

10 Children and the Natural Environment



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10.1 INTRODUCTION

Television, computers, smartphone, tablets; these days, many children have access to a range of media and rather spend their free time indoors behind a screen than outdoors playing in **nature** and **green space**. In addition, increasing urbanization has diminished opportunities for safe outdoor play, and many parents discourage children from going outdoors to prevent them from the threats of traffic or **stranger danger** (Veitch et al., 2010). For these and other reasons more and more children are growing up disconnected from nature and the outdoors. A large UK survey showed that less than 10% of the interviewed children spend their time playing in natural places, such as woodlands and the countryside, compared to 40% of their parents and grandparents when they were young (Natural England, 2009). There is growing concern that this disconnection may have negative consequences for children's development, health and well-being. This concern has been captured in the term **nature deficit disorder**, reflecting the potential negative impacts of children's disconnection from the natural world (Louv, 2005).

In this chapter, we give an overview of theory and research examining the importance of nature and nearby green space for children. We focus on children in the school age (6-12 years), with some reference to younger children and adolescents (13-18 years). We first discuss research on children's nature experiences, followed by a review of empirical evidence for positive impacts of nature on children's health and well-being. We also discuss emerging insights on the relationship between childhood nature experiences and adult environmentalism. We end with some practical implications of the growing body of knowledge on the importance of nature for children.

10.2 CHILDHOOD EXPERIENCES WITH NATURE

The first studies on children's experiences with nature consisted of **ethnographic studies** that rely on qualitative research methods (Hart, 1979; Lynch, 1977; Moore, 1980). Children were for instance observed while playing, asked to tell about their experiences, keep a diary, take photographs, or make drawings of their favourite places. Content analysis of these data revealed that natural areas like riverbanks, forests, unmown grass, weedy waysides, water edges and patches of woods are highly valued by children. What makes these places special is, among other things, that they contain many **affordances** or possibilities for action that "challenge, engage, inspire and provoke" children to engage in active, diverse and creative play experiences (Gibson, 1979). In general, ethnographic studies reveal that experiencing nature during childhood gives children the opportunity to have meaningful experiences that contribute to their understanding of the world around them, developing a sense of self, imagination and creativity, and affiliation with nature.

Much of the qualitative work on children's nature experiences has been conducted within the context of **environmental education** programmes. An important insight from this research is that "**hands-on-learning**" is an effective way of connecting children to nature. During hands-on-learning, children are encouraged to become actively engaged with the natural environment, and with all their senses and physical abilities interact, explore, modify and take care of nature. In this nature-contact, children may have impressive nature experiences that have a long-lasting influence throughout their life-span. Different forms of impressive childhood nature experiences have been distinguished, namely peak experiences, significant life experiences, flow experiences and magical moments (Verboom & De Vries, 2006, see also Table 10.1). These concepts are clarified below.

A **peak experience** is a rare, exciting, deeply moving experience that stands out from everyday events (Maslow, 1970). Peak experiences play an important role in self-actualization which represents the highest state of Maslow’s pyramid of needs. Although peak experiences are more likely to occur in people with a more mature personality, children and teens may also undergo peak experiences. For example, nature encounters, such as “enjoying the sunshine as I sat at a windowsill” or “exploring the forest near my neighborhood” were identified as distinct youth-peak experiences in various countries (Hoffman & Ortiz, 2009).

Significant life experiences are deeply touching forming experiences that often contain a component of anxiety, and may permanently change the vision on life (Tanner, 1980). For an experience to qualify as a significant life experience, the experience should be challenging but not too much, evoking just the right amount of anxiety. An event that is too challenging will be negatively evaluated. What the right amount of anxiety is for a significant life experience to occur may differ from person to person. What is experienced as shocking for some children (e.g. letting a sowbug crawl your hand) can be too plain or boring for other children to make a lasting impression (Verboom & De Vries, 2006).

Table 10.1 *Typologies of impressive childhood nature experiences (Based on Verboom and De Vries 2006).*

	Peak & flow experiences	Significant life experiences	Magical moments
Examples	Building a dam at the beach, building a shelter or taking care of an animal	Getting lost in the forest or a confrontation with a (wild) animal	Intrigued by the beauty of a flower or animal or the growing process of a seed
Psychological state	Synergy of mind, senses and body. A deep focus and concentration	Conquer fears, feeling of mastery	Being grasped by something that you’ve never sensed before
Adult supervision	Alone, preferably without adult supervision	Alone or with adults, adults can function as a role model	Alone or with adults, adults can facilitate the experience by guiding attention
Availability of nature	Proximate and easily accessible nature	Access and accessibility to nature, preferable wild nature areas	A rich sensory natural environment, indoors or outdoors
Conditional: time and space	There needs to be time and space to emerge in the experience		

