FAMILY EXPERIENCES IN NATURE: HOW PARENTS MAY INFLUENCE THEIR CHILDREN'S EXPOSURE TO THE NATURAL ENVIRONMENT

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ABSTRACT

Family Experiences in Nature: How Parents May Influence Their Children's Exposure to the Natural Environment

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Children may be spending less time outdoors in nature than in previous generations, with one potential reason being parents in their role as 'gatekeepers' to the outdoors. This study investigated how families are spending their time during the COVID-19 pandemic, and how parents may influence children's outdoor nature experiences. Parents (N = 121) from across Canada completed measures related to their family's activities as well as their own connection with nature, attitudes about nature, and childhood nature contact. Results suggest that having easy access to nature, a greater connection with nature, believing in the importance of outdoor experiences, and doing outdoor activities in childhood may be associated with more current family time outside in nature. By understanding the reasons behind parental decisions regarding where and how families spend time outside, strategies can be developed to help parents increase their children's nature time in the future.

Keywords: family, parents, children, outdoor time, nature, nature-relatedness, play

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Exposure to nature has been associated with numerous benefits for both adults (e.g., Cox et al., 2017) and children (e.g., Dopko et al., 2019). However, it has been suggested that the amount of time children spend outdoors is declining (Cleland et al., 2010; Clements, 2004; Natural England, 2019), which can have negative consequences for their physical and mental health (Louv, 2008; Soga & Gaston, 2016). For instance, mental illness is an increasingly significant issue for Canadian children and youth (Centre for Addiction and Mental Health, 2018; Ipsos, 2017; MacKean et al., 2018). One avenue of improvement may come from the natural environment, as both exposure to and a sense of connection with nature has been associated with better mental health for young people in Canada (Piccininni et al., 2018). It is therefore important to understand the reasons behind a potential decline in outdoor time, one of which may be attributed to parents and their role as children's 'gatekeepers' of the outdoors (McFarland & Laird, 2018, 2020). Exploring parental influences on children's exposure to nature, and family nature time in general, may help to bridge this gap for future generations – especially within the stressful context of the global COVID-19 pandemic.

Benefits of Nature

The concept of "nature" refers to natural elements of the physical environment; these are often considered on a spectrum, ranging from "wild" areas that have not been altered by humans, to urban areas that incorporate some amount of green space (Bratman et al., 2012; Gaston & Soga, 2020). Nature has also been categorized in terms of green or blue spaces; green spaces typically include parks, forests, grassy fields, or areas made up of extensive vegetation, whereas blue spaces refer to areas where water is visible, such as oceans, lakes, streams, or ponds (Gascon et al., 2015). Regardless of the definition,

spending time in nature is beneficial for human life, both physically and psychologically (Oh et al., 2017).

A few different theories have been developed to try and explain why nature is beneficial for human health and well-being. For instance, Attention Restoration Theory (Kaplan & Kaplan, 1989; Kaplan, 1995) suggests that natural environments improve our directed (or voluntary) attention by restoring our ability to think calmly and clearly; this is because nature provides a sense of 'being away' from urban settings, evokes a 'soft fascination' that takes less effort to attend to, provides an extensive landscape to explore, and is often compatible with the notion of a 'refuge' or escape. Further, Ulrich's (1981) Stress Reduction Theory, also known as Stress Recovery Theory, suggests that natural environments are perceived more positively than urban environments and cause less physical stress.

Research has largely supported these theoretical claims. For example, time spent in nature has been linked with declines in physiological symptoms of stress, such as decreased cortisol (Hunter et al., 2019), decreased blood pressure (Meredith et al., 2020), and improved immune functioning (Oh et al., 2017). Even viewing natural environments, as in the practice of forest bathing (i.e., Shinrin-yoku, the act of experiencing nature with all the senses), can lead to greater declines in cortisol than viewing urban environments (Antonelli et al., 2019). Exposure to nature has also been associated with an increase in physical activity (Cox et al., 2017), and walks in nature can improve both the duration and quality of sleep (Morita et al., 2011).

Regarding psychological benefits, nature time has been associated with improved cognitive functioning. For example, nature walks improve focus and decrease repetitive thinking, and more so than walks in highly urbanized areas (Bratman et al., 2015). Adults have also reported improvements in memory (Berman et al., 2012), decreases in confusion and fatigue (Takayama et al., 2014), and a greater sense of vitality (i.e., energy; Ryan et al., 2010) after walking in nature. In addition, nature exposure has

beneficial effects on emotion, such as increases in positive mood (Berman et al., 2012; Nisbet & Zelenski, 2011; Nisbet et al., 2019; Oh et al., 2017; Takayama et al., 2014; Tester-Jones et al., 2020), as well as decreases in depression (Cox et al., 2017; Oh et al., 2017) and anxiety (Oh et al., 2017; Takayama et al., 2014; Tester-Jones et al., 2020). Notably, practices such as forest-bathing may exhibit greater benefits for anxiety than depression (Kotera et al., 2020), though nature walks may be more effective for decreasing situational rather than general anxiety (Kotera et al., 2021). Spending time in nature has also been linked with lower levels of psychological stress (Meredith et al., 2020; Morita et al., 2007).

More specifically, the association between nature-based recreational activities (e.g., walking dogs, cycling, skiing, etc.) and higher levels of emotional well-being (Korpela et al., 2014) may be influenced by how restorative people believe those nature-based activities are. For example, walks in green spaces have been associated with greater perceived restoration and psychological well-being (Carrus et al., 2015; Pasanen, Johnson, et al., 2018). Interestingly, perceived restoration is often greater after engaging in physical activities in natural rather than built environments (Carrus et al., 2015), although this may depend on the type of restoration under study (Pasanen, Ojala, et al., 2018). Specific effects of being physically active within nature include self-reported feelings of calm (Pasanen, Ojala, et al., 2018) and relaxation (Pasanen, Johnson, et al., 2018).

Being in nature has spiritual benefits as well, as some women have found that spending time in the “wilderness” helps improve their own spirituality (Fredrickson & Anderson, 1999). Greater exposure to nature more broadly (through urban or rural areas, green or blue spaces) has also been related to higher levels of spirituality (Kamitsis & Francis, 2013). Being immersed in nature, beyond simply being outdoors, may promote feelings of awe and can lead to positive emotions (Ballew & Omoto, 2018). More recently, some young adults have described that spending time in nature helped

them engage in self-reflection about their place in the world and feel connected to something bigger than themselves (Puhakka, 2021).

Further, exposure to nature also has benefits for social connection, as spending time in green spaces has been associated with lower reported levels of loneliness (van den Berg et al., 2019). Frequent visits to and time spent in nature, as well as the presence of nearby trees, have also been linked to a greater sense of connection with neighbours (Cox et al., 2017; Nisbet et al., 2020). Even being exposed to nature for a short amount of time can increase peoples' willingness to help others (Guéguen & Stefan, 2016). Regarding families, specifically, spending time in nature may encourage longer and more responsive conversations between parents and their children (Cameron-Faulkner et al., 2018), and engaging in activities together in nature may lead to more positive interactions between family members (Izenstark & Ebata, 2019).

Some of the aforementioned effects may actually depend on one's level of exposure to nature (i.e., a dose-response effect). As such, individuals may need to have contact with a certain amount of nature, make a certain number of visits to nature, or spend a certain length of time in nature in order to experience benefits (Shanahan et al., 2015). For example, spending just 10 minutes in nature at a time has been connected to significant improvements in adults' health and well-being (Meredith et al., 2020). Regular contact with nature may also play a role in these effects – for instance, visiting natural areas (e.g., gardens) four to five times per week is considered most effective for decreasing symptoms of depression (Cox et al., 2017).

Benefits of Nature for Children and Adolescents

The benefits of time spent in nature not only apply to adults, but to children and adolescents as well. In terms of physical benefits, outdoor time may help children cope with physical ailments such as

asthma and eczema (Bento & Dias, 2017). Also, children tend to be more physically active when spending time outside versus inside (Truelove et al., 2018).

Exposure to nature may have cognitive benefits for children, such as greater creativity and imaginative thinking (Boileau & Dabaja, 2020; Zamani, 2016), and improved memory (Dadvand et al., 2015). Interaction with nature also gives children a chance to master new skills (e.g., building forts), which can lead to a greater sense of competence (Chawla et al., 2014). Children who spend time in natural areas may experience improved attention as well. For example, children with ADHD often have better concentration after walking in nature (Bowler et al., 2010; Faber Taylor & Kuo, 2009); similarly, children who frequently use green spaces tend to have lower levels of hyperactivity (Flouri et al., 2014). Simply experiencing a lesson within nature has improved students' engagement and attention in the classroom (Kuo et al., 2018), and spending time in green schoolyards has been associated with improved self-regulation (Taylor et al., 2020). The type of attention under study may reveal differences in attentional benefits – for instance, some research shows improvements in voluntary attention (which requires personal effort), but not involuntary attention (which occurs automatically; Johnson et al., 2019).

Having nature close to home may also reduce the stress children feel when confronted with negative experiences (Wells & Evans, 2003), and children who frequently use urban green spaces have reported high levels of health-related quality of life (e.g., self-esteem; McCracken et al., 2016). Further, adolescents who spend longer time periods in green spaces may experience improved mood and decreased levels of depression, fatigue, and anger (Li et al., 2018). Children who spend time in nature (e.g., forests) also tend to act more kindly towards other children, and view environmental protection more positively (Dopko et al., 2019). For both children and youth, time spent in nature may improve

feelings of social connection (Wray et al., 2020), and engaging in cooperative tasks in nature may facilitate the development of social bonds (Boileau & Dabaja, 2020; Chawla et al., 2014).

Research has also focused specifically on the benefits of playing outdoors. Nature may facilitate some of the play experiences that are healthy for children, as varying natural environments allow for many different types of play (Alejandre & Lynch, 2020; Zamani, 2016). Indeed, playing has been cited as the most common outdoor activity for children (Larson et al., 2011), and is a significant motivator for children's use of outdoor green spaces (Chen et al., 2020; McCracken et al., 2016). Playing may also elicit specific benefits – for instance, outdoor play of at least 30 minutes each week has been linked with fewer symptoms of mental illness in female adolescents (Piccininni et al., 2018). Additionally, free play (i.e., unstructured play) in nature may provide both physical and cognitive benefits to children, through greater activity levels and a broadened imagination (Dankiw et al., 2020). Risky play in particular, which may be more prevalent in natural versus structured environments, can also promote physical activity (Brussoni et al., 2015) and help improve children's self-confidence (Zamani, 2016).

Interestingly, when engaging in physical activity outside, children tend to spend less time in green spaces as opposed to more built environments (e.g., on pavements), even though green environments may facilitate more intense levels of activity (Coombes et al., 2013). As such, it is important to note that the benefits derived from being "outdoors" may differ from being in "nature". For instance, the specific type of space used for play can impact symptom severity for children with ADHD: those who play outdoors in areas with human-made components still experience more severe symptoms than those who play in more natural environments (e.g., open grassy areas or places with large trees; Faber Taylor & Kuo, 2011).

Children's Declining Outdoor and Nature Time

Given the benefits of nature exposure, one might assume that contact with nature is a common experience for most children. However, research suggests that the amount of time children spend in nature is declining (Natural England, 2019; Skar & Krogh, 2009; Soga & Gaston, 2016). While there have been some varying opinions on the issue – e.g., that it is the types of children's outdoor activities that are changing rather than time spent outdoors (Larson et al., 2011; Novotný et al., 2020) – there is some evidence to suggest a general decline in children's outdoor time. For example, mothers in the United Kingdom (UK) have reported that they spent more time outdoors in their own childhood than their children do now (Clements, 2004), and a majority of children report playing most often indoors, either in their own home or their friends' houses (England Marketing, 2009). Further, from 2012 to 2018, the amount of time children spent engaged in outdoor activities each year decreased by 15% (Outdoor Foundation, 2020). In terms of nature, specifically, parents in Norway are noting a decline in children playing in local nature areas where they themselves once played (Skar & Krogh, 2009), and children's use of urban green spaces in Scotland has been considered relatively low in recent years (McCracken et al., 2016). Similarly, children's time spent in nature has decreased from 2013-2019 in the UK – especially for children going outdoors alone (Natural England, 2019).

A few different terms are commonly used to refer to this phenomenon. Pyle (1993) described peoples' decreasing contact with nature, particularly in urban areas, as an *extinction of experience*; the consequence of such an extinction is ultimately a lack of care for and connection with nature, which can only be remedied through direct nature experiences (as cited in Soga & Gaston, 2016). Richard Louv (2008) also coined the term "Nature-Deficit Disorder" to address the decline in children's time spent in nature, specifically. However, this term has recently been considered controversial due to its lack of empirical evidence and suggestion that decreasing time spent in nature is largely a result of children's

own choices rather than due to external factors such as school environments or the attitudes of others (Birch et al., 2020).

A number of factors have been associated with declines in children's outdoor time. For instance, lower levels of physical activity may have a bi-directional relationship with decreasing time spent outdoors. According to the Canadian 24-Hour Movement Guidelines (Canadian Society for Exercise Physiology [CSEP], 2017), children between the ages of 1-4 should be getting a minimum of three hours of physical activity a day, and sedentary time should not exceed one hour (at a time). For children aged 5-17, several hours of physical activity is recommended, including one hour of moderate to vigorous physical activity, while extended sedentary time should be limited (CESP, 2017). Research has shown that while approximately 62% of children aged 3-4 meet the physical activity guidelines (Chaput et al., 2017), only about 36% of those aged 5-17 are doing so as well; 5-11 year olds are more likely to meet these guidelines than 12-17 year olds (Roberts et al., 2017). Since children are typically more active when outdoors (Tremblay et al., 2015; Truelove et al., 2018), and in green spaces specifically (Alejandre & Lynch, 2020), these declines in physical activity may suggest declines in outdoor time.

Similarly, children and adolescents are often spending more time on screens or using technology. In Canada, the screen time recommendation for those aged 3-4 years is one hour maximum (CESP, 2017), yet only about 24% of Canadian children in this age bracket met this criteria, with an average of two hours spent on screens per day (Chaput et al., 2017). Interestingly, children's excessive screen time has been linked to their mothers' own screen time habits (Madigan et al., 2019). Canadian guidelines suggest that sedentary screen time should not exceed two hours a day for children and youth aged 5-17 (CESP, 2017). While about 70% of those aged 5-11 met this criteria, only about 28% of children and youth aged 12-17 were within the screen time limit (Roberts et al., 2017). Preferences for watching TV and movies, gaming, texting, and/or using the internet (Larson et al., 2011), as well as being too busy

and uninterested in going to outdoor green spaces (McCracken et al., 2016) are some of the main reasons why children do not go outside. Further, children who prefer spending their time on screens often spend less time outdoors (Loebach et al., 2021). However, it may be more popular for some children and adolescents to use technology or electronic media outdoors (Larson et al., 2011). For instance, in Japan, some children who spend large amounts of time on screens also reportedly engage in many nature-based activities (Soga, Yamanoi, et al., 2018). Further, technology (e.g., an electronic or educational guide) can actually help children connect with the natural environment, as using them can increase knowledge about and engagement with nature (McClain & Zimmerman, 2016), and may lead to even more enjoyable experiences than outings without such technology (Crawford et al., 2017).

The amount of structure in children's activities may be changing as well. Children tend to be involved in more supervised sports and less imaginative or free play outdoors then previous generations (Clements, 2004; Mullan, 2019; Skar & Krough, 2009). Although some research suggests that children are playing outside and engaging in free play more frequently than structured activities, the actual amount of time spent in outdoor free play is low, and children may still spend the most amount of time completing schoolwork or watching TV (Singer et al., 2009). Less is known about how often children engage in imaginative/free play in Canada, especially outdoors in nature.

Parents as Gatekeepers

As stated above, it is important to consider how external factors may influence children's decreasing time spent in nature (e.g., from the surrounding environments or other people). For instance, a significant influence may stem from parents themselves, who are often described as the "gatekeepers" of children's experiences – meaning that they have the power to encourage or limit certain activities for their children (Beets et al., 2007; McFarland & Laird, 2018, 2020; Veitch et al., 2006). In this context,

studies tend to focus more on parental influences of children's outdoor active play in general (e.g., Veitch et al., 2006), rather than on nature-based activities specifically (e.g., McFarland & Laird, 2018).

Lack of Access to Nature

One reason for declines in outdoor time is that many more people are living in urban areas, which may prevent them from accessing nature (see Baxter & Pelletier, 2019; Soga & Gaston, 2016; Soga, Yamanoi, et al., 2018). For instance, in Helsinki, people living in suburban areas with more green space tend to engage in more frequent outdoor activities near their home than people who live in urban city areas with less green space (Neuvonen et al., 2007). Also, compared to previous generations, and children living in rural areas, Japanese children living in urban environments have significantly less contact with traditional plants (Soga, Gaston, & Kubo, 2018). In addition, some parents may need to drive to access favourable nature areas, as nearby parks may not meet the needs of their children (Veitch et al., 2006). For instance, in Norway, children's experiences outdoors in nature often depend on parents' ability to drive to various destinations, since local spaces are not preferred (Skar & Krogh, 2009). Similarly, parents in the UK seem to be increasingly dissatisfied with the quality of natural areas close to home (Natural England, 2019). However, accessibility may not be the only influencing factor in children's use of outdoor spaces – for instance, it has been suggested that in Norway, where nature spaces like forests are considered very easily accessible, children are still much more likely to spent time in their family's garden or on nearby streets every day (Gundersen et al., 2016).

The Influence of Social Norms on Parenting

Parents may feel pressure to increase supervision of their children, especially if that is the norm for other parents (Carver et al., 2008). It is often not socially acceptable to leave children alone outdoors for extended periods of time (Skar & Krogh, 2009); thus, enhanced supervision may be viewed as the responsible way to parent (Niehues et al., 2016). Also, parents may feel pressured to structure their

children's activities, thereby lessening their free play (Skar et al., 2016). For example, Norwegian parents often feel pressure from society to have their children engaged in many activities; as such, social norms in Norway seem to be changing from valuing children's independence to valuing children's protection (Skar & Krogh, 2009).

Time and Priorities for Children's Activities

For adults generally, the most frequent barrier for nature contact is a lack of time (Fretwell & Greig, 2019). This is likely the same for parents, as children often note that their parents are too busy to play with them (Chen et al., 2020). Further, children may be more likely to spend time outdoors if accompanied by their parents (though only on the weekend; Larson et al., 2011). Mothers consider lack of time as a barrier to their children spending time outdoors (Skar et al., 2016; Singer et al., 2009), and children often cite lack of time as the most prominent barrier to using green spaces (McCracken et al., 2016). Parents may feel that homework demands and organized activities take precedence over (and thereby restrain) their children's ability to engage in free play outdoors (Skar & Krogh, 2009). Further, parental notions about what kind of play is best for their children may influence the type of play that children engage in. For example, mothers who place high value on structured play have children who participate in structured play more often than other forms of play (e.g., unstructured or free play; Fisher et al., 2008). Less is known about whether parents' beliefs regarding the importance of nature experiences could impact the extent to which children spend time in nature.

Fear and Safety Concerns Associated with the Outdoors

A widely-cited reason for parents limiting or restricting their children's outdoor activity is fear related to their children's safety (Lee et al., 2015; Veitch et al., 2006). Types of concerns may include dangers on the road (Carver et al., 2008; Veitch et al., 2006), personal injury (McFarland & Laird, 2018; Tremblay et al., 2015), and potentially harmful interactions with strangers (Carver et al., 2008; Mitra et

al., 2014; Tremblay et al., 2015). Due to these types of fears, children's levels of independent mobility may be limited (Mitra et al., 2014). For example, many parents report that their children engage in outdoor free play most often in their household yard when not in school (Janssen, 2015; Veitch et al., 2006). Young children in Norway are also more likely to play closer to home than in past generations (Skar & Krogh, 2009). Additionally, perceptions of unsafe environments (Niehues et al., 2016) and fear of their children getting injured (McFarland & Laird, 2018) are often the basis for why parents limit their children's risky play outdoors.

Heightened fear may also lead to increased supervision of children by their parents, thereby lessening the extent to which children are able to actively get around their neighbourhood (Carver et al., 2008; Lee et al., 2015). For instance, one of the most frequently mentioned barriers to park use by young children is whether an adult is available to supervise (Veitch et al., 2006). Parents in Norway spend a significant amount of time supervising their children's play outdoors (Skar & Krogh, 2009). Levels of parental supervision may also be higher in urban environments, due to increased safety concerns – for example, crowding in urban parks may lead parents to feel the need to supervise their children at all times (Chen et al., 2020). It is less clear whether these parenting habits are also prevalent within a Canadian context.

Unfortunately, parental supervision has been linked to decreases in physical activity for young children, particularly in parks (Floyd et al., 2011). Further, children who are restricted to playing close to home actually spend less time outdoors per week than children who have a larger outdoor play radius (Loebach et al., 2021) – though children who are able to play independently may engage in greater levels of physical activity outside (Brussoni et al., 2015). Most forms of "hyper-parenting" (e.g., enrolling children in many extra-curricular activities, expecting high levels of achievement, etc.) have also been associated with declines in children's physical activity (Janssen, 2015).

Importance of Early Experiences in Nature

Children's early experiences in nature may also vary depending on parental influence, which could impact how they spend time in nature as an adult. In addition, childhood nature experiences may influence the extent to which parents encourage (or provide opportunities for) their own children to be in nature. For instance, greater time spent in nature as a child has been associated with more time spent in outdoor green spaces as an adult (Holt et al., 2019; Mears et al., 2021; Thompson et al., 2008) and more time engaged in nature-based activities as an adult (e.g., walking, hiking, relaxing in nature, viewing nature or wildlife) – particularly if childhood nature activities occurred with family members, friends, or on one's own, rather than through extracurricular activities or school-based programs (Asah et al., 2018). The frequency of childhood nature visits has been considered a stronger predictor of adult visits to nature spaces than other variables such as area of residence, income, and level of education (Taye et al., 2019). However, parents may visit green spaces less frequently if they have young children (Taye et al., 2019; Thompson et al., 2008). More research should be done to investigate the frequency of nature time for families, specifically.

