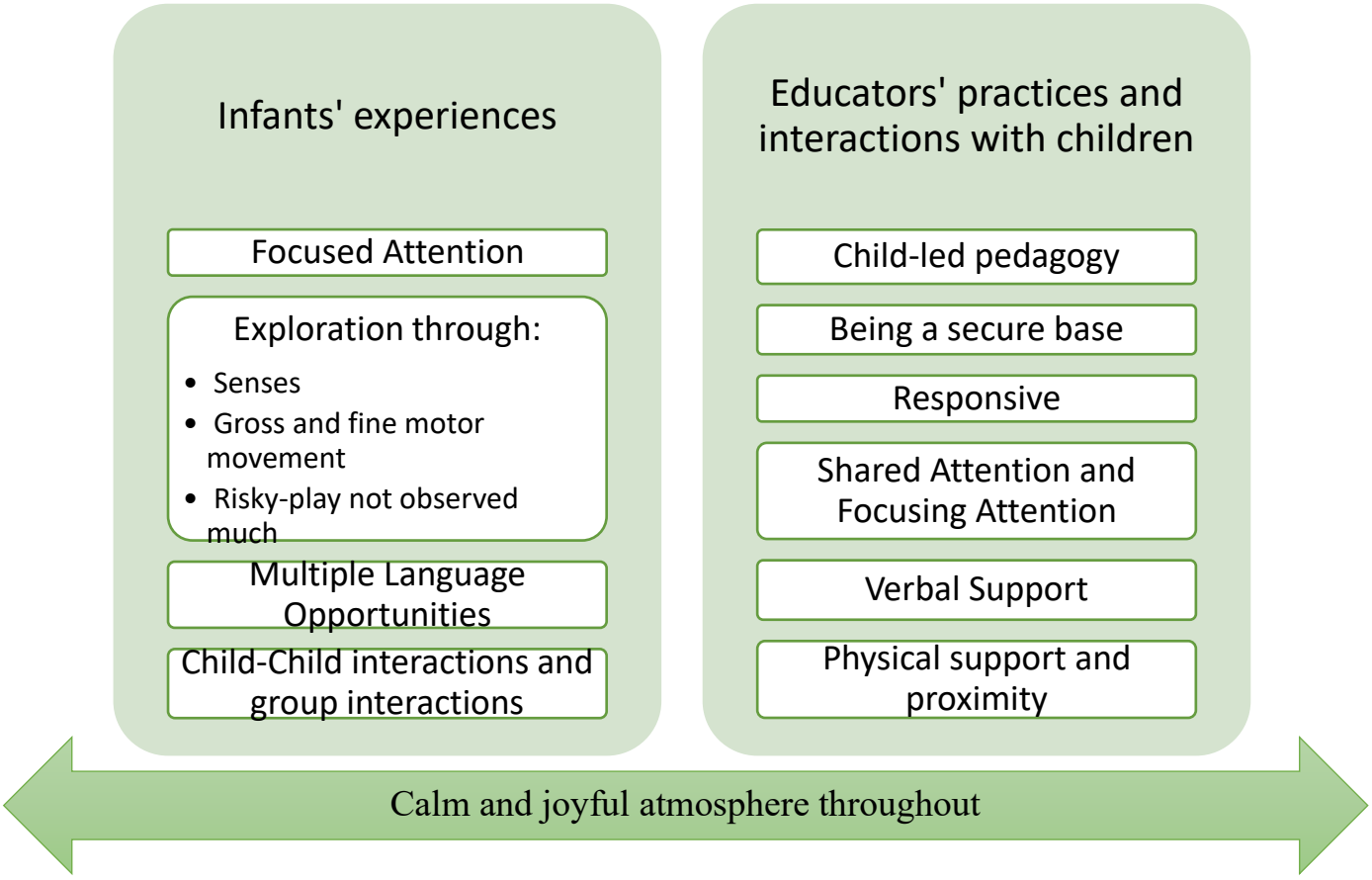
1. Est-ce que tu peux me décrire brièvement ton groupe? Qui sont les poupons avec qui tu travailles présentement: leurs âges, principal intérêt, la dynamique du groupe.
2. Peux-tu me décrire qu'est-ce que c'est l'éducation par la nature pour toi et ton groupe de poupons? (philosophy)
3. Peux-tu me décrire ton expérience concrète en contexte d'éducation par la nature à l'extérieur avec les poupons. (As-tu des photos de ces expériences?) (Horaire, routines, jeux, matériels, planification, etc.)
4. Si tu avais un exemple concret fort à partager sur ton expérience d'éducation par la nature avec ton groupe, ce serait quoi? (as-tu des photos de cette expérience?)
5. Comment connais-tu l'approche d'éducation par la nature? Comment as-tu appris sur ce sujet? (Formation initiale? Formation continue? Lecture? Expérience de vie? Etc.?)
6. Peux-tu me décrire les impacts que tu observes chez les poupons de ton groupe **pendant** l'expérience d'éducation par la nature?
    a. **Après**?
    b. Et comment c'est les jours où vous n'allez **pas à l'extérieur**?
7. Pourquoi penses-tu que ces impacts sont observés chez les poupons de ton groupe?
8. Comment te sens-tu comme éducatrice dans ces expériences en nature?
    a. Quelles émotions ressens-tu?
    b. Peux-tu me décrire ton rôle professionnel d'éducatrice dans ce contexte?

9. Quels **obstacles** vis-tu ou as-tu vécu face à l'implantation de l'éducation par la nature à l'extérieur avec les poupons?
10. As-tu des **solutions** à ces obstacles? Ou des solutions que tu verrais pour le futur? (Si oui, peux-tu me donner un exemple, peux-tu me décrire ces solutions)
11. Y-a-t-il des pratiques d'éducation par la nature qui t'apparaissent **impossibles** à faire avec un groupe de poupons?
12. Quelle est ta perception de l'éducation par la nature aujourd'hui pour les poupons dans notre société?
13. Depuis ta première impression, comment ta perception de l'éducation par la nature a-t-elle évolué?
14. Qu'est-ce qui a été ou qui est le plus aidant pour toi dans la progression de ton expérience d'éducation par la nature avec les poupons?
15. Quels conseils donnerais-tu à une éducatrice qui veut tenter l'expérience avec son groupe de poupons?
16. As-tu autre chose de ton expérience d'éducation par la nature avec les poupons que tu aimerais partager?

Appendix N

Preliminary Figure of Results

Preliminary Figure of Themes from the Observations



Appendix O

Map of BB8-16m's Trajectory