A **flow experience** is an experience in which people are so involved in an activity that they forget everything around them (Csikszentmihaly, 1990). During this experience thoughts, intentions, feelings and senses are aimed at the same goal. Flow experiences relatively often take place in nature because the variation in forms and materials that are present in nature environments challenge children to practice their sensorimotor coordination (Gibson, 1979). An example of a flow experience is a child who tries to cross a stream using a tree trunk. Such an experience can fully engage children, challenging them to over and over again try to smoothly reach the other side. To stimulate flow experiences children are best left on their own, and as a minimum a child has to feel that it is responsible for its actions and in control. Activities

that evoke a sense of responsibility such as gardening, taking care of animals, building huts or rafts can set the stage for flow experiences.

Magical moments appeal to children's need for the mystical and sense of wonder (Talbot & Frost, 1989). Such moments may arise when a child is fascinated or 'intrigued' by a certain natural phenomenon, like a butterfly going from flower to flower. These kind of nature experiences are characterized by rich sensory stimulation, that extends possibilities, expands awareness, transcends the common, and enhances opportunities for children to immerse in nature and to wonder, create, and experiment and thus to grow.

10.3 NATURE AND CHILDREN'S HEALTH AND WELL-BEING

Next to the aforementioned qualitative studies, more rigorous quantitative and controlled studies provide further empirical evidence on the importance of nature for children's health and well-being. Results of these studies indicate that exposure to nature can have physical, emotional and cognitive benefits for children. Below we give an overview of findings regarding these three types of benefits.

10.3.1 Physical health benefits

Exposure to neighbourhood green space has been found to be positively related to children's levels of moderate-to-vigorous physical activity (MVPA). For example, a study among American children aged 8-14 showed that children who experienced more than 20 minutes of daily exposure to green spaces in their neighbourhood engaged in nearly five times the daily rate of MVPA compared to children with nearly zero daily exposure to green spaces (Almanza et al., 2012). These positive impacts of green space on physical activity may result in lower levels of overweight and obesity among children in greener neighborhoods (Wolch et al., 2011). Perhaps even more strikingly, green space can already affect children's physical health when they are still in the womb. A child's birth weight is an important predictor of its psycho-physiological development into adulthood, with issues arising in particular for children with a very low birth weight. A meta-analysis pooling data of eight studies showed that more neighbourhood greenness was associated with higher birth weight, independent of socio-economic status and other risk factors (Dzhambov et al., 2014). This association is assumed to arise from lower stress levels and other health advantages in the pregnant women living in green surroundings.

In line with observations from qualitative studies on the importance of natural environments for children's motor development, a study in Norway found that playing in nature, as compared to playing in a paved school ground, promoted the development of motor skills in pre-school children measured by standardized pre- and post- tests of motor fitness (Fjørtoft, 2004). Also, controlled observational studies confirm that children display more diverse and creative play behaviour in natural than in non-natural environments (Dowdell et al., 2011).

10.3.2 Mental health benefits

A study in rural Austrian middle schools reported an increase in students' psychological well-being and a reduction in stress after greening of the school ground, compared to children in control schools (Kelz et al., 2015). Nearby nature can also make children less vulnerable to negative impacts of stressful events, by helping them to cope better with adversities (Corraliza et al., 2012). Furthermore, several studies have revealed a relation between greenery in the school surroundings and a decrease of anti-social behaviours, such as bullying and aggressive behaviours (Cheskey, 2001). In addition, at green playgrounds more prosocial behaviour occurs than at barren, paved playgrounds.

Further evidence for the importance of nature for children's mental health comes from evaluations of outdoor challenge programmes. In these programmes, children take part in various outdoor activities in the wilderness with the purpose to improve their mental well-being. Pre- and post- surveys among American youth who participated in a wilderness programme revealed an increased sense of personal autonomy, improved self-concept, a greater capacity for taking action and being decisive, and an improved interpersonal skills (Kahn Jr. & Kellert, 2002).

10.3.3 Cognitive benefits

Interacting with nature can also improve cognitive functioning. As described in Chapter 6, natural environments support **restoration** from **directed attentional fatigue**. Among other things, natural environments tend to automatically draw attention without cognitive effort, thereby allowing central executive functions in the brain to rest and replenish. There is growing evidence that children may benefit from these restorative qualities of nature as much as adults do (Collado & Staats, 2016; see Box 10.1). For example, children from low-income families demonstrated better ability to concentrate and other signs of improved cognitive functioning, as measured by a parents' rating scale, after moving to a house with greater accessibility to nature (Wells, 2000). Girls aged 7-12 years scored better on tests of concentration, impulse inhibition, and delay of gratification when they had greener views from the home (Faber Taylor et al., 2002).