Parents may also differ in their attachment to certain places, and this may affect how they encourage their children to spend time in nature. Place attachment refers to the emotional connection that people form with certain places in their lives, which may occur through recalling personal- and time-specific memories of favourite places, such as those visited in childhood (Ratcliffe & Korpela, 2018). For instance, adults may have fond memories of certain green spaces they visited as children (Völker & Kistemann, 2015). Further, children who form an attachment with certain places in nature will often return to these places repeatedly, even into adulthood; people who have favourite places in nature may also wish to share these places with others (Ratcliffe & Korpela, 2020). Indeed, parents who

had positive nature experiences as children often express a desire to spend more time in nature, and also to share nature experiences with their children (Fretwell & Greig, 2019).

Early experiences in nature may also influence parents' current attitudes and behaviours related to the environment. For example, spending time outside in one's childhood is considered a better predictor of pro-environmental behaviour as a young adult than childhood attitudes or behaviours (Evans et al., 2018). Spending time in nature as a child, particularly with other family members, may enhance the development of pro-environmental attitudes and behaviours in adulthood (Chawla, 1999), especially if these nature experiences are positive (Wells & Lekies, 2006). Indeed, adults have reported that factors such as time spent outdoors, exposure to greenery or wildlife, and the influence of parents have been influential in shaping their own views about nature (Fretwell & Grieg, 2019). Additionally, pro-environmental attitudes and behaviours in adulthood have been linked to specific outdoor activities in childhood – particularly "wild" experiences, such as camping, fishing, or hiking; children who have "domestic" nature experiences, such as tending to plants or harvesting vegetables, more often exhibit pro-environmental attitudes as adults, as opposed to behaviours (Wells & Lekies, 2006). As such, early experiences in nature may play an important role in shaping how parents feel about the environment. Little is known, however, about how this early nature exposure is linked to family nature experiences later in life.

Individual Differences in Connection to Nature

Parents may also differ in their own connection to nature, which may impact the extent to which they encourage their children to spend time outdoors (or restrict their children's outdoor time). Connection with nature, or nature-relatedness, generally refers to a person's subjective sense of interconnectedness with other living things on the planet (Nisbet et al., 2009). The nature connectedness construct can be considered as multi-dimensional (Tam et al., 2013), including physical, cognitive,

emotional, or spiritual aspects (Fretwell & Greig, 2019; Nisbet et al., 2009). Individuals may also form connections to nature for different reasons, e.g., perceiving nature as a place of refuge or escape, a space to relax, a form of healing, a place to observe beauty, etc. (Martyn & Brymer, 2016).

Having a sense of connection with nature has been associated with greater feelings of vitality (Cervinka et al., 2012; Nisbet et al., 2011), happiness (Fretwell & Greig, 2019; Zelenski & Nisbet, 2014), personal growth (Pritchard et al., 2020), a sense of purpose (Cervinka et al., 2012), lower levels of psychological anxiety (Martyn & Brymer, 2016), and a greater tendency to engage in pro-environmental behaviour (Mackay & Schmidt, 2019). Moreover, adults who have a greater connection to the environment may engage in more recreation in the natural environment – though this finding may be less applicable to young adults, possibly because they tend to live in more urban environments and could have less access to nature (Beery, 2013). Nature-related people tend to use their backyards more, visit parks more frequently (Lin et al., 2014), and spend more time in nature (Nisbet et al., 2009). Perhaps if parents feel more connected to nature, they might encourage their children to spend time in nature as well.

More time spent in nature in adulthood has been linked with a greater sense of connection to nature (Cox et al., 2017; Fretwell & Greig, 2019). More specifically, some studies argue that this connection is highly dependent on certain activities – e.g., engaging in more specific nature-based activities, such as viewing or photographing wildlife, appreciating the views of nature, or listening to birdsong (Fretwell & Greig, 2019; Lumber et al., 2017; Richardson et al., 2021). Further, taking notice of the positive aspects of nature on a regular basis may improve nature-relatedness over time (Richardson & Sheffield, 2017). Other activities that may promote connectedness include leisurely or exercise-based walking, dog-walking, gardening, and engaging in nature-based meditation or yoga (Beery, 2013). Adults' connection with nature may also be positively influenced by their childhood

experiences in nature – especially through engaging in activities which facilitate physical contact with nature (Fretwell & Geig, 2019). More research is needed, however, to better understand the types of experiences which contribute to an individual's sense of nature-relatedness, especially within a Canadian context.

Family Attitudes Towards the Outdoors

Parents' positive views of physical activity and recreation, support of their children's activities, and ability to act as role models, are influential factors in encouraging children to play outdoors (Lee et al., 2021). In terms of nature time, specifically, children reportedly engage in local nature-based activities more frequently when other family members encourage this behaviour and take them outdoors, whereas children engage in fewer nature-based activities when family members restricted them from going to natural spaces in their neighbourhood (Soga, Yamanoi, et al., 2018). Further, children who view natural environments negatively (e.g., as dirty) may be less inclined to engage in nature-based activities and instead prefer to spend time indoors (Bixler & Floyd, 1997). Interestingly, children's negative attitudes towards nature (e.g., thinking that bugs are disgusting) have been linked to parents or grandparents having the same negative attitudes (Soga et al., 2020).

Time in Nature During the Pandemic

Following the rise in cases of the novel Coronavirus (COVID-19) in 2020, many countries imposed limitations and restrictions to daily activities such as banning travel, closing schools and non-essential businesses, and mandating social distancing, in order to reduce disease transmission (Barrable et al., 2021). These life changes may have impacted how individuals engage with the natural environment. For instance, prior to the COVID-19 pandemic, adults spent approximately one hour in green spaces each week (Mears et al., 2021). Nature time may have increased during the pandemic, however, as some university students reported having more time to spend outdoors (Puhakka, 2021) and

using time in nature as a coping method (Desrochers et al., 2022). In various cities in Asia, a higher number of visits to green spaces (e.g., parks) were recorded after the onset of the pandemic, and this increase continued as the pandemic progressed (Lu et al., 2021). Furthermore, in Norway, the frequency of outdoor activities (e.g., running and cycling) in urban green spaces significantly increased during the pandemic in 2020, compared to the previous three years (Venter et al., 2020). It is important to note that these results have not always been consistent, though – due to COVID-based restrictions, some adults in the UK reported fewer visits to green spaces since before the pandemic (Burnett et al., 2021).

Although many adults may have sought out nature to cope with the stress of the pandemic (Robinson et al., 2021), little is known about the impact of COVID-19 on families' nature experiences, in particular. For example, COVID-19 restrictions in Canada have been associated with large declines in children's and adolescents' outdoor activities, as well as decreases in families' physical activities (Moore et al., 2020). Some initial evidence may also suggest particular barriers for families, as parents with busy schedules may have less time to provide opportunities for their children to spend outdoors (Riazi et al., 2021). Parents may be required to work from home while also looking after their children, with limited assistance (Fegert et al., 2020) – a particularly stressful situation for those with children under 18 years of age (Gaderman et al., 2021; Riazi et al., 2021). With growing evidence of the benefits of nature for physical and mental health, exploring family activities during the pandemic may provide some insights into the potential barriers limiting families' outdoor experiences in nature.

The Present Study

This study investigated how often parents and their children are spending time in nature, the types of activities they engage in, and how these experiences may be affected by the COVID-19 pandemic. In addition, parents' nature experiences during their own childhood, as well as their

connection to nature, were assessed in order to explore their potential impact on current family experiences in the natural environment. It was hypothesized that:

1. Parents who believe it is easier to access nature spaces will report more nature contact with their family[1]. Similarly, parents who report fewer barriers to access nature (as per qualitative responses) will report more nature contact with their family.
2. Parents whose ability to get outdoors in nature was less impacted by the pandemic will report more nature contact with their family.
3. Parents who have a greater connection with nature will report a lower impact of the pandemic on their ability to get outdoors in nature, and will report more nature contact with their family.
4. Parents' current (adult) and childhood connection with nature will be positively correlated.
5. Parents who recall engaging in more frequent contact with nature as a child (e.g., playing in the backyard or local park, going for nature walks) will have a greater childhood and current (adult) connection with nature.
6. Parents who prefer to play or do activities outdoors with their children will report more time spent engaged in outdoor activities and greater frequency of playing with their children outdoors in nature.
7. Participants who recall frequently engaging in outdoor activities with their own parents in childhood will report more (current) family time spent engaged in outdoor activities and greater frequency of playing with their children outdoors in nature.
8. Parents who place more importance on early nature experiences and/or outdoor play for child development will report more nature contact with their family.

[1] 'Nature contact with family', for all hypotheses, is operationalized with three variables: family time spent engaged in outdoor activities, frequency of family visits to nature, and parents' general frequency of play with children outdoors in nature.

9. Parents who were frequently encouraged to spend time outdoors as a child will report more nature contact with their own family.

Method

Participants

Participants across Canada were recruited via snowball sampling for an anonymous online survey assessing family activities during the COVID-19 pandemic (see Appendix A for the full survey). Adult (18+) parents with one or more children under the age of 16 were eligible to participate in the study, and were given the opportunity to enter a $200 cash prize draw. A total of 138 parents submitted information for the survey. Participants who did not have children, who only gave demographic information, or who did not complete key study measures (e.g., frequency of visits to and perceived accessibility of nature spaces, the Nature-Relatedness scale, Inclusion of Nature in Self scale) were removed from the data set (N = 17). The final sample consisted of 121 participants; this included 53 participants who completed all study measures, as well as 68 participants who completed part of the measures (including n = 27 who were only missing qualitative data) but were retained and included in some analyses.

Overall, parents in the study are largely female, Caucasian, and reside in suburban areas; they typically live in a house with a median of two children (full demographic characteristics are found in Table 1). Most have a post-graduate education, slightly more liberal attitudes, and consider their family to be slightly more financially well-off than others in their community. Their children are mostly between ages five to nine, and were going to school online in the spring of 2021.

Table 1

Family Demographic Characteristics

	M	*SD*	Range
Parent Age (*N* = 114)	40.18	6.15	27 – 64
Political Orientation (*N* = 121)	2.34	0.89	1 – 5
Subjective Socioeconomic Status (*N* = 121)	6.38	1.85	1 – 10
	Median		Range
Number of Children (*N* = 121)	2.00		1 – 5
	Percentage	*N*	
Parent Gender (*N* = 121)			
Female	90.1%	109	
Male	8.3%	10	
Gender Fluid/Non-Binary/Two Spirit	0.8%	1	
Prefer Not to Say	0.8%	1	
Child(ren)'s Age			
Infant (0-1)	5.1%	12	
Toddler (1-3)	12.7%	30	
Preschool (3-5)	15.2%	36	
School Age (5-9)	33.8%	80	
Pre-Teen (9-13)	21.5%	51	
Young Teen (13-15)	11.8%	28	
Child(ren)'s Gender			
Female	46.0%	108	
Male	53.2%	125	
Gender Fluid/Non-Binary/Two Spirit	0.9%	2	
Prefer to Self-Describe	0.0%	0	
Prefer Not to Say	0.0%	0	
Family Ethnicity (*N* = 121)			
Arab	3.3%	4	
Black	2.5%	3	
Caucasian	88.4%	107	
Chinese	2.5%	3	
Filipino	1.7%	2	
Indigenous	1.7%	2	
Japanese	0.0%	0	
Korean	0.8%	1	
Latin American	2.5%	3	
South Asian	3.3%	4	
Southeast Asian	0.8%	1	

West Asian	0.0%	0
Multiple Ethnicities	1.7%	2
Other	0.8%	1
Prefer Not to Answer	1.7%	2
Location Growing Up (*N* = 121)		
City (Downtown)	8.3%	10
City (Suburbs)	42.1%	51
Small Town	28.1%	34
Rural or Farm	18.2%	22
Other	3.3%	4
Location Living Now (*N* = 121)		
City (Downtown)	11.6%	14
City (Suburbs)	48.8%	59
Ex-Urban Area (Development Beyond Suburbs)	1.7%	2
Small Town	22.3%	27
Rural or Farm	14.0%	17
Other	1.7%	2
Current Dwelling (*N* = 121)		
Single Family House	82.6%	100
Apartment	5.0%	6
Townhouse	9.1%	11
Low-Rise Building	1.7%	2
Other [Duplex]	1.7%	2
Others Living at Home (*N* = 121)		
Significant Other	85.1%	103
Parents/Grandparents	5.0%	6
Children	98.3%	119
Other	2.5%	3
Parent Highest Level of Education (*N* = 121)		
Some / Graduated High School	2.5%	3
Some / Graduated Technical School / College	16.5%	20
Some / Graduated University	24.0%	29
Post-Graduate / Graduated University	55.4%	67
Not Sure / Did Not Disclose	1.7%	2
Child(ren)'s Education in Spring (April – June) 2021 (*N* = 121)		
Online	42.1%	51
In-Person	14.0%	17

Both Online and In-Person	14.9%	18
Child(ren) is / are Homeschooled	6.6%	8
Children is / are not in School yet	16.5%	20
Other	5.8%	7

Materials

All participants completed the following measures:

Demographic and Background Information

Parents reported their age, gender, education, past and present living circumstances, and number of children. Political orientation was scored with three items on a five-point Likert scale ranging from 'extremely liberal (1) to 'extremely conservative' (5); scores across these three items were then averaged to produce a composite score for each participant ($\alpha = .87$). Questions were also included asking about children's age, gender, and type of education, as well as family ethnicity.

Perceived Financial Status

An adapted version of the MacArthur Scale of Subjective Social Status (Adler et al., 2000) was used to determine perceived socio-economic status. The scale depicts a vertical ladder with 10 rungs: the first rung (at the bottom) represents a perception of being the *least* financially well off, and the tenth rung (at the top) represents a perception of being the *most* financially well off. Participants were asked to place their family on the ladder in terms of how financially well off they perceived their family to be, relative to other families in their community. Respondents moved a slider ranging from 1-10 underneath the ladder image to answer.

Frequency of Visits to Nature

Participants were asked how often they and their families visited a range of places in nature, including: a beach/waterfront, backyard, schoolyard, local park, bike paths/trails, a conservation park/area, walking trails/forested areas, pond or stream, or public/community garden. Participants rated

the frequency of family visits to these places by selecting either ‘never’, ‘once or twice a year’, ‘once or twice a month’, ‘once or twice a week’, or ‘almost daily/every day’ for each place.

Access to Nature

Participants were asked how easy it was for them and their families to visit each of the above nature areas using a five-point Likert scale ranging from ‘very difficult’ (1) to ‘very easy’ (5). Additionally, a composite variable was created by averaging participants’ ratings for all nine places (α = .74), in order to get a sense of parents’ perceived ease of access to nature in general. An open-ended response question about perceived barriers asked participants to describe some things that made it difficult for them to visit these nature spaces, in order to understand specific barriers that parents and families may face.

Impact of the COVID-19 Pandemic

Participants were asked about the extent to which the pandemic impacted various areas of their life, including: their living situation, work, social life, physical activity, ability to get outside in nature, child care, homeschooling, and mental-wellbeing, as well as their children’s physical activity and mental-wellbeing. Participants rated the impact of COVID-19 on each of these areas of their life by moving a slider between ‘no impact at all’ (1) and ‘impacted my life a great deal’ (5). Participants were also given an open-ended question to allow for a more detailed response, which asked them to describe how the COVID-19 pandemic impact their life in any of the previous ways.

Connection with Nature

The Nature Relatedness (NR) Scale (Nisbet et al., 2009) was used to measure parents’ subjective sense of connection with nature. The scale consists of 21 statements, and participants rated how well each item described them using a five-point Likert scale ranging from ‘disagree strongly’ (1) to ‘agree strongly’ (5); higher scores indicate a stronger connection with nature. Reverse items were recoded and

participants' scores were averaged to calculate both an overall NR score for all 21 items (α = .90) as well as a score on each of three sub-scales. The first dimension, NR-self, includes eight items (α = .88) such as "I feel very connected to all living things and the earth". The second dimension, NR-perspective, includes seven items (α = .70) such as "Humans have the right to use natural resources any way we want". The third dimension, NR-experience, includes six items (α = .79) such as "I enjoy being outdoors, even in unpleasant weather".

The Inclusion of Nature in Self Scale (INS; Schultz, 2002) was used to measure parents' connection with nature. Seven pairs of circles, with one circle labelled 'self' and the other labelled 'nature', represented different levels of inclusion of nature in self. The varying amount of overlap between circles is indicative of connectedness, ranging from two separate circles (complete separation between self and nature) to one single circle (complete overlap between self and nature). Participants completed two versions of the scale, to assess their current interconnection with nature as well as their childhood nature connectedness. A modified version of the scale ('me/my neighbourhood') was used to measure participants' current interconnection with their neighbourhood.

Parental Views on Play and Important Experiences for Child Development

To understand parents' views and practices regarding play with their children, participants were first asked how often they play with their children, both inside and outdoors in nature. The frequency of play in both environments was rated on 5-point scale ranging from 'never', 'a few times a month', 'once a week', 'several times a week', or 'every day'. Participants were then asked, according to their own personal preferences, the environment in which they preferred to play with their children: 'indoors', 'outside in nature', or 'other', which was accompanied by a blank text box for participants to type in their answer.

Participants were also asked to rate how important they viewed various opportunities for child development, including: early nature experiences, adult guidance, independent exploration, indoor play, and outdoor play. These questions were adapted from an interview protocol used by Vandermaas-Peeler and colleagues (2019) to understand how parents believed child development may be impacted by various childhood experiences. Participants indicated their response using a sliding scale ranging from 'not important' (1) to 'very important' (5).

Family Activities

To understand exactly how families may be spending their current time together, participants were asked how many hours their family spent engaged in various indoor and outdoor pastimes over the last 3 days. Options included: imaginative/free play indoors, watching TV or movies/gaming/ video-chatting, playing boardgames/making arts and crafts/doing puzzles, visiting museums or art galleries, imaginative/free play outdoors, going on a picnic, going on a walk/hike/bike ride in nature, visiting a zoo, gardening/planting or harvesting, camping, fishing, canoeing or kayaking, and swimming. An additional option was given for participants to describe any other activity that is important to their family. Beside each activity, parents typed in the number of hours their family spend engaged in that past-time. Participants were then asked an open-ended question to describe some of their favourite family activities.

To understand how the current pandemic may have shaped these experiences, participants were also asked if COVID-19 changed their family's activities. The choice for this response was either 'yes' or 'no'. If participants chose 'yes', they were given an open-ended question which asked them to explain how the pandemic had affected their activities (e.g., how much more or less time their family spent doing certain things).

Parents' Childhood Experiences Outdoors

To assess how parents' activities were supported in their childhood, participants were asked to recall how often their parents (or other significant adults): encouraged them to go outside, wanted them to stay outside for most of the day, supervised their time spent outdoors, did activities with them outdoors, encouraged them to explore the outdoors independently, and encouraged them to stay indoors. These questions were adapted from the modified dimensions of social support for outdoor play questionnaire, as used in a study by Beets and colleagues (2007). A 5-item scale ranging from 'never', 'sometimes', 'often', 'all the time', and 'unsure/cannot recall' was used to capture participant responses for each question. In addition, a composite variable was created in order to get a better sense of the extent to which parents' time spent outdoors, specifically, was encouraged by their own parents in childhood. This subscale included three of the above items ($\alpha = .89$): how often their parents (or other significant adults) encouraged them to go outside, encouraged them to explore the outdoors independently, and wanted them to stay outside for most of the day. Scores were not computed for participants who indicated 'unsure/cannot recall' on at least one of the three items.

To better understand how parents may have spent their time outdoors as a child, participants were asked to recall how often they engaged in the following activities: walking or hiking in nature, riding a bike, playing in their backyard or local park, camping, swimming outdoors, gardening or harvesting, taking care of pets or animals, fishing, having picnics, canoeing or kayaking, playing in snow, skating, and sledding or tobogganing. An extra option was also given for participants to describe any other activity they recalled. Parents rated the frequency of each activity on a 5-point scale, ranging from 'never', 'rarely', 'occasionally', 'regularly', or 'all the time'.

Participants were also asked who most often accompanied them when they were out in nature in their childhood, and chose from one of the following responses: 'parents or other significant adults',

‘sibling(s)’, ‘friends/peers’, ‘teachers or school group’, or ‘I was mostly by myself’. Two open-ended questions followed, which allowed participants to describe their childhood memories in greater detail: if they had a favourite place in nature growing up, and if they had a memorable nature experience from their childhood that they could share. Large text boxes were included underneath each question for participants to type their responses.

For all qualitative results, replied were coded and grouped together under various themes derived from the total set of responses. Themes were analyzed by either counting the number of replies for each group or describing overall patterns.

Procedure

Participants were invited to complete an anonymous online survey about family experiences during the COVID-19 pandemic, which was hosted on Trent University’s Qualtrics survey program. From July to December of 2021, advertisements for the study were posted on social media and distributed via email to various parent-related and outdoor organizations across Canada; these included parent and child resource and/or program providers, daycares, schools, outdoor play groups, parks and recreation centers, and nature or conservation organizations (see Appendix B for advertising materials). Interested parents visited the study website, which included more details about what the study involved. After providing informed consent, participants completed questions about their demographics, access to nature, family activities, and the life impacts of COVID-19. The survey included measures of connection with nature and questions about participants’ early nature and play experiences. Participants were then presented with debriefing information that explained the purpose of the research in more detail and included resources on outdoor play and human-nature connection. Interested participants had the option to enter a $200 cash prized draw by providing their email address in a separate online form

that was not linked to the survey. The total time needed to complete the survey was approximately 25 minutes.

Results

Missing Values and Descriptive Statistics

After examining all quantitative data, missing values were less than 4%, which is within an acceptable range (Dong & Peng, 2013). Due to the challenges in recruiting community members, data was retained from participants even if they left some of these answers blank.

Overall, in terms of visits to places in nature, families most frequently visited their backyard and least frequently visited public or community gardens (see Table 2 and Figure 1 for frequency of reported family visits to all nine nature areas).

Table 2

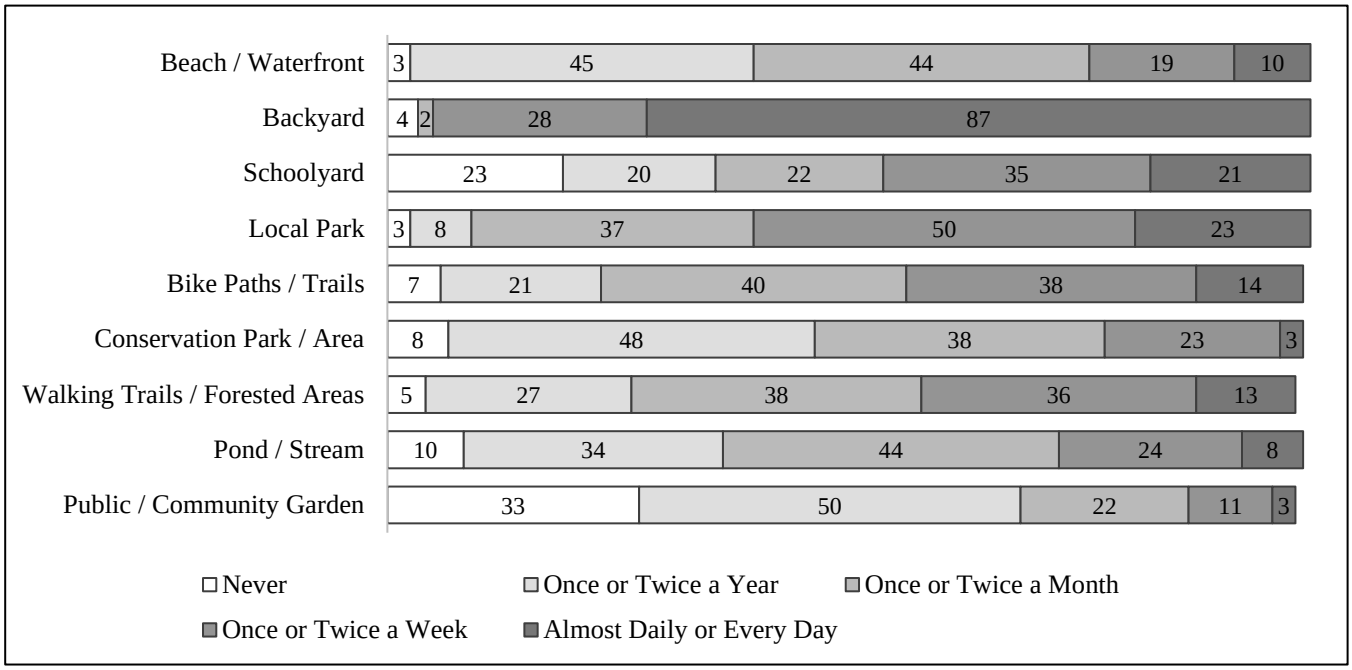
Frequency of Family Visits to Nature Areas

	Percentage	*N*
Beach/Waterfront (*N* = 121)		
Never	2.5%	3
Once or Twice a Year	37.2%	45
Once or Twice a Month	36.4%	44
Once or Twice a Week	15.7%	19
Almost Daily / Every Day	8.3%	10
Backyard (*N* = 121)		
Never	3.3%	4
Once or Twice a Year	0.0%	0
Once or Twice a Month	1.7%	2
Once or Twice a Week	23.1%	28
Almost Daily / Every Day	71.9%	87
Schoolyard (*N* = 121)		
Never	19.0%	23
Once or Twice a Year	16.5%	20
Once or Twice a Month	18.2%	22
Once or Twice a Week	28.9%	35
Almost Daily / Every Day	17.4%	21

Local Park (*N* = 121)		
Never	2.5%	3
Once or Twice a Year	6.6%	8
Once or Twice a Month	30.6%	37
Once or Twice a Week	41.3%	50
Almost Daily / Every Day	19.0%	23
Bike Paths / Trails (*N* = 120)		
Never	5.8%	7
Once or Twice a Year	17.5%	21
Once or Twice a Month	33.3%	40
Once or Twice a Week	31.7%	38
Almost Daily / Every Day	11.7%	14
Conservation Park / Area (*N* = 120)		
Never	6.7%	8
Once or Twice a Year	40.0%	48
Once or Twice a Month	31.7%	38
Once or Twice a Week	19.2%	23
Almost Daily / Every Day	2.5%	3
Walking Trails / Forested Areas (*N* = 119)		
Never	4.2%	5
Once or Twice a Year	22.7%	27
Once or Twice a Month	31.9%	38
Once or Twice a Week	30.3%	36
Almost Daily / Every Day	10.9%	13
Pond / Stream (*N* = 120)		
Never	8.3%	10
Once or Twice a Year	28.3%	34
Once or Twice a Month	36.7%	44
Once or Twice a Week	20.0%	24
Almost Daily / Every Day	6.7%	8
Public or Community Garden (*N* = 119)		
Never	27.7%	33
Once or Twice a Year	42.0%	50
Once or Twice a Month	18.5%	22
Once or Twice a Week	9.2%	11
Almost Daily / Every Day	2.5%	3

Figure 1

Frequency of Family Visits to Nature Areas



The most easily accessible nature space was the backyard, followed by a local park; the least easily accessible space was a conservation park/area, very closely followed by a public or community garden (ease of access ratings for all nine nature spaces can be found in Table 3 and Figure 2).

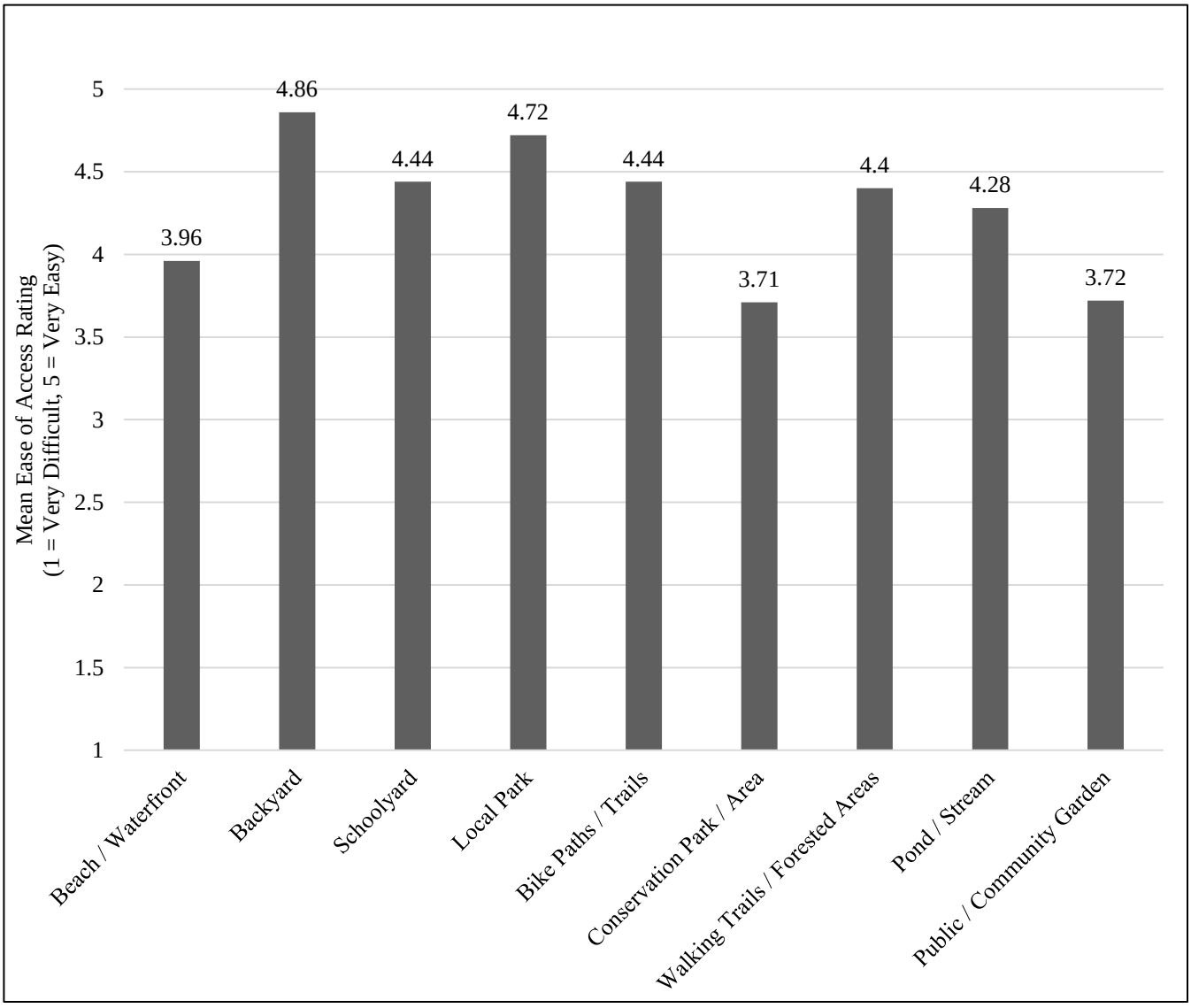
Table 3

Parents' Perceived Ease of Access to Nature Areas

	M	*SD*	Range
Beach / Waterfront (*N* = 121)	3.96	1.15	1.00 – 5.00
Backyard (*N* = 119)	4.86	0.65	1.00 – 5.00
Schoolyard (*N* = 120)	4.44	0.93	2.00 – 5.00
Local Park (*N* = 119)	4.72	0.59	2.00 – 5.00
Bike Paths / Trails (*N* = 119)	4.44	0.79	1.00 – 5.00
Conservation Park / Area (*N* = 119)	3.71	1.23	1.00 – 5.00
Walking Trails / Forested Areas (*N* = 117)	4.40	0.83	2.00 – 5.00
Pond / Stream (*N* = 119)	4.28	0.97	2.00 – 5.00
Public / Community Garden (*N* = 119)	3.72	1.25	1.00 – 5.00

Figure 2

Parents' Perceived Ease of Access to Nature Areas

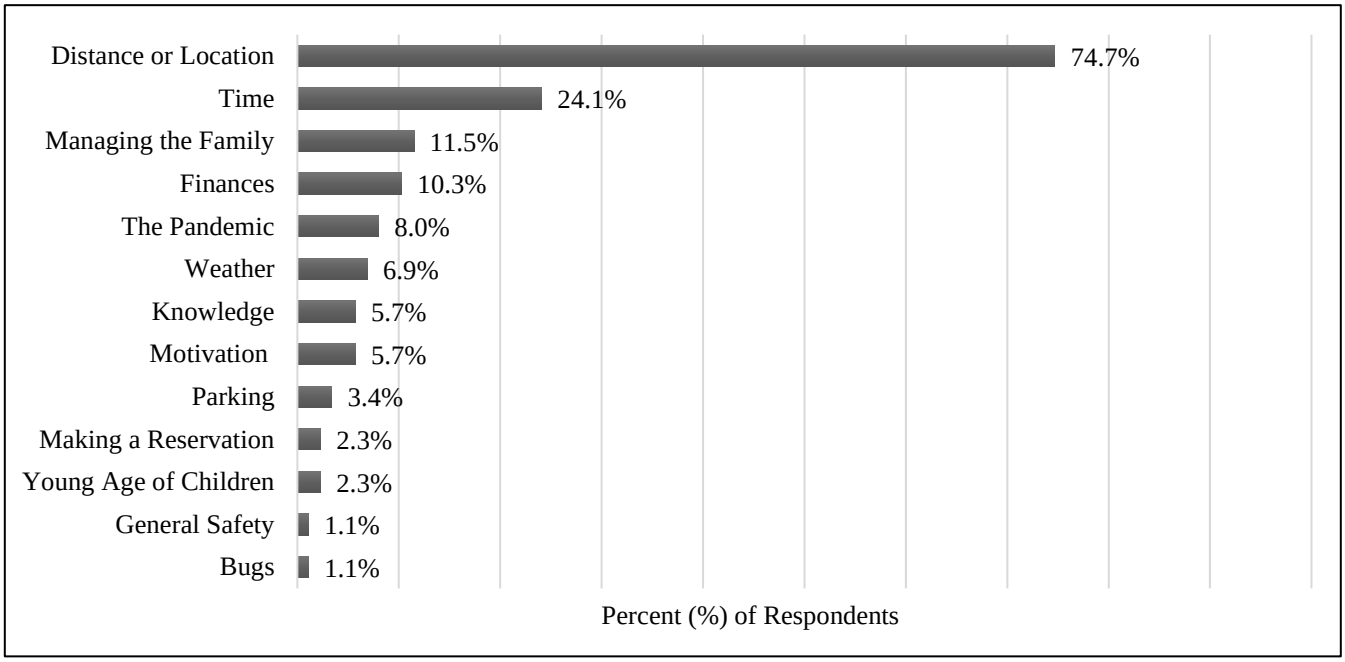


According to 87 parents who described things that make nature spaces difficult to access, the most common barrier was distance or location (e.g., needing a car to drive to some areas, or places were inaccessible by transit), followed by time restraints (e.g., making time to visit nature places within work or school schedules was challenging). The least common barriers were bugs and general safety,

followed by making reservations (e.g., at conservation areas) and young age of children (see Figure 3 for all barriers reported by parents).

Figure 3

Parents' Perceived Barriers to Visiting Nature Areas



In terms of the COVID-19 pandemic, the greatest impact was on the social lives of parents and families, and the least impact was on respondents' living situation (see Table 4 and Figure 4 for reported impacts across all areas of family life). Qualitative responses describing pandemic impacts also supported these findings: Parents most commonly mentioned a lack of social interaction between friends and extended family, and even social tensions within the household, as a significant struggle – though it is notable that some parents perceived the increased time with their immediate family during the pandemic as beneficial. Living situation was only mentioned twice, in which parents described having to move due to their own or their landlord's job loss. Other reports of negative pandemic impacts on family life included a decrease in physical and mental health for both parents and children (e.g., increased stress and anxiety, decreased physical activity), difficulties related to their job (e.g., loss of

employment or spending more time working at home), loss of organized children's activities (e.g., sports, swimming) and closure of facilities (e.g., gyms), difficulties homeschooling or learning/teaching online, and trying to manage various responsibilities simultaneously – including work, their children's schooling, and/or childcare needs; only a few parents discussed financial difficulties or too much screen time. However, a positive impact mentioned by some parents was that their family spent more time outdoors than normal. For example, one participant described: "We have got outside in nature much more than we did before as most other options weren't available. Nature is always 'open'".

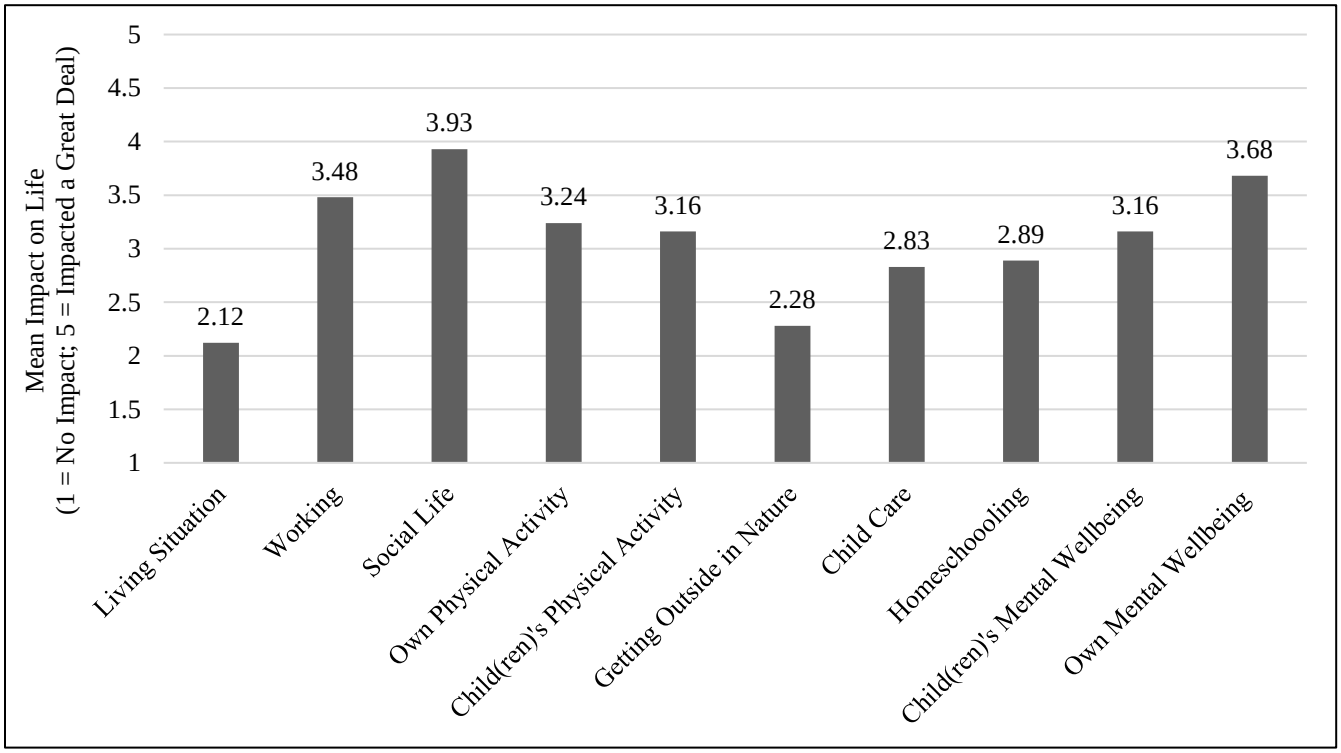
Table 4

Parents' Perceived Impact of the COVID-19 Pandemic on Various Areas of Life

	M	*SD*	Range
My Living Situation (*N* = 102)	2.12	1.43	1.00 – 5.00
Working (*N* = 114)	3.48	1.38	1.00 – 5.00
Social Life (*N* = 120)	3.93	0.98	1.00 – 5.00
My Own Physical Activity (*N* = 117)	3.24	1.24	1.00 – 5.00
My Child(ren)'s Physical Activity (*N* = 118)	3.16	1.28	1.00 – 5.00
Getting Outside, in Nature (*N* = 109)	2.28	1.33	1.00 – 5.00
Child Care (*N* = 112)	2.83	1.65	1.00 – 5.00
Homeschooling (*N* = 106)	2.89	1.78	1.00 – 5.00
My Child(ren)'s Mental Wellbeing (*N* = 116)	3.16	1.36	1.00 – 5.00
My Own Mental Wellbeing (*N* = 118)	3.68	1.12	1.00 – 5.00

Figure 4

Parents' Perceived Impact of the COVID-19 Pandemic on Various Areas of Life



Although parents recalled a moderate sense of inclusion with nature in their childhood, they were somewhat more connected to nature in the present. Parents were also highly nature-related (see Table 5 for parents' average reports of inclusion with nature and their neighbourhood, and Table 6 for parents' average sense of nature-relatedness).

Table 5

Inclusion of Nature in Self Scale

	M	*SD*	Range
Childhood Connection with Nature (*N* = 120)	4.62	1.70	1.00 – 7.00
Connection with Nature (*N* = 120)	4.74	1.50	1.00 – 7.00
Connection with Neighbourhood (*N* = 121)	4.00	1.72	1.00 – 7.00

Table 6

Nature-Relatedness Scale

	M	*SD*	Range
NR 21 (*N* = 121)	3.99	0.63	2.19 – 5.00
NR Self (*N* = 121)	4.04	0.71	1.63 – 5.00
NR Perspective (*N* = 121)	4.01	0.65	2.29 – 5.00
NR Experience (*N* = 121)	3.89	0.86	1.00 – 5.00

Most parents reported playing or doing activities with their children inside every day and outside several times a week – though parents overwhelmingly prefer doing activities with their children outside in nature, rather than inside (see Table 7 for frequency of indoor and outdoor play, as well as parents' preferred space to play with their children). The 'other' category included parents who had an equal preference to play outdoors or indoors, or whose preference depended on the season, weather, type of activity, etc.

Table 7

Parents' Play Experiences with their Child(ren)

	Percentage	*N*
Play / Do Activities with Child(ren) Inside (*N* = 120)		
Never	2.7%	2
A Few Times a Month	5.8%	7
Once a Week	11.7%	14
Several Times a Week	28.3%	34
Every Day	52.5%	63
Play / Do Activities with Child(ren) Outside, in Nature (*N* = 119)		
Never	0.8%	1
A Few Times a Month	7.6%	9
Once a Week	8.4%	10
Several Times a Week	53.8%	64
Every Day	29.4%	35
Parent Play Preferences with Child(ren) (*N* = 119)		
Indoors	11.8%	14
Outdoors, in Nature	79.0%	94
Other	9.2%	11

In terms of opportunities that promote children's development, independent exploration was the most important, closely followed by both outdoor play and early experiences in nature; the least important experience was indoor play (see Table 8 for how important parents believed various experiences were for child development).

Table 8

Experiences Believed to be Important for Child Development

	M	*SD*	Range
Adult Guidance (*N* = 117)	4.05	0.91	2.00 – 5.00
Independent Exploration (*N* = 118)	4.68	0.55	3.00 – 5.00
Early Experiences in Nature (*N* = 118)	4.64	0.69	2.00 – 5.00
Indoor Play (*N* = 118)	3.77	0.99	1.00 – 5.00
Outdoor Play (*N* = 118)	4.66	0.56	3.00 – 5.00

According to 111 accounts of family activities, families spent the most time over the past three days engaged in outdoor free play, indoor free play, and using technology/media (e.g., watching TV/movies, gaming, etc.), and the least amount of time visiting zoos, fishing, and visiting museums/art galleries. Activities mentioned in the 'other' category included reading, organized activities such as sports, cooking/baking, doing errands or chores, and sharing family meals (see Table 9 and Figure 5 for the average time families spent engaged in all activities).

Table 9

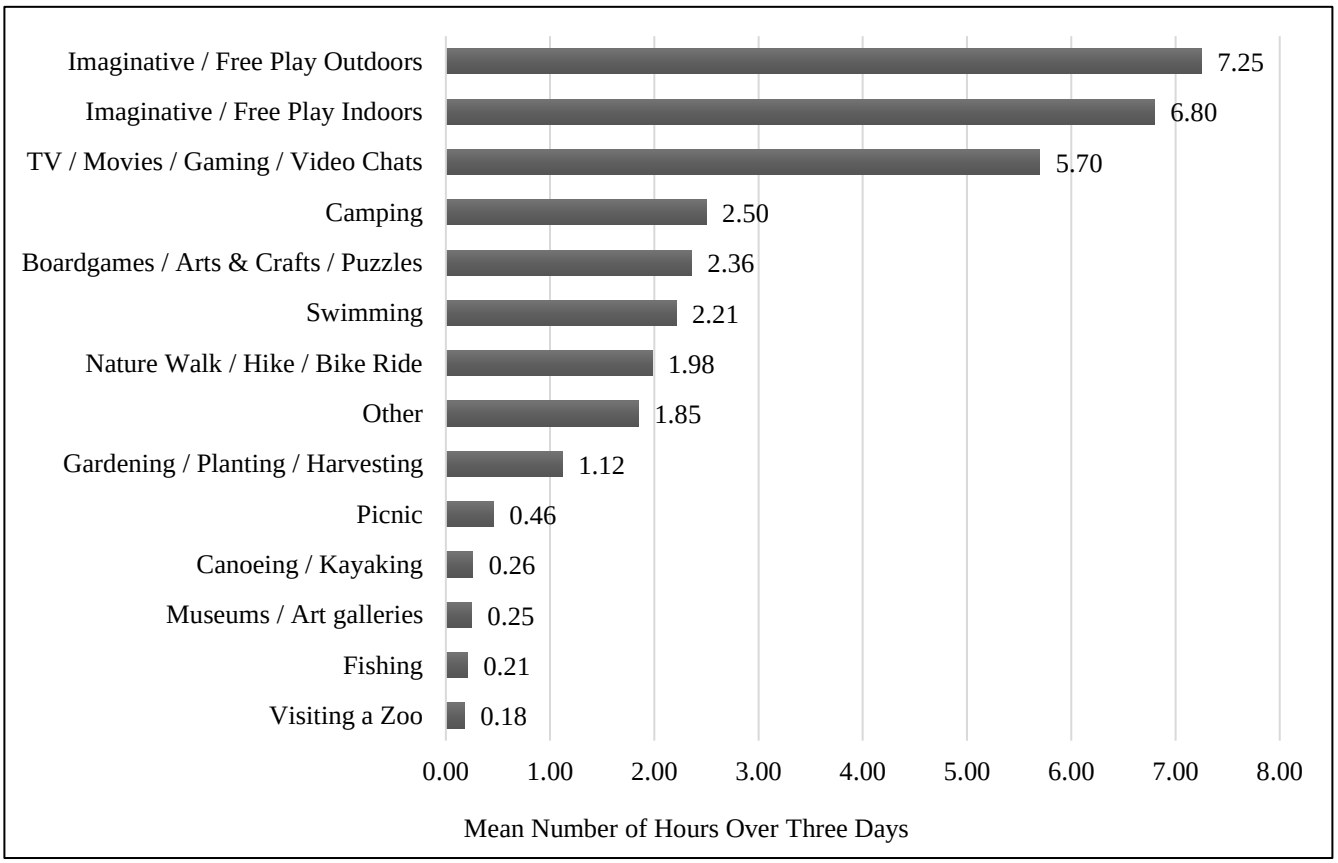
Average Number of Hours Families Spent Doing Various Activities Over the Past Three Days

	M	*SD*	Range
Imaginative / Free Play Indoors (*N* = 114)	6.80	6.17	0 – 30
TV / Movies / Gaming / Video Chat (*N* = 114)	5.70	4.43	0 – 25
Boardgames / Arts and Crafts / Puzzles (*N* = 113)	2.36	2.23	0 – 10
Museums / Art Galleries (*N* = 114)	0.25	0.89	0 – 6
Imaginative / Free Play Outdoors (*N* = 114)	7.25	6.69	0 – 50
Having a Picnic (*N* = 114)	0.46	1.05	0 – 6
Nature Walk / Hike / Bike Ride (*N* = 114)	1.98	1.88	0 – 9

Visiting a Zoo (*N* = 114)	0.18	0.74	0 – 5
Gardening / Planting / Harvesting (*N* = 114)	1.12	1.58	0 – 10
Camping (*N* = 113)	2.50	10.71	0 – 72
Fishing (*N* = 114)	0.21	0.80	0 – 6
Canoeing / Kayaking (*N* = 114)	0.26	0.76	0 – 4
Swimming (*N* = 114)	2.21	2.76	0 – 14
Other (*N* = 113)	1.85	3.58	0 – 28

Figure 5

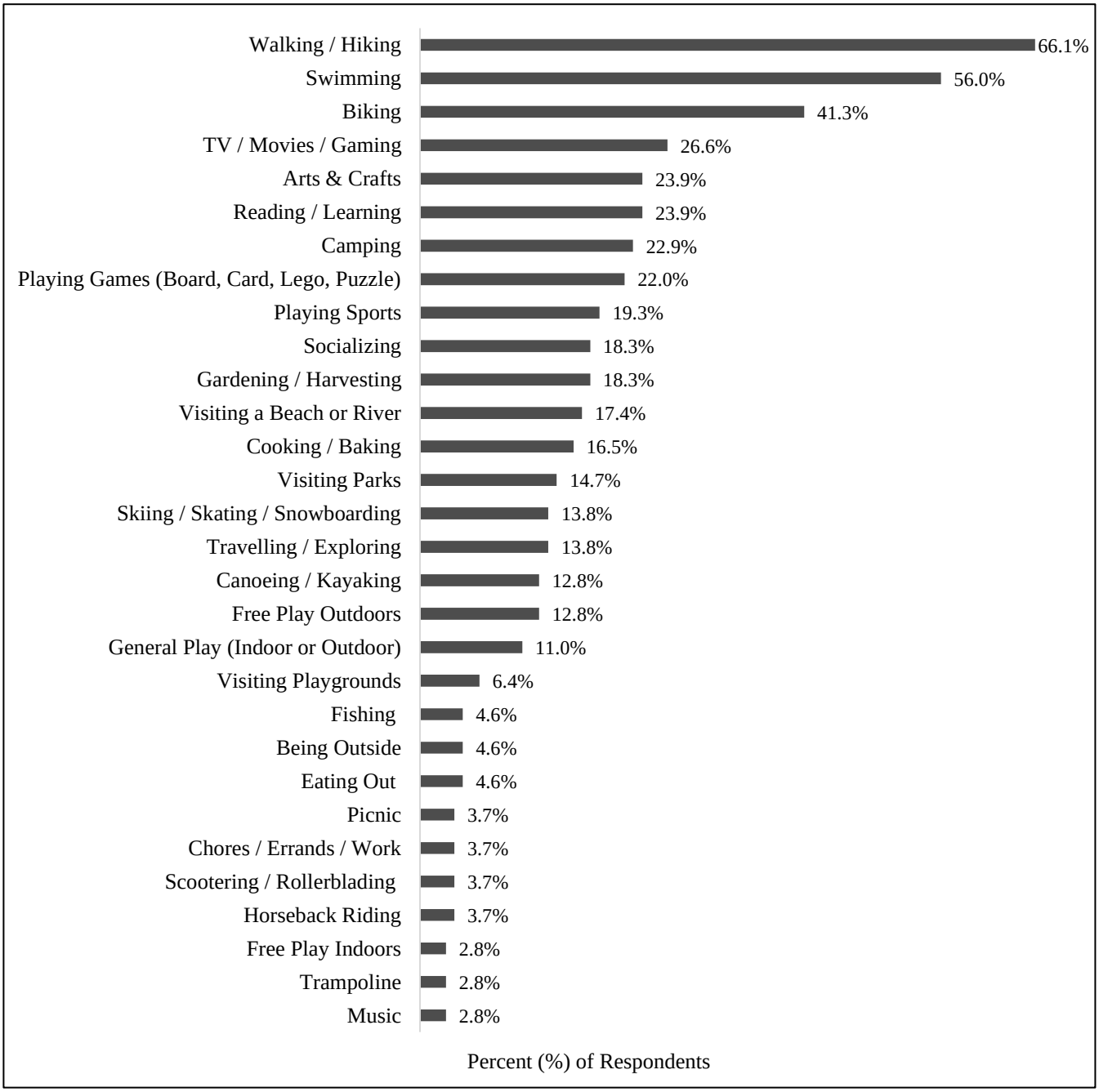
Average Number of Hours Families Spent Doing Various Activities Over the Past Three Days



Out of 109 parents who described their family's favourite activity, going for walks or hikes was the most common, followed by swimming, then biking; the least commonly reported activities were music-related (e.g., singing, playing, listening), playing on a trampoline, or indoor free play (see Figure 6 for all reported favourite family activities).

Figure 6

Favourite Family Activities



Parents also described how the pandemic impacted their family activities, specifically. Most often, parents discussed the prevention of normal activities – including the cancellation of organized

sports or registered programs for their children, being unable to visit indoor attractions (e.g., restaurants, malls, movie theatres, libraries, etc.) or outdoor attractions (e.g., zoos, fairs), and not going to certain outdoor nature spaces such as parks, trails, beaches, and campgrounds due to pandemic-related closures or overcrowding. Some parents also discussed a greatly reduced travel radius, spending more time close to home or their own neighbourhood. Further, there were reports of significant decreases in socialization with friends and extended family, and much more time spent with immediate family. A few parents mentioned doing more indoor activities together (e.g., playing games, making art), and some reported greater screen time for both themselves and their children. However, many parents mentioned that, in general, they spent more time outside as a family – often through walks, bike rides, playing in the backyard, or exploring local nature areas.

During their childhood, parents most frequently recalled their parents encouraging them to go outside, and least frequently recalled being encouraged to stay indoors (see Table 10 and Figure 7 for frequency reports of parent behaviours).

Table 10

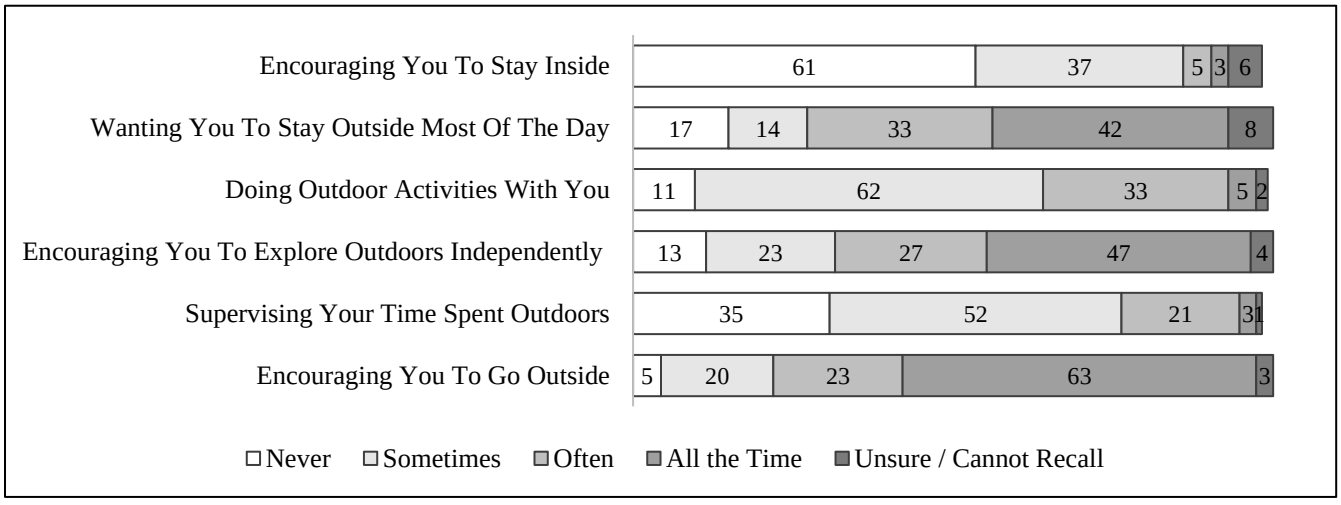
Childhood Recollections of Parent Behaviour

	Percentage	*N*
Encouraging You to go Outside (*N* = 114)		
Never	4.4%	5
Sometimes	17.5%	20
Often	20.2%	23
All the Time	55.3%	63
Unsure / Cannot Recall	2.6%	3
Supervising Your Time Spent Outdoors (*N* = 112)		
Never	31.3%	35
Sometimes	46.4%	52
Often	18.8%	21
All the Time	2.7%	3
Unsure / Cannot Recall	0.9%	1
Encouraging You to Explore the Outdoors Independently (*N* = 114)		

Never	11.4%	13
Sometimes	20.2%	23
Often	23.7%	27
All the Time	41.2%	47
Unsure / Cannot Recall	3.5%	4
Doing Outdoor Activities With You (*N* = 113)		
Never	9.7%	11
Sometimes	54.9%	62
Often	29.2%	33
All the Time	4.4%	5
Unsure / Cannot Recall	1.8%	2
Wanting You to Stay Outside for Most of the Day (*N* = 114)		
Never	14.9%	17
Sometimes	12.3%	14
Often	28.9%	33
All the Time	36.8%	42
Unsure / Cannot Recall	7.0%	8
Encouraging You to Stay Inside (*N* = 112)		
Never	54.5%	61
Sometimes	33.0%	37
Often	4.5%	5
All the Time	2.7%	3
Unsure / Cannot Recall	5.4%	6

Figure 7

Frequencies of Childhood Recollections of Parent Behaviour



In terms of childhood activities outdoors, parents recalled playing in their backyard or local park fairly often as a child, whereas fewer people regularly went canoeing or kayaking (see Table 11 and Figure 8 for the frequency reports of all childhood nature activities). Other activities mentioned included playing sports, skiing, doing outdoor chores, horseback riding, playing in sand, or going to a cottage, beach, or family farm.

Table 11

Childhood Frequency of Outdoor Activities

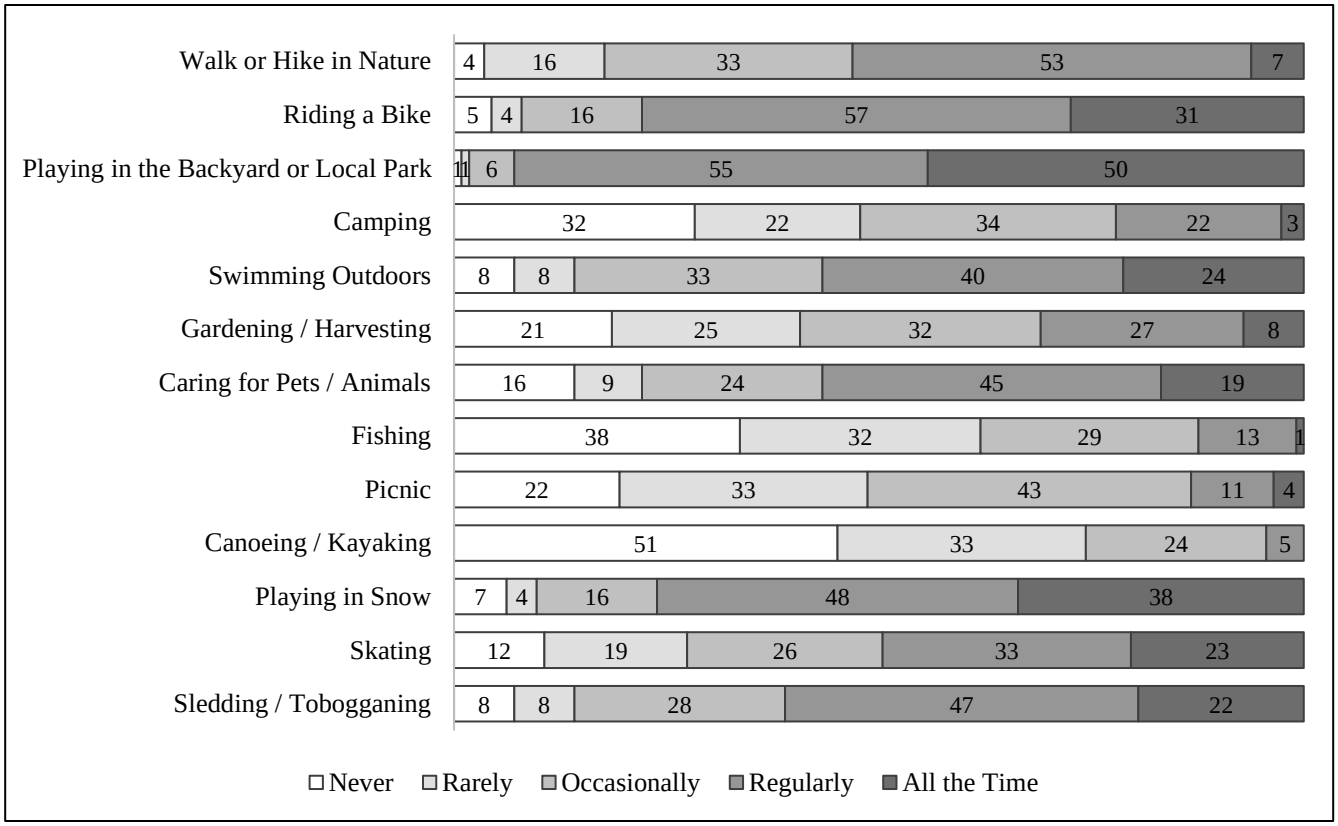
	Percentage	*N*
Walk or Hike in Nature (*N* = 113)		
Never	3.5%	4
Rarely	14.2%	16
Occasionally	29.2%	33
Regularly	46.9%	53
All the Time	6.2%	7
Riding a Bike (*N* = 113)		
Never	4.4%	5
Rarely	3.5%	4
Occasionally	14.2%	16
Regularly	50.4%	57
All the Time	27.4%	31
Playing in the Backyard or Local Park (*N* = 113)		
Never	0.9%	1
Rarely	0.9%	1
Occasionally	5.3%	6
Regularly	48.7%	55
All the Time	44.2%	50
Camping (*N* = 113)		
Never	28.3%	32
Rarely	19.5%	22
Occasionally	30.1%	34
Regularly	19.5%	22
All the Time	2.7%	3
Swimming Outdoors (*N* = 113)		
Never	7.1%	8
Rarely	7.1%	8

Occasionally	29.2%	33
Regularly	35.4%	40
All the Time	21.2%	24
Gardening / Harvesting (*N* = 113)		
Never	18.6%	21
Rarely	22.1%	25
Occasionally	28.3%	32
Regularly	23.9%	27
All the Time	7.1%	8
Caring for Pets / Animals (*N* = 113)		
Never	14.2%	16
Rarely	8.0%	9
Occasionally	21.2%	24
Regularly	39.8%	45
All the Time	16.8%	19
Fishing (*N* = 113)		
Never	33.6%	38
Rarely	28.3%	32
Occasionally	25.7%	29
Regularly	11.5%	13
All the Time	0.9%	1
Picnic (*N* = 113)		
Never	19.5%	22
Rarely	29.2%	33
Occasionally	38.1%	43
Regularly	9.7%	11
All the Time	3.5%	4
Canoeing / Kayaking (*N* = 113)		
Never	45.1%	51
Rarely	29.2%	33
Occasionally	21.2%	24
Regularly	4.4%	5
All the Time	0.0%	0
Playing in Snow (*N* = 113)		
Never	6.2%	7
Rarely	3.5%	4
Occasionally	14.2%	16
Regularly	42.5%	48
All the Time	33.6%	38
Skating (*N* = 113)		

Never	10.6%	12
Rarely	16.8%	19
Occasionally	23.0%	26
Regularly	29.2%	33
All the Time	20.4%	23
Sledding / Tobogganing (*N* = 113)		
Never	7.1%	8
Rarely	7.1%	8
Occasionally	24.8%	28
Regularly	41.6%	47
All the Time	19.5%	22
Other (*N* = 44)		
Never	34.1%	15
Rarely	0.0%	0
Occasionally	9.1%	4
Regularly	31.8%	14
All the Time	25.0%	11

Figure 8

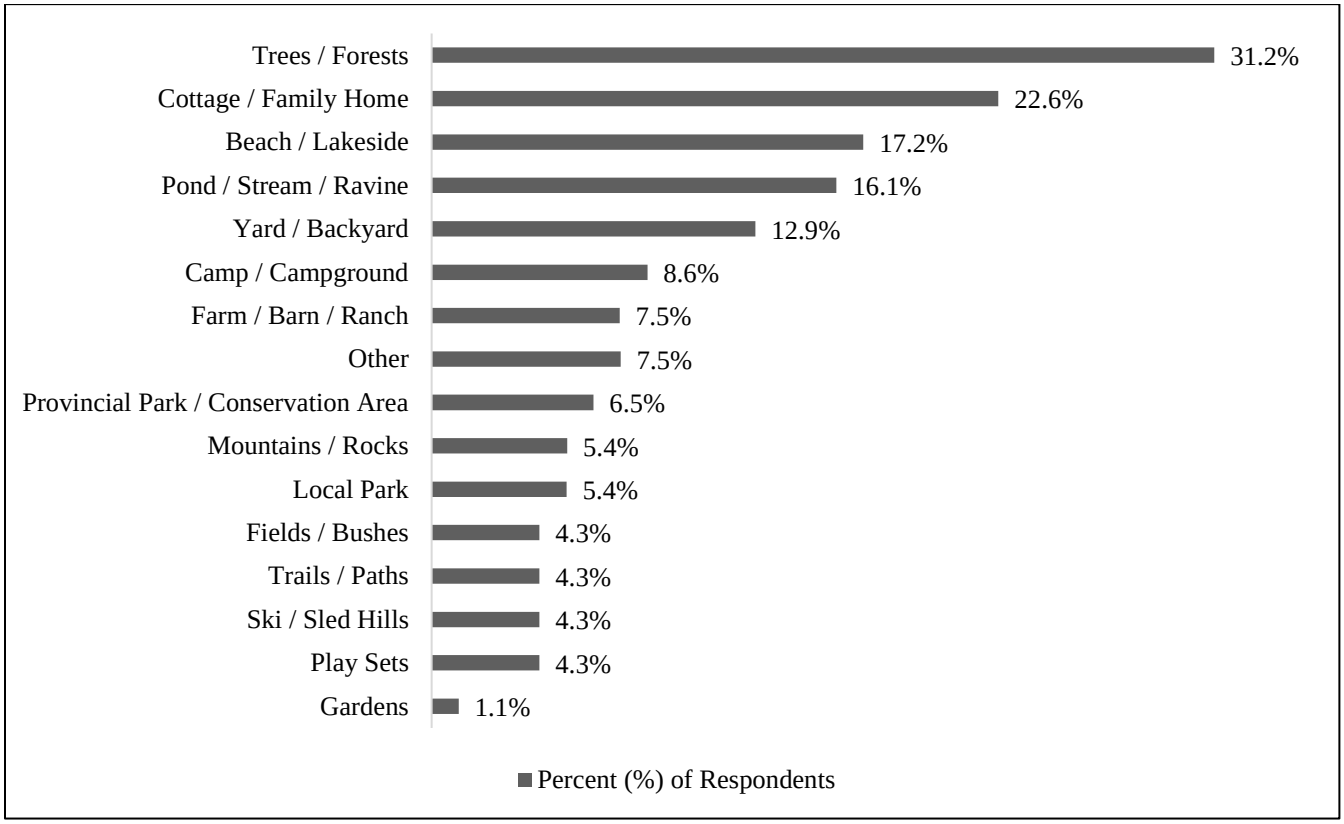
Childhood Frequency of Outdoor Activities



In 93 descriptions of favourite childhood places in nature, parents often specifically referred to areas close to home (*n* = 41, or 44% of responses). Further, the top three types of places mentioned included areas with trees/forests, a cottage/family home, or by a beach/lakeside (see Figure 9 for all parent reports of favourite nature spaces during childhood). The 'other' category includes zoos, a trailer, a baseball field, and an island.

Figure 9

Parents' Favourite Places in Nature During Childhood



Parents were most often accompanied by their siblings during childhood nature experiences, occasionally by their friends, and then slightly less often by their parents or other significant adults (see Table 12 for frequency reports of people who most often accompanied parents while in nature generally during childhood). However, out of 87 people who wrote about memorable early nature experiences, they often did not include other people or mentioned being alone – though significant adults, such as

parents, were the second most frequent mention (see Figure 10 for reports of who accompanied parents during a memorable nature experience in childhood).

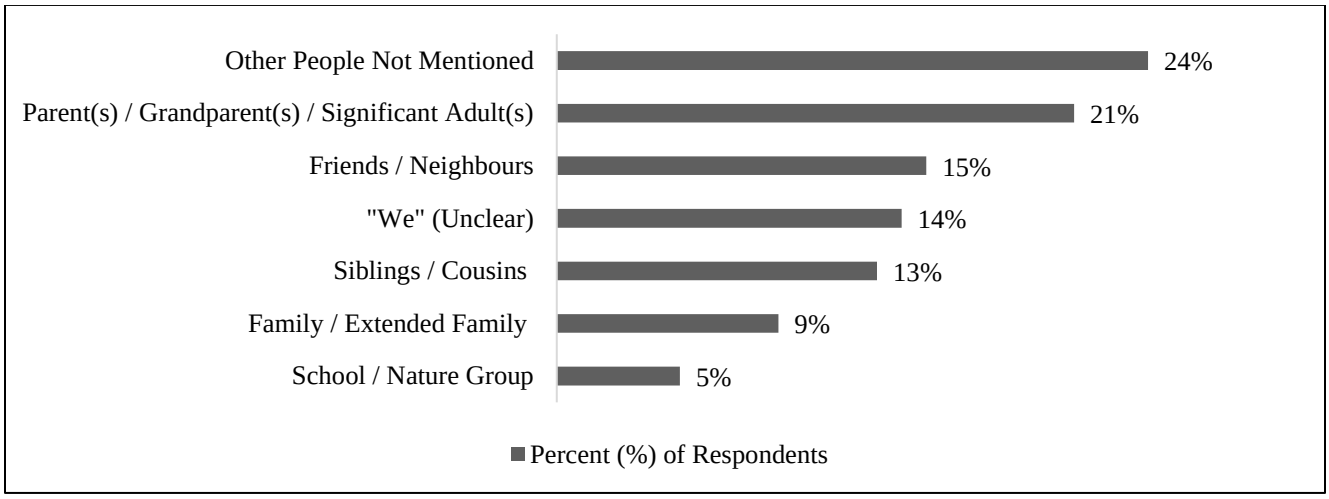
Table 12

Most Frequent Type of Company When in Nature During Childhood, in General

	Percentage	*N*
Parent(s) or Significant Adult(s)	20.5%	23
Sibling(s)	39.3%	44
Friends / Peers	28.6%	32
Teachers / School Group	4.5%	5
Mostly Alone	7.1%	8

Figure 10

Reported Type of Company During a Memorable Nature Experience in Childhood



Hypothesis 1

Correlations and ANOVAs were used to analyze whether parents' perceived ease of access to nature spaces, as well as the number of reported barriers to accessing nature, was related to families' contact with the outdoors over the past three days. There was a significant but somewhat weak correlation between perceived ease of access to nature (the composite of all places) and hours spent

engaged in free play outdoors (r = .20, p = .03).[2] In other words, the easier nature was to access, the more time families spent playing outside. Ease of access to nature was unrelated to the number of hours spent on nature outings (walks, hikes, bike rides; p > .10).

ANOVAs revealed significant differences between ease of access and frequency of visits to all nine nature spaces, though due to a lack of homogeneity, Kruskal-Wallis tests only found significant differences for eight of the nine nature categories (see Table 13 for ease of access to all eight nature spaces). Mann-Whitney U post-hoc tests (adjusted with a Bonferroni correction) revealed that parents who regularly visit the beach/waterfront, backyard, schoolyard, bike paths/trails, conservation park/area, walking trails/forested areas, pond/stream, and public/community gardens with their family also perceive these places as easy to access; however, ease of access was not connected with visits to the local park (p > .10).

Table 13

Parents' Perceived Ease of Access and Frequency of Family Visits to Nature Areas

	Visit Frequency – Beach / Waterfront					
	Never (n = 3)	Once or Twice a Year (n = 45)	Once or Twice a Month (n = 44)	Once or Twice a Week (n = 19)	Almost Daily or Every Day (n = 10)	Omnibus Kruskal-Wallis
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*H* (E^2_R)
Ease of Access – Beach / Waterfront	2.33_{ab} (2.31)	3.31_{a} (1.18)	4.27_{b} (.90)	4.53_{b} (.70)	4.70_{b} (.95)	28.85** (0.24)
	Visit Frequency – Backyard					
	Never (n = 4)	Once or Twice a Year (n = 0)	Once or Twice a Month (n = 2)	Once or Twice a Week (n = 28)	Almost Daily or Every Day (n = 85)	Omnibus Kruskal-Wallis

[2] Spearman's rank correlation, to account for non-normality, resulted in a similar outcome: ρ = .19, p = .04.

	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)
Ease of Access – Backyard	2.25_a (1.89)	0.00_{ab} (.00)	5.00_b (.00)	4.93_b (.38)	4.96_b (.64)	44.31*** (0.37)
Visit Frequency – Schoolyard						
	Never (*n* = 22)	Once or Twice a Year (*n* = 20)	Once or Twice a Month (*n* = 22)	Once or Twice a Week (*n* = 35)	Almost Daily or Every Day (*n* = 21)	Omnibus Kruskal-Wallis
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)
Ease of Access – Schoolyard	3.95_a (1.33)	3.80_a (1.06)	4.64_{ab} (.58)	4.80_b (.47)	4.86_b (.48)	25.22*** (0.21)
Visit Frequency – Bike Paths / Trails						
	Never (*n* = 6)	Once or Twice a Year (*n* = 21)	Once or Twice a Month (*n* = 40)	Once or Twice a Week (*n* = 38)	Almost Daily or Every Day (*n* = 114)	Omnibus Kruskal-Wallis
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)
Ease of Access – Bike Paths / Trails	3.50_{ab} (1.38)	4.05_a (.92)	4.50_{ab} (.72)	4.68_b (.57)	4.64_{ab} (.79)	13.08* (0.11)
Visit Frequency – Conservation Park / Area						
	Never (*n* = 7)	Once or Twice a Year (*n* = 48)	Once or Twice a Month (*n* = 38)	Once or Twice a Week (*n* = 23)	Almost Daily or Every Day (*n* = 3)	Omnibus Kruskal-Wallis
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)
Ease of Access – Conservation Park / Area	2.43_{ab} (1.62)	3.13_{ac} (1.14)	4.03_{bd} (.97)	4.78_d (.42)	5.00_{cd} (.00)	42.48*** (0.36)
Visit Frequency – Walking Trails / Forested Areas						
	Never (*n* = 5)	Once or Twice a Year (*n* = 27)	Once or Twice a Month (*n* = 37)	Once or Twice a Week (*n* = 35)	Almost Daily or Every Day (*n* = 13)	Omnibus Kruskal-Wallis
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)

Ease of Access – Walking Trails / Forested Areas	4.40_{ab} (.89)	3.70_{a} (1.07)	4.49_{b} (.69)	4.66_{b} (.54)	4.92_{b} (.28)	24.04*** (0.21)
Visit Frequency – Pond / Stream						
	Never (n = 9)	Once or Twice a Year (n = 34)	Once or Twice a Month (n = 44)	Once or Twice a Week (n = 24)	Almost Daily or Every Day (n = 8)	Omnibus Kruskal-Wallis
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*H* (E^2_R)
Ease of Access – Pond / Stream	3.67_{a} (1.23)	3.91_{a} (1.22)	4.27_{ab} (.79)	4.83_{b} (.38)	5.00_{b} (.00)	20.03*** (0.17)
Visit Frequency – Public / Community Garden						
	Never (n = 33)	Once or Twice a Year (n = 50)	Once or Twice a Month (n = 22)	Once or Twice a Week (n = 11)	Almost Daily or Every Day (n = 3)	Omnibus Kruskal-Wallis
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*H* (E^2_R)
Ease of Access – Public / Community Garden	3.18_{a} (1.40)	3.54_{ab} (1.16)	4.36_{b} (.85)	4.64_{b} (.67)	5.00_{ab} (.00)	22.46*** (0.19)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Mann-Whitney U.

*p < .05, **p < .01, ***p < .001

Unexpectedly, ease of access to nature was not related to how often parents generally play with their children outdoors in nature (p > .10). Further, the number of barriers parents described regarding nature access was unrelated to the number of hours families spent playing outside or going on nature outings (p's all > .10)[3], how frequently families visited any of the nine nature spaces (p's all > .10), or how often parents generally play with their children outdoors in nature (p > .10)[4].

[3] Spearman's rank correlations, to account for non-normality, resulted in a similar outcome: p's all > .10.
[4] A Kruskal-Wallis test, to account for a lack of homogeneity, resulted in a similar outcome: p > .10.

Hypothesis 2

Correlations and ANOVAs were used to determine whether the impact of the COVID-19 pandemic on parents' ability to get outdoors in nature was related to families' contact with the outdoors – i.e., playing outside (imaginative/free play) and going on nature outings (walks, hikes, bike rides) – within the past three days. There was a significant negative correlation between the pandemic's impact and the amount of time playing outside (r = -.21, p = .04)[5]; the greater the impact of the pandemic, the less families played outdoors. However, the impact of the pandemic was unrelated to the number of hours a family spent on nature outings (p > .10).

The pandemic also influenced how parents accessed some, but not all, nature locations (see Table 14 for ANOVA and Tukey post hoc test results). Parents who visited a conservation park/area with their family once or twice a week felt that the pandemic had a moderately greater impact on their ability to get outside in nature, compared to parents who only visited this type of place once or twice a year. The pandemic's impact on time spent outdoors in nature was also related to family visits to walking trails/forested areas, however a Tukey's post hoc test revealed no significant differences between visit frequencies. Visits to the beach/waterfront, schoolyard, local park, bike paths/trails, pond/stream, or public/community garden were not related to the pandemic's impact (p's all > .10), although there was a (non-significant) trend (p = .05) for daily backyard visits to be more frequent among those who felt less of an impact from the pandemic on their ability to get outside.

[5] Spearman's rank correlation, to account for non-normality, resulted in a similar outcome: ρ = .20, p = .04.

Table 14

COVID Life Impact on Ability to Get Outdoors and Frequency of Visits to Nature Areas

	Visit Frequency – Backyard					
	Never (n = 4)	Once or Twice a Year (n = 0)	Once or Twice a Month (n = 2)	Once or Twice a Week (n = 26)	Almost Daily or Every Day (n = 77)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
COVID Impact on Getting Outside in Nature	2.50_{a} (1.92)	0.00_{a} (.00)	3.00_{a} (.00)	2.85_{a} (1.08)	2.05_{a} (1.34)	2.70 (.07)
	Visit Frequency – Conservation Park / Area					
	Never (n = 6)	Once or Twice a Year (n = 43)	Once or Twice a Month (n = 36)	Once or Twice a Week (n = 20)	Almost Daily or Every Day (n = 3)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
COVID Impact on Getting Outside in Nature	2.33_{ab} (1.75)	1.98_{a} (1.12)	2.25_{ab} (1.27)	3.00_{b} (1.14)	1.00_{ab} (.00)	3.03* (.11)
	Visit Frequency – Walking Trails / Forested Areas					
	Never (n = 4)	Once or Twice a Year (n = 22)	Once or Twice a Month (n = 36)	Once or Twice a Week (n = 32)	Almost Daily or Every Day (n = 13)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
COVID Impact on Getting Outside in Nature	3.00_{a} (1.41)	1.91_{a} (1.11)	1.86_{a} (1.07)	2.69_{a} (1.45)	2.38_{a} (1.33)	2.67* (.10)

Note. Means not sharing subscripts differ significantly at $p < .05$ as indicated by Tukey's HSD.

*$p < .05$, **$p < .01$, ***$p < .001$

For general frequency of outdoor play, there was a (non-significant) trend (p = .09) in which parents who played outside in nature with their children on a daily basis rated the pandemic as having less of an impact on their ability to get outside than those who played with their children outdoors less often[6] (see Table 15 for ANOVA results).

Table 15

COVID Life Impact on Ability to Get Outdoors and General Frequency of Playing with Children in Nature

	Play / Do Activities with Child(ren) Outside in Nature					
	Never (n = 1)	A Few Times a Month (n = 9)	Once a Week (n = 9)	Several Times a week (n = 57)	Every Day (n = 31)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
COVID Impact on Getting Outside in Nature	1.00_a (.00)	2.89_a (1.54)	3.11_a (1.62)	2.14_a (1.11)	2.06_a (1.41)	2.07 (.08)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Tukey's HSD.

*p < .05, **p < .01, ***p < .001

Hypothesis 3

Correlations were used to determine if parents' connection with nature (Inclusion with Nature in Self and Nature-Relatedness) was associated with pandemic impacts on nature time, as well as the frequency of nature contact with their family. Unexpectedly, there were almost no significant relationships between the nature connectedness measures and perceptions that the pandemic influenced getting outdoors (see Table 16 for correlations). Only the dimension of nature-related experience negatively correlated with the perceived impact of the pandemic. In other words, parents who felt more

[6] NB: One participant in the 'Never' category did not fit this pattern, and instead had the lowest pandemic impact rating.

drawn to nature and familiar with it were slightly less likely to perceive the pandemic as affecting their ability to get outdoors in nature.

Table 16

Correlations Between Pandemic Impact on Getting Outdoors and Nature Connectedness

Measures	Inclusion of Nature in Self (n = 120)	Nature-Relatedness (n = 121)	Nature-Related Self (n = 121)	Nature-Related Perspective (n = 121)	Nature-Related Experience (n = 121)
COVID Impact on Getting Outside in Nature	-.16	-.13	-.08	-.04	-.22*

*p < .05, **p < .01, ***p < .001

Parents with a stronger connection to nature were also expected to spend more time outdoors with their family. Indeed, those with a sense of inclusion with nature spent more time on nature outings (nature walks, hikes, bike rides; r = .21, p = .02), but not more time playing outside with the family, over the prior three days (p > .10)[7]. Similarly, those with a sense of nature-relatedness spent more time on nature outings (r = .28, p = .003), though not in outdoor family play (p > .10)[8].

A stronger nature connection was also expected to be associated with more frequent family visits to nature areas. A sense of inclusion with nature was related to frequency of visits to five of the nine nature spaces (the beach/waterfront, backyard, conservation park/area, walking trails/forested areas, and pond/stream)[9], meaning that parents who had a greater sense of inclusion with nature often visited these areas more frequently than those less connected with nature[10] (see Table 17 for ANOVA and Tukey post

[7] Spearman's rank correlation, to account for non-normality, resulted in a similar outcome: Nature outings: ρ = .24, p = .01; Playing outside: p > .10.

[8] Spearman's rank correlation, to account for non-normality, resulted in a similar outcome: Nature outings: ρ = .31, p < .001; Playing outside: p > .10.

[9] Kruskal-Wallis tests run for the beach/waterfront, conservation park/area, and walking trails/forested areas, to account for non-normality, also resulted in significant outcomes. Beach/waterfront: H = 16.35, p = .003; Conservation park/area: H = 16.58, p = .002; Walking trails/forested areas: H = 12.81, p = .01.

[10] NB: Four participants who 'Never' visited a backyard also had a moderately high sense of inclusion with nature.

hoc test details). There was a similar (non-significant) trend for bike paths/trails (p = .05) and public/community gardens (p = .08), however nature inclusion was not related to visits to the schoolyard or local park (p's all > .10).

Table 17

Inclusion of Nature in Self and Frequency of Visits to Nature Areas

Visit Frequency – Beach / Waterfront						
	Never (n = 2)	Once or Twice a Year (n = 45)	Once or Twice a Month (n = 44)	Once or Twice a Week (n = 19)	Almost Daily or Every Day (n = 10)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	1.50_{a} (.71)	4.27_{ac} (1.60)	5.00_{bc} (1.20)	5.05_{bc} (1.27)	5.80_{b} (1.40)	6.11*** (.18)
Visit Frequency – Backyard						
	Never (n = 3)	Once or Twice a Year (n = 0)	Once or Twice a Month (n = 2)	Once or Twice a Week (n = 28)	Almost Daily or Every Day (n = 87)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	5.00_{ab} (1.00)	0.00_{ab} (.00)	2.50_{ab} (.71)	4.11_{a} (1.57)	4.99_{b} (1.42)	4.28** (.10)
Visit Frequency – Bike Paths / Trails						
	Never (n = 6)	Once or Twice a Year (n = 21)	Once or Twice a Month (n = 40)	Once or Twice a Week (n = 38)	Almost Daily or Every Day (n = 14)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	5.00_{a} (1.67)	4.10_{a} (1.48)	4.62_{a} (1.53)	5.26_{a} (1.25)	4.79_{a} (1.48)	2.42 (.08)
Visit Frequency – Conservation Park / Area						
	Never (n = 8)	Once or Twice a Year (n = 48)	Once or Twice a Month (n = 38)	Once or Twice a Week (n = 23)	Almost Daily or Every Day (n = 3)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)

Inclusion of Nature in Self	3.50_{a} (2.07)	4.40_{ac} (1.55)	4.87_{abc} (1.23)	5.48_{b} (1.12)	6.33_{bc} (.58)	4.84** (.14)

Visit Frequency – Walking Trails / Forested Areas

	Never (n = 5)	Once or Twice a Year (n = 27)	Once or Twice a Month (n = 38)	Once or Twice a Week (n = 36)	Almost Daily or Every Day (n = 13)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	4.80_{ab} (1.48)	3.93_{a} (1.71)	4.71_{ab} (1.35)	5.28_{b} (1.06)	5.31_{b} (1.60)	4.15** (.13)

Visit Frequency – Pond / Stream

	Never (n = 10)	Once or Twice a Year (n = 34)	Once or Twice a Month (n = 44)	Once or Twice a Week (n = 24)	Almost Daily or Every Day (n = 8)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	3.30_{a} (1.42)	4.74_{bc} (1.44)	4.82_{bc} (1.48)	5.50_{b} (.98)	3.88_{ac} (1.89)	5.15*** (.15)

Visit Frequency – Public / Community Gardens

	Never (n = 33)	Once or Twice a Year (n = 50)	Once or Twice a Month (n = 22)	Once or Twice a Week (n = 11)	Almost Daily or Every Day (n = 3)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	4.67_{a} (1.47)	4.74_{a} (1.45)	4.91_{a} (1.41)	4.36_{a} (1.50)	7.00_{a} (.00)	2.11 (.08)

Note. Means not sharing subscripts differ significantly at $p < .05$ as indicated by Tukey's HSD.

*$p < .05$, **$p < .01$, ***$p < .001$

Likewise, parents' sense of nature-relatedness was related to family visits to the same five nature spaces (beach/waterfront, backyard, conservation park/area, walking trails/forested areas, and pond/stream)[11], meaning that parents who had a greater sense of nature-relatedness visited these areas

[11] Kruskal-Wallis tests run for the beach/waterfront, conservation park/area, walking trails/forested areas, and pond/stream, to account for non-normality, also resulted in significant outcomes. Beach/waterfront: $H = 20.32$, $p < .001$; Conservation park/area: $H = 22.19$, $p < .001$; Walking trails/forested areas: $H = 17.34$, $p = .002$; Pond/stream: $H = 22.98$, $p < .001$.

more frequently than those with less nature-relatedness[12] (see Table 18 for ANOVA and Tukey post hoc test details). Nature-relatedness was not associated with family visits to the schoolyard, local park, bike paths/trails, or public/community garden (*p*'s all > .10).

Table 18

Nature-Relatedness and Frequency of Visits to Nature Areas

	Visit Frequency – Beach / Waterfront					
	Never (*n* = 3)	Once or Twice a Year (*n* = 45)	Once or Twice a Month (*n* = 44)	Once or Twice a Week (*n* = 19)	Almost Daily or Every Day (*n* = 10)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Nature-Relatedness	3.08_a (.46)	3.70_{ac} (.71)	4.22_b (.44)	4.17_b (.51)	4.19_{bc} (.47)	7.37*** (.20)
	Visit Frequency – Backyard					
	Never (*n* = 4)	Once or Twice a Year (*n* = 0)	Once or Twice a Month (*n* = 2)	Once or Twice a Week (*n* = 28)	Almost Daily or Every Day (*n* = 87)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Nature-Relatedness	3.86_{ab} (.95)	0.00_{ab} (.00)	3.38_{ab} (.74)	3.73_a (.66)	4.09_b (.58)	3.09* (.07)
	Visit Frequency – Conservation Park / Area					
	Never (*n* = 8)	Once or Twice a Year (*n* = 48)	Once or Twice a Month (*n* = 38)	Once or Twice a Week (*n* = 23)	Almost Daily or Every Day (*n* = 3)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Nature-Relatedness	3.36_a (.54)	3.85_{ac} (.67)	4.07_{bc} (.56)	4.31_b (.30)	4.76_{bc} (.13)	6.64*** (.19)
	Visit Frequency – Walking Trails / Forested Areas					
	Never (*n* = 5)	Once or Twice a Year (*n* = 27)	Once or Twice a Month (*n* = 38)	Once or Twice a Week (*n* = 36)	Almost Daily or Every Day (*n* = 13)	Omnibus ANOVA

[12] NB: Four participants who 'Never' visited a backyard also had a moderately high sense of nature-relatedness.

	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Nature-Relatedness	3.75_{ab} (.51)	3.61_{a} (.67)	4.01_{ab} (.64)	4.25_{b} (.43)	4.25_{b} (.44)	5.74*** (.17)
	Visit Frequency – Pond / Stream					
	Never (*n* = 10)	Once or Twice a Year (*n* = 34)	Once or Twice a Month (*n* = 44)	Once or Twice a Week (*n* = 24)	Almost Daily or Every Day (*n* = 8)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Nature-Relatedness	3.17_{a} (.66)	3.89_{c} (.52)	4.08_{bc} (.65)	4.34_{b} (.32)	3.94_{bc} (.45)	8.61*** (.23)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Tukey's HSD.

*p < .05, **p < .01, ***p < .001

Further, it was expected that parents' connection with nature would be related to how often they generally play with their children outdoors in nature. There was a (non-significant) pattern (p = .05) that parents with a strong sense of inclusion with nature were slightly more likely to spent time playing outdoors with their children every day[13] (see Table 19 for frequencies of general outdoor play). However, there was no relation between parents' nature-relatedness and family time spent playing outdoors in general (p > .10[14]; see Table 18 for frequencies of general outdoor play).

[13] NB: One participant who indicated "Never" did not fit this pattern, and instead had moderate nature inclusion.
[14] A Kruskal-Wallis test, to account for non-normality, resulted in a similar outcome: p > .10

Table 19

Connection with Nature and General Frequency of Playing with Children in Nature

	Play / Do Activities with Child(ren) Outside in Nature					
	Never (n = 1)	A Few Times a Month (n = 9)	Once a Week (n = 9)	Several Times a week (n = 64)	Every Day (n = 35)	Omnibus ANOVA
	M *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*F* (partial η^2)
Inclusion of Nature in Self	5.00_a (.00)	4.33_a (1.54)	4.67_a (1.62)	4.52_a (1.11)	5.40_a (1.41)	2.40 (.08)
	Never (n = 1)	A Few Times a Month (n = 9)	Once a Week (n = 10)	Several Times a week (n = 64)	Every Day (n = 35)	Omnibus ANOVA
	M *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*F* (partial η^2)
Nature-Relatedness	4.19_a (.00)	3.76_a (1.04)	3.97_a (.80)	3.91_a (.57)	4.20_a (.49)	1.63 (.05)

Note. Means not sharing subscripts differ significantly at $p < .05$ as indicated by Tukey's HSD.

$^*p < .05$, $^{**}p < .01$, $^{***}p < .001$

Hypothesis 4

It was expected that parents who felt a connection with nature in childhood would be more connected as an adult, compared to those who may have lacked a connection in their early years. As expected, childhood and adult nature connectedness was moderately correlated across all indicators (see Table 20 for correlations). In other words, parents who felt more connected to nature as a child also feel moderately more connected to nature in general, consider nature to be a greater part of their identity, have more pro-environmental beliefs, and are more drawn to nature as adults.

Table 20

Correlations Between Past and Current Connection with Nature

Measures	Inclusion of Nature in Self (n = 120)	Nature-Relatedness (n = 121)	Nature-Related Self (n = 121)	Nature-Related Perspective (n = 121)	Nature-Related Experience (n = 121)
Childhood Inclusion of Nature in Self	.40***	.48***	.37***	.43***	.45***

*p < .05, **p < .01, ***p < .001

Hypothesis 5

ANOVAs were used to determine if an association exists between childhood nature contact and both past and current connection with nature. In terms of past nature connection, parents who went on nature walks or hikes regularly or all the time in childhood often had a greater sense of inclusion with nature as a child than those who went on nature walks less frequently[15,16] (see Table 21 for all frequencies). In contrast, parents who never or rarely played in a backyard or local park in childhood often had a greater sense of inclusion with nature as a child than those who only occasionally played in these areas[17] (see Table 21 for frequencies).

[15] A Kruskal-Wallis test, to account for non-normality, resulted in a similar outcome. Nature walks/hikes: H = 33.25, p < .001.

[16] NB: Four participants who said they 'Never' went on nature walks/hikes did not fit this pattern, and instead a moderate sense of inclusion with nature.

[17] NB: Only one response was given for 'Never' and 'Rarely' playing in the backyard/local park.

Table 21

Frequency of Childhood Nature Activities and Childhood Inclusion of Nature in Self

Childhood Activity Frequency – Nature Walks / Hikes						
	Never (n = 4)	Rarely (n = 16)	Occasionally (n = 32)	Regularly (n = 53)	All the Time (n = 7)	Omnibus ANOVA
	M *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*F* (partial η^2)
Childhood Inclusion of Nature in Self	4.25_{ab} (2.63)	3.44_{a} (1.90)	3.81_{a} (1.40)	5.36_{b} (1.29)	6.29_{b} (.49)	11.02*** (.29)
Childhood Activity Frequency – Playing in the Backyard / Local Park						
	Never (n = 1)	Rarely (n = 1)	Occasionally (n = 6)	Regularly (n = 54)	All the Time (n = 50)	Omnibus ANOVA
	M *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*F* (partial η^2)
Childhood Inclusion of Nature in Self	7.00_{a} (.00)	5.00_{a} (.00)	2.83_{b} (1.47)	4.31_{ab} (1.69)	5.20_{ab} (1.47)	4.65** (.15)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Tukey's HSD or Planned Contrasts.

*p < .05, **p < .01, ***p < .001

For current nature connection, there was a (non-significant) trend (p = .09) that parents who went on nature walks/hikes all the time in childhood had a moderately higher sense of inclusion with nature as adults than those who went on nature walks less frequently[18], although there was no relation between playing in the backyard/local park in childhood and nature inclusion in adulthood (p > .10; see Table 22 for all frequencies). In addition, parents who went for nature walks regularly or all the time in childhood had a greater sense of nature-relatedness as adults than those who never went on nature walks[19], and

[18] NB: Those who 'Rarely' went on nature walks/hikes in childhood also had a moderately high sense of inclusion with nature.
[19] NB: Those who 'Rarely' went on nature walks/hikes in childhood also had a moderately high sense of nature-relatedness.

parents who played in the backyard or local park all the time in childhood had a greater sense of nature-relatedness than those who played in these areas less frequently (see Table 22 for all frequencies).

Table 22

Frequency of Childhood Nature Activities and Current Connection with Nature

Childhood Activity Frequency – Nature Walks / Hikes						
	Never (n = 3)	Rarely (n = 16)	Occasionally (n = 33)	Regularly (n = 53)	All the Time (n = 7)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	3.33_a (1.53)	5.38_a (.89)	4.58_a (1.58)	4.77_a (1.42)	5.43_a (1.13)	2.07 (.07)
	Never (n = 4)	Rarely (n = 16)	Occasionally (n = 33)	Regularly (n = 53)	All the Time (n = 7)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Nature Relatedness	3.21_a (.81)	4.10_{ab} (.54)	3.80_{ab} (.65)	4.12_b (.56)	4.37_b (.36)	4.18** (.13)
Childhood Activity Frequency – Playing in the Backyard / Local Park						
	Never (n = 0)	Rarely (n = 1)	Occasionally (n = 6)	Regularly (n = 55)	All the Time (n = 50)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Inclusion of Nature in Self	0.00_a (.00)	5.00_a (.00)	4.33_a (1.21)	4.58_a (1.41)	5.10_a (1.45)	1.40 (.04)
	Never (n = 1)	Rarely (n = 1)	Occasionally (n = 6)	Regularly (n = 55)	All the Time (n = 50)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Nature Relatedness	2.81_a (.00)	3.86_a (.00)	3.68_a (.78)	3.92_a (.60)	4.16_b (.57)	2.50* (.09)

Note. Means not sharing subscripts differ significantly at $p < .05$ as indicated by Tukey's HSD or Planned Contrasts.

*$p < .05$, **$p < .01$, ***$p < .001$

Hypothesis 6

ANOVAs and chi-square tests[20] were used to determine if an association exists between parents' preference to do activities outdoors in nature (versus indoors) with their children and family time spent doing activities outdoors[21]. There was no relation between parents' preference and the number of hours families spent playing outside (imaginative/free play) or going on nature outings (walks, hikes, bike rides) within the past three days (*p*'s all > .10; see Table 23 for parent preferences and family time spent doing both activities).

Table 23

Preferred Place to Do Activities with Children and Number of Hours Families Spent Doing Outdoor Activities Over Three Days

Preferred Place to Play / Do Activities with Children			
	Indoors (*n* = 13)	Outdoors in Nature (*n* = 90)	Omnibus ANOVA
	M *(SD)*	*M* *(SD)*	*F* (partial η^2)
Family Time Playing Outdoors	5.00_a (3.63)	7.71_a (7.22)	1.76 (.02)
Family Time on Nature Outings	1.92_a (2.14)	1.95_a (1.87)	.002 (.00)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Tukey's HSD.

*p < .05, **p < .01, ***p < .001

Parents' preference to do activities with their children outside (versus inside) was also not related to how often parents generally play with their children outdoors in nature (*p*'s all > .10; see Table 24 for all frequencies of general outdoor play).

[20] The Likelihood Ratio is reported for these analyses instead of the Pearson Chi-Square statistic, as more than 20% of cells in all cases had expected counts less than five.

[21] Analyses exclude data from *N* = 11 participants who chose 'other' as their preferred place to do activities with their children.

Table 24

Preferred Place to Do Activities with Children and General Frequency of Outdoor Play with Children

Preferred Place to Spend Time with Children	General Frequency of Outdoor Play with Children										λ (ϕc)
	Never		A Few Times a Month		Once a Week		Several Times a Week		Every Day		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	
Indoors	0	0%	2	14%	2	14%	8	57%	2	14%	2.25 (.14)
Outdoors in Nature	0	0%	7	7%	8	9%	50	54%	28	30%	

*$p < .05$, **$p < .01$, ***$p < .001$

Hypothesis 7

ANOVAs and chi-square tests[22] were used to determine if an association exists between doing outdoor activities with parents in childhood and current family time spent doing activities outdoors[23]. A (non-significant) trend ($p = .07$) suggested that parents who regularly engaged in outdoor activities with their own parents during childhood may currently spend more time playing outside (imaginative/free play) with their family than parents who did nature activities with their parents less often (see Table 25 for frequencies). However, there was no relation between frequency of outdoor activities with parents in childhood and current family time going on nature outings (walks, hikes, bike rides; $p > .10$).

[22] The Likelihood Ratio is reported for these analyses instead of the Pearson Chi-Square statistic, as more than 20% of cells in all cases had expected counts less than five.

[23] Analyses exclude data from $N = 2$ participants who were unsure or could not recall how frequently they did outdoor activities with their parents in childhood.

Table 25

Frequency of Outdoor Activities with Parents in Childhood and Family Time Spent Doing Outdoor Activities Over Three Days

	Frequency of Doing Outdoor Activities with Parents in Childhood				
	Never (n = 11)	Sometimes (n = 62)	Often (n = 33)	All the Time (n = 5)	Omnibus ANOVA
	M *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*F* (partial η^2)
Family Time Playing Outdoors	4.91_a (4.48)	6.27_a (4.91)	9.52_a (9.16)	9.20_a (6.53)	2.43 (.06)
Family Time on Nature Outings	1.45_a (2.02)	2.02_a (1.83)	2.33_a (1.95)	1.00_a (1.73)	1.13 (.03)

Note. Means not sharing subscripts differ significantly at $p < .05$ as indicated by Tukey's HSD

*$p < .05$, **$p < .01$, ***$p < .001$

There was also no relation between frequency of participants doing outdoor activities with parents in childhood and how often they generally play with their own children outdoors in nature ($p > .10$; see Table 26 for all frequencies). Most parents seem to play with their children outside several times a week regardless of how frequently they recalled doing outdoor activities with their own parents in childhood.

Table 26

Frequency of Outdoor Activities with Parents in Childhood and General Frequency of Outdoor Play in Nature with Children

Frequency of Doing Outdoor Activities with Parents	General Frequency of Outdoor Play in Nature with Children										λ (ϕc)
	Never		A Few Times a Month		Once a Week		Several Times a Week		Every Day		
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	
Never	0	0%	3	27%	2	18%	4	36%	2	18%	9.16 (.17)
Sometimes	1	2%	4	7%	4	7%	34	55%	19	31%	
Often	0	0%	2	6%	3	9%	19	58%	9	27%	
All the Time	0	0%	0	0%	0	0%	3	60%	2	40%	

*$p < .05$, **$p < .01$, ***$p < .001$

Hypothesis 8

Correlations and ANOVAs were used to determine if an association exists between parents' beliefs in the importance of outdoor experiences for children and families' contact with the outdoors. No relation was found between perceived importance of early nature experiences or outdoor play for child development and how much time families spent playing outside (imaginative/free play) and going on nature outings (walks, hikes, bike rides) within the past three days (*p*'s all > .10[24], see Table 27 for all correlations).

[24] Spearman's rank correlations, to account for non-normality, resulted in similar outcomes: *p*'s all > .10

Table 27

Correlations Between Importance of Outdoor Experiences for Child Development and Family Time Spent Outdoors Over Three Days

Measures	Family Time Playing Outdoors (n = 113)	Family Time on Nature Outings (n = 113)
Importance of Early Experiences in Nature	.08	.07
Importance of Outdoor Play	.11	.06

*p < .05, **p < .01, ***p < .001

In terms of visit frequency, there were (non-significant) trends (p's all = .06) that parents who believe early nature experiences are important for child development visited conservation parks/areas and walking trails/forested areas with their family more frequently than those who believe these experiences are less important (see Table 28 for frequencies); however, there were no associations with family visits to the remaining nature areas (p's all > .10) [25]. Further, parents who believe outdoor play is important for child development often visited conservation parks/areas and walking trails/forested areas more frequently than those who believe these experiences are less important[26] (see Table 28 for frequencies). No relation was found between importance of outdoor play and family visits to the remaining nature areas (p's all > .10).

[25] Kruskal-Wallis tests for all nature places except bike paths/trails, to account for non-normality, resulted in similar outcomes: Conservation park/area: H = 8.96, p = .06; walking trails/forested areas: H = 9.47, p = .05; remaining nature areas: p's all > .10

[26] Kruskal-Wallis tests, to account for non-normality, resulted in similar outcomes. Conservation park/area: H = 13.37, p = .01; Walking trails/forested areas: H = 9.54, p = .049.

Table 28

Importance of Childhood Experiences and Frequency of Family Visits to Nature Areas

Visit Frequency – Conservation Park / Area						
	Never (n = 7)	Once or Twice a Year (n = 48)	Once or Twice a Month (n = 37)	Once or Twice a Week (n = 22)	Almost Daily or Every Day (n = 3)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Importance of Early Nature Experiences	4.14_a (1.07)	4.52_a (.77)	4.73_a (.56)	4.86_a (.47)	5.00_a (.00)	2.32 (.08)
Importance of Outdoor Play	4.14_a (.69)	4.56_{ab} (.62)	4.70_{ab} (.52)	4.91_b (.29)	5.00_{ab} (.00)	3.57** (.11)
Visit Frequency – Walking Trails / Forested Areas						
	Never (n = 4)	Once or Twice a Year (n = 27)	Once or Twice a Month (n = 37)	Once or Twice a Week (n = 35)	Almost Daily or Every Day (n = 13)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Importance of Early Nature Experiences	4.50_a (.58)	4.37_a (.93)	4.59_a (.69)	4.86_a (.49)	4.85_a (.38)	2.39 (.08)
Importance of Outdoor Play	4.50_{ab} (.58)	4.41_a (.75)	4.62_{ab} (.55)	4.80_b (.41)	4.92_b (.28)	2.93* (.10)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Tukey's HSD.

*p < .05, **p < .01, ***p < .001

Parents' perceived importance of early nature experiences or outdoor play for childhood development was not related to how often parents generally play with their children outdoors in nature (p's all > .10; see Table 29 for frequencies)[27].

[27] A Kruskal-Wallis test for early nature experiences, to account for non-normality, resulted in a similar outcome: p > .10.

Table 29

Importance of Outdoor Experiences for Child Development and General Frequency of Outdoor Play with Children

Play / Do Activities with Children Outside in Nature						
	Never (n = 1)	A Few Times a Month (n = 9)	Once a Week (n = 10)	Several Times a Week (n = 62)	Every Day (n = 35)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Importance of Early Nature Experiences	5.00 (.00)	4.78 (.44)	4.90 (.32)	4.53 (.76)	4.74 (.66)	1.10 (.04)
	Never (n = 1)	A Few Times a Month (n = 9)	Once a Week (n = 10)	Several Times a Week (n = 62)	Every Day (n = 35)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Importance of Outdoor Play	4.00 (.00)	4.56 (.73)	4.80 (.42)	4.68 (.54)	4.63 (.60)	.62 (.02)

*p < .05, **p < .01, ***p < .001

Hypothesis 9

Correlations and ANOVAs were used to determine if an association exists between parental encouragement to be outdoors in childhood (as measured by the composite variable) and families' current contact with the outdoors[28]. There was no relation between encouragement of outdoor time in childhood and family time spent playing outside (imaginative/free play; p > .10) or going on nature outings (walks, hikes, bike rides; p > .10) in the past three days[29].

In terms of visit frequency, encouragement to be outdoors in childhood appeared to be associated with increased family visits to the beach/waterfront, however a Tukey's post hoc test revealed no

[28] Analyses exclude N = 12 participants who were unsure or could not recall an answer to one or more of the items in the composite variable.
[29] Spearman's rank correlations, to account for non-normality, resulted in similar outcomes: p's all > .10

significant differences between visit frequencies (see Table 30 for all frequencies). There was a (non-significant) trend ($p = .08$)[30] that parents who visited a schoolyard daily with their family recalled being encouraged to spend time outdoors moderately more frequently in childhood than those who visited a schoolyard less often. Further, although ANOVAs revealed (non-significant) trends that outdoor encouragement was related to family visits to a local park ($p = .10$) and bike paths/trails ($p = .06$), Kruskal-Wallis tests, to account for non-normality, found no relation to these nature areas (p's all > .10; see Table 30 for frequencies and Kruskal-Wallis test details). There were also no connections between encouragement to be outdoors in childhood and family visits to the backyard, conservation park/area, walking trails/forested areas, pond/stream, or public/community gardens (p's all > .10).

Table 30

Encouragement to be Outdoors in Childhood and Frequency of Visits to Nature Areas

Visit Frequency – Beach / Waterfront						
	Never (n = 2)	Once or Twice a Year (n = 37)	Once or Twice a Month (n = 39)	Once or Twice a Week (n = 17)	Almost Daily or Every Day (n = 7)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Encouragement to be Outdoors	1.83_a (.71)	2.95_a (.95)	3.11_a (.96)	3.65_a (.53)	3.00_a (.79)	2.92* (.11)
Visit Frequency – Schoolyard						
	Never (n = 20)	Once or Twice a Year (n = 19)	Once or Twice a Month (n = 18)	Once or Twice a Week (n = 28)	Almost Daily or Every Day (n = 17)	Omnibus ANOVA
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*F* (partial η^2)
Encouragement to be Outdoors	2.92_a (1.00)	3.11_a (.88)	3.07_a (1.02)	2.93_a (.97)	3.67_a (.44)	2.14 (.08)
Visit Frequency – Local Park						

[30] A Kruskal-Wallis test, to account for non-normality, resulted in a similar outcome: $p = .09$.

	Never (n = 3)	Once or Twice a Year (n = 6)	Once or Twice a Month (n = 31)	Once or Twice a Week (n = 43)	Almost Daily or Every Day (n = 19)	Omnibus Kruskal-Wallis
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)
Encouragement to be Outdoors	2.33_a (1.45)	3.50_a (.62)	3.01_a (.90)	3.00_a (1.01)	3.51_a (.58)	5.74 (.06)
Visit Frequency – Bike Paths / Trails						
	Never (n = 6)	Once or Twice a Year (n = 17)	Once or Twice a Month (n = 34)	Once or Twice a Week (n = 32)	Almost Daily or Every Day (n = 12)	Omnibus Kruskal-Wallis
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*H* (E^2_R)
Encouragement to be Outdoors	2.22_a (1.29)	3.41_a (.49)	3.17_a (.96)	2.98_a (.97)	3.36_a (.74)	4.70 (.05)

Note. Means not sharing subscripts differ significantly at p < .05 as indicated by Tukey's HSD.

*p < .05, **p < .01, ***p < .001

Further, encouragement to be outdoors in childhood was not related to how often parents generally play with their children outdoors in nature (p > .10[31]; see Table 31 for frequencies).

Table 31

Encouragement to be Outdoors in Childhood and General Frequency of Outdoor Play with Children

Play / Do Activities with Children Outside in Nature						
	Never (n = 1)	A Few Times a Month (n = 8)	Once a Week (n = 8)	Several Times a Week (n = 54)	Every day (n = 30)	Omnibus ANOVA
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* (partial η^2)
Encouragement to be Outdoors	4.00 (.00)	3.67 (.56)	3.38 (.60)	2.94 (1.00)	3.18 (.92)	1.64 (.06)

*p < .05, **p < .01, ***p < .001

[31] A Kruskal-Wallis test, to account for non-normality, resulted in a similar outcome: p > .10.

Discussion

To understand whether children's time outdoors in nature is decreasing, and how parents may influence this trend in their role as 'gatekeepers', the present study explored how families are spending their time outdoors – specifically during the COVID-19 pandemic – as well as the potential impact that parents' nature connectedness, attitudes about nature, and childhood nature experiences might have on family outdoor time. Results suggest that easy access to nature, a greater sense of connection with nature, perceiving outdoor experiences as important for child development, and doing outdoor activities in childhood may be influential in increasing family time spent outdoors and in nature. Spending more time outside close to home may also be linked to fewer perceived restrictions in accessing the outdoors during the pandemic.

Potential Increase in Outdoor Free Play

The activities families engaged in the most over a three-day period were outdoor free play (almost two and a half hours per day), indoor free play (around two hours and fifteen minutes per day), and activities involving screen time (e.g., watching tv or movies, gaming, video chats; almost two hours per day). This time spent in outdoor play seemed to be higher than at the very beginning of the pandemic, when children averaged just under two hours spent in outdoor play each day (Dodd et al., 2021). Also, families spending more time engaged in free play than on screens contradicts previous findings in which screen time use (e.g., watching TV) outweighed the time children spent in free play (e.g., Singer et al., 2009).

Families spending this amount of time engaged in free play over the period covered in this study may suggest that children are engaging in more imaginative/free play nowadays, particularly outdoors. This apparent increase is surprising, given that previous studies have shown a decline in children's outdoor free play over time (e.g., Mullan, 2019; Skar & Krough, 2009). There has also been evidence of

a slight decrease in outdoor play among Canadian children after the onset of the pandemic (de Lannoy et al., 2020; Moore et al., 2020). However, the current study differs in that parents were specifically asked about playing outdoors *with* their children. In accordance with this apparent increase in family outdoor play, previous research has suggested that children spend more time playing in nature when accompanied by adults (Gunderson et al., 2016), and during the pandemic, outdoor recreation increased for families with children (Fagerholm et al., 2021).

While it is notable that parents reported generally playing with their children slightly more often inside than outside (i.e., daily versus several times a week), this finding could reflect seasonal differences. Most responses for the current study were obtained during the summer months, and as such the three-day period may provide a better indication of how often families are playing outside in the summer – a season in which children typically spend more time in outdoor play (Gunderson et al., 2016). 'General' trends, however, could encompass other seasons in which time spent playing outdoors is less frequent (e.g., winter). Indeed, previous research showing declines in outdoor play during the pandemic have been conducted in late winter or early spring (e.g., Moore et al., 2020; Riazi et al., 2021). Thus, if outdoor play is indeed increasing, it may only be during certain times of the year (e.g., summer).

Ease of Access to Nature

In exploring where the majority of families spend their time outside, the current study found that families most often visited their own backyard. One explanation for this finding may be related to ease of access, since families often made more frequent visits to nature areas that were perceived to be more easily accessible. This result aligns with other research in which people tend to make more frequent visits to green spaces that are close to home (Thompson et al., 2008). Indeed, the backyard was considered the easiest to access out of all the nature areas assessed, which perhaps is unsurprising given

that most families live in houses that likely have access to this type of space. Potential exposure to COVID-19 in outdoor public spaces may have also led parents to perceive their own backyard as more easily accessible. Further, socio-economic status may be related to ease of access: most parents in the study perceived their family to be slightly more well-off financially than other families in their community, and families with greater income are more likely to have access to outdoor spaces in which their children can play (Perez et al., 2021). However, ease of access did not influence family visits to a local park, even though it was rated as the second most easily accessible place – a finding that is consistent with research suggesting that some local nature spaces, though very easy to access, are still used less frequently than places around the home such as gardens or playgrounds (Gunderson et al., 2016).

Access to the outdoors may also influence the extent to which families play together outside, as easier access to nature spaces was associated with increased family time spent in outdoor free play over three days. Since families in this study mostly live within city suburbs, this finding aligns with previous research in which people living in suburban areas with greater access to local greenspaces may do more outdoor activities close to home (Neuvonen et al., 2007). However, ease of access was not related to family time spent on nature outings (e.g., walks, hikes, bike rides) over three days, which suggests that other factors may have a greater impact on family participation in these activities. For instance, going out for walks in nature may take more time than simply going outside in the backyard to play.

Barriers to Getting Outdoors: Distance and Time Versus Safety

The most commonly described barrier to accessing nature spaces was distance or location (e.g., some nature spaces required a car to get there or were less accessible by transit), followed by time constraints (e.g., finding time to be in nature between work, school, etc.). In terms of distance, previous research has suggested that many parents would rather take their children to ‘better quality’ nature areas

further from home (Skar & Krough, 2009), so being unable to access these more distant spaces in nature is a barrier consistent with the literature. Previous research has also found time to be a prevalent barrier to children's nature contact (Skar et al., 2016; Singer et al., 2009). Socio-economic status may be related to increased time constraints, as parents with higher income are more likely to report being busy with work as hindering their ability to be active with their children (Perez et al., 2021).

However, one of the least frequently mentioned barriers was general safety. Although the pandemic itself was described as a barrier, which could be considered a safety issue, it was still only mentioned by about 8% of respondents. This apparent decrease in safety concerns differs greatly from much of the literature in which parents' worries regarding their children's safety is at the forefront of barriers to children's time spent outdoors (e.g., Carver et al., 2008; McFarland & Laird, 2018; Veitch et al., 2006). It is worth noting, though, that this result does align with recent research in Finland where parents (mainly mothers) found lack of time and inaccessibility to be greater barriers to spending time in nature with their children than fears about safety (e.g., sustaining an injury; Gustafsson et al., 2021). As such, this potential decrease in fears surrounding children's safety when going outside in nature, also mainly reported by female parents, may be a new finding for Canadian parents.

One possible explanation could be that since families were often spending more time together near the home during the pandemic (e.g. in the backyard), parents were able to keep a closer eye on their children than if they were going out alone or with other friends away from home. Indeed, many parents supervised their children's outdoor time closely during the pandemic (Riazi et al., 2021), and even if they were allowed to go outdoors alone, some parents described still being able to watch their children's activity from inside their residence (Eyler et al., 2021). As such, being able to control when and where their children played outdoors may have led to a decrease in safety concerns. The extent to which children are supervised may also relate to their age, as parents may have been more inclined to

accompany younger, rather than older, children outdoors during the pandemic (Eyler et al., 2021; Riazi et al., 2021).

Impact of the Pandemic on Getting Outside

The pandemic may have also influenced family visits to certain nature spaces, as parents who visited conservation areas frequently believed the pandemic had a greater impact on their ability to get outside in nature. This result may relate to perceptions that more people were engaging in outdoor recreation during this time (Fagerholm et al., 2021). If families visited public nature spaces like conservation areas on a regular basis, perhaps they were able to see these large increases in attendance firsthand – especially as some parents complained about overcrowding in areas such as parks, beaches, etc. It could also be the case that if urban nature areas were perceived to be extremely busy, parents may have made an effort to take their family to places farther away in nature (e.g., conservation areas). Indeed, some people during the pandemic avoided visiting nature areas perceived to be the most crowded (Fagerholm et al., 2021). On the other hand, there was a trend for parents who visited backyards daily with their family to view the pandemic as having slightly less of an impact on their ability to get outdoors in nature. As such, having access to a private nature space, without worrying about large crowds, may have lessened parents' concerns about going outside during the pandemic.

Similarly, the pandemic may have had less of an impact on families who engaged in regular play outside: Parents who spent more time engaged in outdoor free play with their family over three days, and in general, believed the pandemic did not greatly impact their ability to get outside in nature. This association between increased outdoor play and lower pandemic impacts could be influenced by family residence, as living in a house may be linked to greater outdoor play for children during the pandemic (Moore et al., 2020; Riazi et al., 2021). Since the pandemic hindered most structured forms of play (e.g., many parents described the cancellation of organized sports or registered programs for their children as

impacting family activities), perhaps families living in areas with nature or outdoor spaces close by were able to provide opportunities for children's free play outside.

Parents' Connection with Nature

Connection with nature may also have a special influence on outdoor time during the pandemic: Parents who felt drawn to or familiar with nature perceived a slightly lower impact of the pandemic on their ability to get outdoors, which suggests that the need to be in nature may not be greatly hindered by stressful experiences like a pandemic. Parents with a greater sense of nature connection also made more frequent visits with their family to the beach/waterfront, backyard, conservation area, walking trails, and pond/stream, and there was a trend for parents with a greater sense of nature inclusion to visit bike paths and public gardens more frequently. These findings align with previous research suggesting that nature-related people make more frequent visits to places in nature (Lin et al., 2014; Nisbet et al., 2009). Thus, nature-related parents may be more likely to bring their children to spaces in nature. It is also notable that parents in the study were fairly nature-related to begin with, perhaps relating to the fact that most were female – and females are often more connected with nature than males (Grabowska-Chenczke et al., 2022).

Connection with nature may also impact family time spent outdoors. There was a trend that parents with a greater sense of nature inclusion were slightly more likely to play with their children outdoors daily, in general, though nature connectedness was unrelated to outdoor play over three days. However, connection with nature may have had a stronger influence on walks, hikes or bike rides in nature, as parents with a higher sense of connection with nature spent more time on nature outings with their family over the past three days. This finding aligns with research during the pandemic in which nature-related people often did more nature-based activities (Haasova et al., 2020). Therefore, parents may do more nature-based activities with their children if they have a greater connection with nature.

Factors Influencing Nature Connection

Since parents' sense of connection with nature has somewhat of an impact on family time spent outdoors, it is important to understand what might influence this connection. Parents' current connection with nature may be directly influenced by childhood experiences in nature, as frequency of play in the backyard or local park during childhood was related to an increased sense of nature-relatedness (though not related to a sense of inclusion with nature). Further, more frequent walks/hikes in nature during childhood was linked to a greater sense of nature-relatedness in adulthood, and there was a trend that this activity was related to a greater sense of inclusion with nature as well. These results are consistent with previous research in which greater contact with nature in childhood is linked to a greater connection with nature in adulthood (Chawla, 2020). Even though parents who rarely went on nature walks in childhood still had a moderately high sense of inclusion with nature and nature-relatedness, perhaps walking trails were less accessible – so these participants might have engaged in other nature-based activities.

Results also showed that a greater connection with nature in adulthood is linked to a greater sense of inclusion with nature in childhood. Certain nature-based activities in childhood may contribute to childhood connection, as more frequent walks or hikes in nature were associated with a greater sense of inclusion with nature in childhood. This result aligns with research suggesting that nature-related children tend to have greater contact with natural environments (Chawla, 2020). However, *less* frequent play in the backyard or local park was associated with a greater sense of inclusion with nature in childhood. In this case, perhaps children played on swing sets or playgrounds in these areas, which may not have provided as much nature-immersion as playing in other nature spaces. On the other hand, some parents may not have had access to spaces like a backyard in their childhood, so spending time in other nature areas could have been more influential in developing a connection with nature early in life.

Parent Attitudes Surrounding Outdoor Experiences

Parent beliefs regarding the importance of outdoor experiences may also relate to frequency of visits to nature spaces. Parents who believed outdoor play to be important for child development made more frequent family visits to conservation parks and walking trails. There was also a trend for parents that believed early nature experiences are important for child development to visit conservation parks and walking trails more frequently with their family. This finding suggests that if parents strongly believe that outdoor, nature experiences are important for their children's development, they will make a greater effort to visit spaces in nature that are perhaps less easily accessible – especially during the pandemic (e.g., conservation areas were considered the least accessible nature space).

In contrast, parents' beliefs regarding the importance of early nature experiences and outdoor play for child development, as well as a preference for playing outdoors, were unrelated to the number of hours families spent doing outdoor activities over three days or the general frequency of outdoor play. This result seems unexpected for this sample, given that outdoor play was considered fairly important for children's development – similar to past research in which mothers placed high importance on outdoor play for child development (Singer et al., 2009) – and parents overwhelmingly preferred to do activities with children outside rather than inside. Further, it contradicts research in which parents who had more positive views of nature, and who viewed outdoor time as beneficial for children, reported that their children spent more time playing outdoors (e.g., McFarland et al., 2014). As such, perhaps parents' attitudes regarding the outdoors may be more influential in guiding their children's outdoor activities without parental accompaniment. In addition, these parental beliefs may have a greater influence on *where* families do outdoor activities rather than the amount of time spent doing them.

Childhood Experiences Outdoors in Nature

In terms of childhood experiences, encouragement from parents to be outdoors in childhood was also not related to family outdoor activities over three days or in general, though there was a small influence on family visits to nature. Although there was a trend for parents who were frequently encouraged to be outdoors in childhood to currently visit schoolyards with their family more often, this encouragement was not related to visiting any other nature space. Perhaps parents who were encouraged to be outdoors in schoolyards, specifically, as children may be more likely to visit schoolyards with their own children – a result which could be influenced by place attachment (e.g., Ratcliffe & Korpela, 2020).

However, the activities parents did in their childhood may influence the types of activities they do with their own children. Although unrelated to nature outings or general outdoor play, there was a trend for parents who did outdoor activities with their own parents regularly in childhood to spend more time engaged in current outdoor free play with their family over three days. Interestingly, parents' most frequently recalled activity from their childhood was playing in their backyard or local park, so the aforementioned result is consistent with research suggesting that increased nature time in childhood is linked to increased nature time in adulthood (Holt et al., 2019; Mears et al., 2021). Previous research has also suggested that doing activities in nature with family members may be even more influential in increasing adult nature time than nature activities within after-school or extracurricular programs (Asah et al., 2018), which could be an avenue for further study within Canadian families.

Limitations and Future Directions

The current study has some limitations which should be addressed, including the characteristics of the sample, the design of the variables, and which parts of the data were analyzed. For instance, as the majority of parents are female, the sample is not equally representative of parent gender. Although females are more likely to participate in research studies, conducting the survey with a greater sample of

male parents would make the results more generalizable. Additionally, many parents in the sample live in a house, meaning they likely had easier access to nearby nature than those who live in apartments, for example. Most parents also both grew up and now live in city suburbs, so it is unclear if the patterns obtained in the present study would be the same for families who currently live in in downtown cities or in very rural areas – or for parents who had more drastic shifts in residence from childhood to adulthood. The type of season may also impact access to nature: families may engage in more outdoor activities during the summer, as the weather is generally pleasant and children are out of school; however, it may be more difficult for families to play or go on nature outings in the winter due to colder weather (e.g., safety concerns, the need for appropriate clothing) and children being in school.

In terms of design, a few variables could have been specifically described as 'outdoors' or 'in nature': a) in the activities list for family time use within the past three days, free play outdoors could have been defined as 'outdoors in nature', b) in the importance for child development questions, independent exploration and adult guidance could have more clearly differentiated between outdoors and indoors, and c) the recollection of parental encouragement of time spent 'outdoors', as well as doing activities with parents 'outdoors', could have been more precisely specified as 'outdoors in nature'. Participants reporting on family activities over the 'past three days' may or may not have included weekends as well as weekdays – a distinction which could have impacted the amount of time families spent outdoors. Further, the activity options for current family time use and childhood recollections could have been more similar, as childhood activities included those done in the winter while activities for current family time only included ones done in the summer. The ranking of childhood activities also could have included a "not applicable" option for participants who grew up in a place without snow or cold enough temperatures to form skating rinks.

Indeed, peoples' experiences may not have been sufficiently captured by the wording used in some measures. When parents reported how often their families engaged in recent outdoor activities or visited spaces in nature, the actual type or quality of space where these outings took place was unknown. For example, a 'backyard' could contain a small patch of grass or a large field. Moreover, after looking through the qualitative responses, some parents likely did not have a backyard or local park in their area as a child – so analyzing how these experiences relate to childhood connection with nature are not relevant. As such, having a "not applicable" option would have helped clarify what kinds of outdoor spaces parents had access to in their childhood. It would also have been useful to include a question specifying whether participants grew up in or outside of Canada, in order to compare their childhood experiences. Additionally, the wording related to "the impact of COVID-19 on getting outdoors" may have meant different things to different respondents. Although 'impact' was assumed to be negative, it was not explicitly phrased in terms of *hindering* peoples' ability to get outdoors. Therefore, some participants may have interpreted this question as to how the pandemic had a *positive* impact on their ability to get outside.

Some analyses also focused on a few, rather than all, variables contained in the survey. For example, in analyzing family time use, playing outdoors and going for nature walks were included as these were assumed to be the most easily 'accessible' activities; however, other activities were not analyzed due to the scope of the study. Further, it is not known whether the frequency of outdoor activities differs significantly from that of indoor activities, as only outdoor activities were included in analyses. It may also be difficult to generalize short-term experiences to long-term habits: while analyzing family activities over the past three days provided a brief glance into families' lives, it may not reflect what families do on a regular basis. Although the pandemic limited how research was conducted in the current study, analyzing children's time outdoors by asking parents about 'family' time

outdoors may lead results to be interpreted through the lens of the parent, rather than asking children directly about their outdoor time. Future studies could ask children about their own experiences of their parents as 'gatekeepers' to the outdoors, and how this might influence their time spent outside (and willingness to do so).

Even in light of these limitations, the current study provided new insights into how Canadian families are spending time together outdoors, particularly in its suggestion that children's outdoor play may actually be increasing. If children are engaging in more free play outdoors in the absence of structured activities (e.g., organized sports, registered programs, etc.), future research should explore if outdoor free play still remains as prevalent once structured activities become more widely available again. Future research should also investigate if other trends in found during the pandemic continue once the pandemic "ends". For instance, before the pandemic, parents and children often visited nature areas further from home, as parents were not impressed with the quality of nearby nature spaces (Natural England, 2019; Skar & Krogh, 2009; Veitch et al., 2006). Now that families appear to be visiting nature areas more locally (e.g., the backyard, local parks), it will be interesting to see if parent perceptions of nearby nature will change, and how this could impact the frequency of children's outdoor time in the future.

In addition, while attachment to places in nature was not specifically analyzed in terms of its impact on family time outdoors, some parents mentioned going to similar nature places with their children that they frequented in their own childhood. This result is consistent with previous research in which adults may revisit spaces in nature that they became attached to as children (Ratcliffe & Korpela, 2020). As such, further studies should more fully explore whether certain places in nature have special meaning for families, and how this attachment might influence the types of spaces that families visit.

It was beyond the scope of this study to fully investigate how demographic characteristics (e.g., age and gender of parents and children, socio-economic status, type and area of residence) influenced family time spent in nature. However, given the suggested importance of living in a suburban house with access to nearby greenspace may be in increasing outdoor time, future research should examine Canadian demographics more closely. For example, exploring differences in outdoor time between families in other kinds of residences (e.g., apartment, duplex), other areas in which people live (e.g., downtown cities, rural areas), and different regions in Canada (e.g., the prairies, the north, etc.) would help build a more complete picture of family nature experiences across the country.

Conclusion

Based on the results of the current study, children's overall time spent outdoors may not be decreasing in Canada. As families may be visiting nearby outdoor spaces with greater frequency, and spending more time engaged in outdoor free play and less in structured activities, it might be more realistic to suggest that how and where children are spending time outside is changing (though experiences 'outdoors' may not always be in 'nature'). The COVID-19 pandemic may be particularly influential in instigating this change: the increase in families spending more time at home, due to restrictions such as online schooling and working from home, might have given some families greater opportunities to spend more time together outdoors than before the onset of the pandemic. Furthermore, exploring the factors influencing family time outdoors – e.g., ease of access, connection with nature, parent attitudes, and childhood experiences – provides an indication of why families may spend more time outside than others. By understanding how to help families access the outdoors, children (and parents) can continue to reap the physical and mental health benefits of contact with nature for years to come.

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Appendix A

Online Survey

WELCOME!

This is the Family Experiences Research Study

Informed Consent
The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Researchers. The following people are involved in this study. You can contact them at any time if you have questions or concerns:
Dr. Elizabeth Nisbet (email: elizabethnisbet@trentu.ca, tel: 705 748-1011 ext. 7855)
Jocelyn Sommerfeld, graduate student researcher (email: jocelynsommerfeld@trentu.ca)

Participants. If you are 18 or older and have one or more children under age 16, we invite you to complete this study. You also need to be able to read and write in English.

Purpose. We are interested in family activities and how these may have changed because of the COVID-19 pandemic. We are also interested in people's ability to get outside, how parents and children play, peoples' thoughts about nature, and parents' experiences in their childhood.

Task Outline. We will ask you to answer an anonymous online survey about your family's play and relaxation activities during the pandemic, your attitudes, and your childhood memories. The survey takes about 25 minutes. If you finish the survey, you can choose to enter a draw for $200 in cash. Your chances of winning are about 1 in 200. A separate (optional) link to enter your email address will be given at the end of the survey. The winner will be contacted after the study is completed in August 2022.

Potential Risk or Discomfort. We do not think the survey will be uncomfortable, but if you feel this way at any time then you can choose to not answer any questions. You may also leave the survey at any point by closing your browser window.

Potential Benefits. There are no direct benefits to you for participating in the study. You are helping us to learn how parents and families spend their time, and helping to expand scientific knowledge.

Confidentiality. Your responses on this survey will be anonymous. This means we will not ask you for your name, address, or other information that could identify you. If you want to enter the draw, a separate survey link will be provided that is not associated with any of your answers. Any emails given for the draw will be destroyed after the draw is done.

All of your answers to this survey will be confidential and will be stored on the researchers' password-protected computers. Since the research is funded by the public, the anonymous information will be kept on the Open Science Framework. This is a non-profit website that helps make research more transparent, reproducible, and open. The anonymized data may be shared with other trusted researchers as required and will be kept for at least 2 years but no longer than 10.

Only general scores from the study will be used in publications, reports, presentations, and teaching. No money will be made from this data, and the researchers have no conflict of interest from this research. If you want to know the results of the study, you can contact the researchers after the study is finished (around August 2022).

Right to Withdraw. Participation is optional and you may leave the survey at any time, for any reason, without penalty. If this happens, your answers will be destroyed. Any surveys that are not answered completely will be deleted. It is not possible to have your information taken out of the study after you finish the survey, since your answers are anonymous. You will not be forced to answer any question, but we would really appreciate your help with this research.

Please read the following points carefully:

- **I understand the purpose of this study and my involvement as descibed above.**
- I understand that participating in this study is optional and that I am free to leave at any time. If I leave, my answers will not be used and will be destroyed.
- I understand that my information will be kept confidential using methods described above.
- I agree that my answers can be analyzed for the purpose of this study.
- **I have read and understood this consent form.**
- I understand that this study has been reviewed by the Trent University Research Ethics Board, study number [21-26665]. I am aware that I can contact the university's Certifications and Regulatory Compliance Officer, Jamie Muckle (Email: jmuckle@trentu.ca), if I have questions about my rights as a participant in this study.

BY CLICKING THE "YES" BUTTON, I RECOGNIZE THAT I HAVE READ AND UNDERSTOOD THIS AGREEMENT, AND THAT I HAVE CARRIED OUT THIS AGREEMENT WILLINGLY.

Please print out or save a copy of this consent form for your records.

I have read, understood, and printed or saved a copy of the above consent form, and I want to participate in this study of my own free will.

○ **Yes, I wish to participate**

○ No thanks

(AFTER ENTERING YOUR RESPONSES, JUST CLICK ON THE "NEXT" BUTTON AT THE BOTTOM-RIGHT OF EACH PAGE TO ADVANCE THE SURVEY)

Demographics

Please tell us a bit about yourself and your family.

Where did you live **while growing up**? (Please choose only one response from the options below)

- ○ City (downtown)
- ○ City (suburbs)
- ○ Exurban area (development beyond suburbs)
- ○ Small town
- ○ Rural or farm
- ○ Other (please specify) _____

Where do you live **now**? (Please choose only one response from the options below)

- ○ City (downtown)
- ○ City (suburbs)
- ○ Exurban area (development beyond suburbs)
- ○ Small town
- ○ Rural or farm
- ○ Other (please specify) _____

What type of place are you living in right now?

- ○ Single family house
- ○ Apartment
- ○ Townhouse
- ○ Low-rise building
- ○ High-rise building
- ○ Other (please explain) _____

Who is living with you in your household right now? (Please check all that apply)

- ☐ Your significant other
- ☐ Your child(ren)
- ☐ Your parent(s) or grandparent(s)
- ☐ Other (please explain) _____

What is your age?

▾

Do **you** identify as:

- ○ Female
- ○ Male
- ○ Gender-fluid, non-binary, and/or Two-Spirit
- ○ Prefer to self-describe (add in comment) _____
- ○ Prefer not to say

What is the highest level of formal education you have completed?

▾

Please tell us a bit about your opinions.

	Extremely Liberal 1	2	3	4	Extremely Conservative 5
Overall, where would you place yourself, on the following scale of liberalism-conservatism?	○	○	○	○	○
In terms of social and cultural issues (e.g., abortion, separation of church and state, affirmative action), where would you place yourself on the following scale?	○	○	○	○	○

	Extremely Liberal 1	2	3	4	Extremely Conservative 5
In terms of economic issues (e.g., taxation, welfare, privatization), where would you place yourself on the following scale?	○	○	○	○	○

How many children do you have?

What is your child's age, and how do they identify?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			
Child 4			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			

	Age	Gender	If choosing to self-describe: Gender description
Child 3			
Child 4			
Child 5			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			
Child 4			
Child 5			
Child 6			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			
Child 4			
Child 5			
Child 6			
Child 7			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			
Child 4			
Child 5			
Child 6			
Child 7			
Child 8			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe:

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			
Child 4			
Child 5			
Child 6			
Child 7			
Child 8			
Child 9			

What are your children's ages, and how do they identify themselves?

(If not choosing to self-describe gender, please enter "N/A" in the third column)

	Age	Gender	If choosing to self-describe: Gender description
Child 1			
Child 2			
Child 3			
Child 4			
Child 5			
Child 6			
Child 7			
Child 8			
Child 9			
Child 10			

In the spring (April-June) of 2021, was your child(ren)'s education mainly...

- ○ Online
- ○ In person
- ○ Both online and in person
- ○ My child(ren) is/are homeschooled
- ○ My child(ren) is/are not in school yet
- ○ Other (please explain):

Using Census categories of race and ethnicity, is your family ... (Please check all that apply)

- ☐ Arab
- ☐ Black
- ☐ Caucasian
- ☐ Chinese
- ☐ Filipino
- ☐ Indigenous (e.g. First Nation, Inuit, Métis)
- ☐ Japanese
- ☐ Korean
- ☐ Latin American
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
- ☐ Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.)
- ☐ West Asian (Iranian, Afghan, etc.)
- ☐ Multiple Ethnicities
- ☐ Other Ethnicity (please specify)
- ☐ Prefer not to answer

Think of this ladder as representing where families stand in your community.

At the **top** of the ladder are families who are the most financially well off, and at the **bottom** of the ladder are families who are the least financially

well off. The higher your family is on this ladder, the closer you are to the families at the very top; the lower your family is, the closer you are to the families at the very bottom.

Where would you place your family on this ladder at this time in your life, when compared to other families in your community?
Please choose a spot on the ladder by moving the slider below.

10 Most financially well off

1 Least financially well off

	1	2	3	4	5	6	7	8	9	10	
My family's spot on the ladder:											**10**

Nature Access

How often do you and your family visit these types of places?

	Never	Once or twice a year	Once or twice a month	Once or twice a week	Almost daily or every day
Beach or waterfront	○	○	○	○	○
Backyard	○	○	○	○	○
Schoolyard	○	○	○	○	○
Local Park	○	○	○	○	○
Bike Paths / Trails	○	○	○	○	○
Conservation Park/Area	○	○	○	○	○
Walking Trails / Forested Areas	○	○	○	○	○
A pond or stream	○	○	○	○	○
Public or Community Garden	○	○	○	○	○

How difficult is it for you and your family to visit these types of places?

	Very Difficult				Very Easy
Beach or waterfront	○	○	○	○	○
Backyard	○	○	○	○	○
Schoolyard	○	○	○	○	○
Local Park	○	○	○	○	○
Bike Paths / Trails	○	○	○	○	○
Conservation Park/Area	○	○	○	○	○
Walking Trails / Forested Areas	○	○	○	○	○
A pond or stream	○	○	○	○	○
Public or Community Garden	○	○	○	○	○

What are some things that make it difficult to visit these places? (Please explain)

How much has the COVID-19 pandemic impacted these parts of your life? (Move the slider to answer)

	No impact at all 1	2	3	4	Impacted my life a great deal 5
My living situation					
Working					
Social life					
My own physical activity					
My child(ren)'s physical activity					
Getting outside, in nature					
Child care					
Homeschooling					
Child(ren)'s mental wellbeing					
My own mental wellbeing					

If the COVID-19 pandemic has greatly impacted your life in any of the previous ways, please tell us how.

Nature Relatedness

For each of the following, please rate the extent to which you agree with each statement, using the scale below. Please respond as you really feel, rather than how you think "most people" feel.

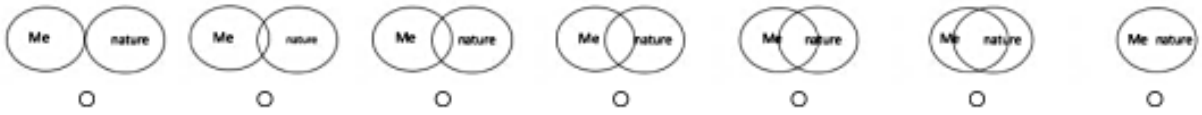
	Disagree strongly	Disagree a little	Neither Agree or Disagree	Agree a little	Agree strongly

	Disagree strongly	Disagree a little	Neither Agree or Disagree	Agree a little	Agree strongly
I enjoy being outdoors, even in unpleasant weather.	O	O	O	O	O
Some species are just meant to die out or become extinct.	O	O	O	O	O
Humans have the right to use natural resources any way we want.	O	O	O	O	O
My ideal vacation spot would be a remote, wilderness area.	O	O	O	O	O
I always think about how my actions affect the environment.	O	O	O	O	O
I enjoy digging in the earth and getting dirt on my hands.	O	O	O	O	O
	Disagree strongly	Disagree a little	Neither Agree or Disagree	Agree a little	Agree strongly
My connection to nature and the environment is a part of my spirituality.	O	O	O	O	O
I am very aware of environmental issues.	O	O	O	O	O
I take notice of wildlife wherever I am.	O	O	O	O	O
I don't often go out in nature.	O	O	O	O	O
Nothing I do will change problems in other places on the planet.	O	O	O	O	O
I am not separate from nature, but a part of nature.	O	O	O	O	O
	Disagree strongly	Disagree a little	Neither Agree or Disagree	Agree a little	Agree strongly
The thought of being deep in the woods, away from civilization, is frightening.	O	O	O	O	O
My feelings about nature do not affect how I live my life.	O	O	O	O	O
Animals, birds and plants should have fewer rights than humans.	O	O	O	O	O
Even in the middle of the city, I notice nature around me.	O	O	O	O	O
My relationship to nature is an important part of who I am.	O	O	O	O	O
Conservation is unnecessary because nature is strong enough to recover from any human impact.	O	O	O	O	O
	Disagree strongly	Disagree a little	Neither Agree or Disagree	Agree a little	Agree strongly
The state of non-human species is an indicator of the future for humans.	O	O	O	O	O
I think a lot about the suffering of animals.	O	O	O	O	O
I feel very connected to all living things and the earth.	O	O	O	O	O

INS

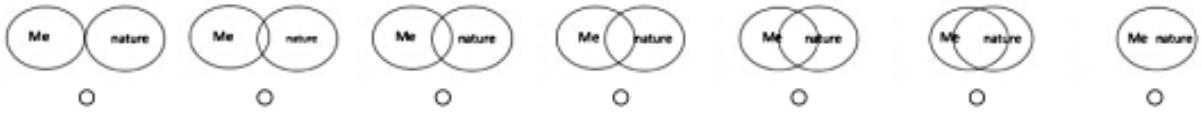
Next, we have some questions about how connected you feel with people and places, in your early years as well as now.

Please select the image below that best describes your relationship with the natural environment in your **childhood**. How interconnected **were you** with nature?



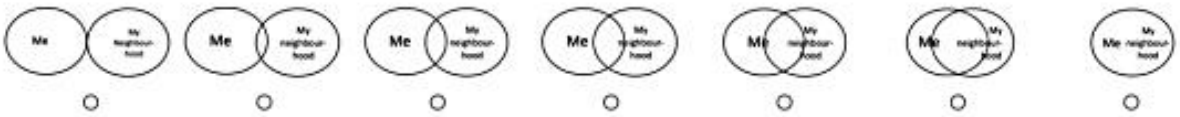
O O O O O O O

Please select the image below that best describes your relationship with the natural environment **currently**. How interconnected **are you** with nature?



O O O O O O O

Please select the image below that best describes your relationship with your **current** neighbourhood. How interconnected are you with your neighbourhood?



Parent Support

While we understand that play experiences might look different in every family, we are interested in your experiences of play with your child(ren).

How often do you do the following?

	Never	A few times a month	Once a week	Several times a week	Every day
Play or do activities with my child(ren) INside	○	○	○	○	○
Play or do activities with my child(ren) OUTside, in nature	○	○	○	○	○

In terms of your own personal preferences, do you prefer to play or do activities with your children...

○ Indoors

○ Outside, in nature

○ Other:

We are also interested in your views on the types of opportunities children should have.

In your opinion, how important do you believe these are for child development?

(Move the slider to answer)

	Not important 1	2	Somewhat important 3	4	Very important 5
Adult guidance					
Independent exploration					
Early experiences in nature					
Indoor play					
Outdoor play					

Time Use

Even though your family activities right now may be a bit different, we are interested in how your family has spent some of their time together recently (over the **past 3 days**).

Note: activities may overlap, and they do not have to add up to a specific amount of time.

In the last 3 days, how many hours did **your family** spend . . .

0 hours Playing **IN**doors (imaginative/free play)

0 hours Watching television / movies, gaming, video chatting

0 hours Playing board games, making arts and crafts, or puzzles

0 hours Visiting museums or art galleries

0 hours Playing **OUT**doors (imaginative/free play)

0 hours On a picnic

0 hours On a walk, hike, or bike ride in nature

0 hours Visiting a zoo

0 hours Gardening / planting, or harvesting

0 hours Please enter the number 6 here to help us know you are still understanding the survey

0 hours Camping

0 hours Fishing

0 hours Canoeing or kayaking

0 hours Swimming

0 hours Doing any other activity that is important to your family (please explain):

What are your family's favourite activities?

Has the COVID-19 pandemic changed your family's activities?

- ○ Yes
- ○ No

Please explain how the pandemic has affected your family's activities
(e.g. How much more or less time does your family spend doing certain things?)

Childhood Nature Experiences

In your childhood, how often do you recall your parent(s) or other significant adult(s)...

	Never	Sometimes	Often	All the time	Unsure/Cannot recall
Encouraging you to go outside	○	○	○	○	○
Supervising your time spent outdoors	○	○	○	○	○
Encouraging you to explore the outdoors independently	○	○	○	○	○
Doing outdoor activities with you	○	○	○	○	○
Wanting you to stay outside for most of the day	○	○	○	○	○
Encouraging you to stay inside	○	○	○	○	○

How often do you recall doing the following activities in your childhood?

	Never	Rarely	Occasionally	Regularly	All the time
Going for a walk or hike in nature	○	○	○	○	○
Riding a bike	○	○	○	○	○
Playing in your backyard or local park	○	○	○	○	○

	Never	Rarely	Occasionally	Regularly	All the time
Camping	○	○	○	○	○
Swimming in an outdoor pool/lake/river/stream	○	○	○	○	○
Gardening / harvesting	○	○	○	○	○
Taking care of pets / animals	○	○	○	○	○
Fishing	○	○	○	○	○
Having a picnic	○	○	○	○	○
Canoeing / kayaking	○	○	○	○	○
Playing in the snow	○	○	○	○	○
Skating	○	○	○	○	○
Sledding / tobogganing	○	○	○	○	○
Other (please explain):	○	○	○	○	○

When thinking back to your childhood time in nature, who was most often with you?

- ○ Parent(s) or other significant adult(s)
- ○ Sibling(s)
- ○ Friends / peers
- ○ Teacher(s) or school group
- ○ I was mostly by myself

Did you have a favourite place in nature when you were growing up?

Do you have a memorable nature experience from your childhood that you could share below?

Debriefing

Family Experiences Debriefing

Thank you for agreeing to participate in this study. The goal of this research is to examine how the pandemic may be affecting families' and children's indoor and outdoor activities. We are also interested in how childhood experiences outdoors may relate to current family play and recreational experiences. It is possible that a person who feels connected to and aware of their natural surroundings may spend more time outdoors in nature. We are hoping to better understand whether connectedness to nature is changing at all, as a result of the pandemic and people's past and current ability to spend time outdoors.

Some researchers are finding that people who spend time outdoors in their childhood feel more connected to nature as an adult. We are interested in the processes through which this occurs, and how one's connection to the world around them might affect choices of where to spend family time. We hope to learn more about the pandemic's impact on the way families spend their time indoors and outdoors - both the challenges and opportunities. Your responses will help us to understand how family experiences may be the same or different during the pandemic, and the links between parents' and children's activities and sense of connection with different environments.

Why is this important to scientists or the general public?

Understanding the challenges of getting outdoors, for families, and the links between childhood and/or adult nature experiences is useful to people (scientists, policy makers, individuals) who are interested in increasing these things. For example, it may be a first step towards policy or advice in future. The pandemic provides a unique time period in which to test some previously established links, and to discover possible new ones.

Where can I learn more?

The following links provide some ideas about how children and families can spend time in nature:

Back to Nature Network. (2021). *Resources & research*. https://www.back2nature.ca/resources-research/

CHEO Research Institute. (2019, April). *Helping your child or youth spend more time outdoors*. https://www.cheo.on.ca/en/resources-and-support/resources/P6200E.pdf

Children & Nature Network. (2020). *Resources*. https://www.childrenandnature.org/resource-hub/resources/

de Lannoy, L., Rhodes, R. E., Moore, S. A., Faulkner, G., & Tremblay, M. S. (2020). Regional differences in access to the outdoors and outdoor play of Canadian children and youth during the COVID-19 outbreak. *Canadian Journal of Public Health, 111*(6), 988-994. https://doi.org/10.17269/s41997-020-00412-4

Pine Project. (2021). *Inspiring a love of nature*. https://pineproject.org/about/about-pine/

Please be assured that your responses will be treated confidentially. In any public presentation of our data, either in print or in speech, we will not present any information that could identify a participant. Thank you for being part of this research.

Contacts
The following people are leading this research project and may be contacted at any time if you have any further questions about the project, what it means, or concerns about how it was conducted:

Lisa Nisbet, Department of Psychology, Trent University, elizabethnisbet@trentu.ca, (705) 748-1011, ext. 7855

Should you have ethical concerns about this research, please contact:

Jamie Muckle, Certifications and Regulatory Compliance Officer, Office of Research at Trent University, phone: 705-748-1011 ext. 7896, Email: jmuckle@trentu.ca

Thank you again for helping us with this research!

Your responses have been recorded.

Do you want to be entered into the draw for the $200 cash prize? This will lead you to a separate survey, where you may enter your email for the draw. Your email is in no way linked to your survey responses.

○ **Yes, please**
Click "Next" to be taken to the separate prize draw entry page.

○ **No thank you**
Click "Next" or simply close your browser to end the survey.

Appendix B

Email Inquiry to Organizations

Hi [*insert name of individual*],

My name is Jocelyn Sommerfeld and I am a Master's student in the Nisbet Research Lab at Trent University. Currently, we are conducting a study on family activities during the COVID-19 pandemic, as well as the activities parents did in their childhood.

We have created a brief online survey for parents across Canada to fill out, and I was wondering if you would be willing to post the attached advertisement to your [*website/Facebook page/Instagram page/newsletter/blog*] to spread the word. Note that parents also have the opportunity to enter a draw for $200 in cash.

We would greatly appreciate your help, so please let me know if you have any questions. Feel free to distribute this ad to any parents you think may be interested.

Sincerely,

Jocelyn Sommerfeld

Figure A1

Study Advertisement Included in Email Inquiry

Family Experiences Study

Nisbet Research Lab
Department of Psychology
TRENT UNIVERSITY

Are you a parent/guardian (18+) with any children under the age of 16?
Tell us about your family's indoor and outdoor activities during the pandemic!

We are researchers at Trent University, and we need your help
to better understand the recreation and play time experiences of parents
and their children during the COVID-19 pandemic.

Complete our short (25 minute) anonymous online survey
and be entered in a $200 cash prize draw!

Visit the survey website to learn more and complete the study, or scan the code to open the survey on your mobile device:

https://trentu.qualtrics.com/jfe/form/SV_42BNVpwhTLk2i90

Thanks for helping us with our research!

This study has been reviewed by the Trent University Research Ethics Board, the study number is [21-26665]. If you have questions regarding your rights as a participant in this study please contact:

Jamie Muckle, Certifications and Regulatory Compliance Officer
c/o Office of the Vice-President, Research and Innovation
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Peterborough, ON K9L 0G2
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