BOX 10.1 EFFECTS OF NATURE ON SCHOOL PERFORMANCE

Within the school environment, it has been found that children perform better on standardized tests of mathematics and English as there is more green space around their school (Wu et al., 2014). Furthermore, a study at five high schools showed that students who were randomly assigned to classrooms with views to green space, as compared to students in classrooms without green views, performed better on attention tests and recovered faster from a stressful experience (Li & Sullivan, 2016). The greening of classrooms has similar benefits. Placement of a green wall in four classrooms of elementary schools, compared to control classrooms without green walls, resulted in better scores on a test for selective attention (Van den Berg et al., 2017). Nature in and around schools thus has the potential to improve children's school performance, which may have a life-changing impact on career and future goals.

Children with ADHD suffer from deficits in their attentional functioning. Given nature's restorative qualities, natural environments might provide supportive settings for these children. In line with this notion, parents have reported a decrease in children's ADHD symptoms after their child played in a natural environment (Kuo & Faber Taylor, 2004). In a large cross-sectional study, more green space in the living environment was related to the use of less ADHD medication (De Vries, 2016). Children with ADHD also performed better on a concentration task after a visit to the woods, compared to a town visit (Van den Berg & Van den Berg, 2011).

10.4 CHILDHOOD NATURE EXPERIENCES AND ADULT ENVIRONMENTALISM

While the short-term benefits of contact with nature for children are well documented, little is known about the long-term effects. As yet, no longitudinal studies have been conducted which followed children from a young age into adulthood to monitor the impacts of childhood interaction with nature through the life-course. However, several studies have retrospectively linked adults' recollections of their experiences with nature in childhood to various adult outcomes. Using this approach, a survey among 2000 adults living in the U.S. found that growing up in a home with natural surroundings, visiting parks, and gardening during childhood were associated with more positive adult attitudes towards trees and higher adult participation in gardening activities (Lohr & Pearson-Mims, 2005). Another large-scale survey among adult residents of U.S. cities showed that people who engaged in nature-based activities such as hiking or playing in the woods, camping, and hunting or fishing before the age of 11 were more likely to exhibit **pro-environmental behaviours** and attitudes and as adults (Wells & Lekies, 2006).

The pathway from childhood nature experiences to adult environmentalism is thought to reflect a stepwise process, in which children first become attached to specific natural places, and then later generalize these feelings of attachment to the natural environment more broadly. In adults, such general attachment or **connectedness to nature** has been found to correlate positively with biospheric values and pro-environmental behaviour (Schultz et al., 2004, see also Chapter 16). Connectedness to nature has not only been implicated in pro-environmentalism, individuals who feel strongly connected to nature also tend to feel happier than those who are less connected (see Chapter 7). These findings suggest that there may exist a “happy path to sustainability” (Nisbet & Zelenski, 2011). That is, if children spend more time in nature and develop a sense of connectedness to nature, they may become happier as adults and behave in more sustainable ways.

10.5 APPLICATIONS AND IMPLICATIONS

In response to the growing insights on how nature can promote children's development, health and well-being, there has been a surge of initiatives to (re)connect children with nature. Many of these initiatives have focused on ‘bringing nature to children’ by greening of places such as school grounds, classrooms, urban public spaces, and hospitals. Other initiatives have aimed at ‘bringing children to nature’ by encouraging and facilitating children to actively participate in nature-based programmes and activities, like nature experience programmes and gardening projects. These interventions may be especially relevant to children from deprived backgrounds, who have been found to have relatively limited access to natural spaces in their living environment (Strife & Downey, 2009). As such, nature-based interventions may help to mitigate **health inequities** between children from families with a low and high socio-economic status (see also Chapter 7).

10.6 SUMMARY

In this chapter, we have provided an overview of research on the relationship between children and the natural environment. This research shows that children are attracted to the rich sensory stimulation provided by nature, and derive pleasure from actively engaging with the natural environment with all their senses and physical abilities. While interacting with nature, children may have impressive experiences that

strengthen their connectedness to nature and may lay a foundation for pro-environmental behaviour later in life. Furthermore, there is increasing evidence that exposure to natural environments can have physical, emotional and cognitive health benefits for children. In general, childhood experiences with nature, or a lack of those experiences, can set in train developmental trajectories that may have life-long consequences for an individual's health and well-being. These research findings and insights provide a rationale for concerted efforts to re-connect children with nature, especially those children from deprived backgrounds who have limited access to nature in their daily living environment.

GLOSSARY

affordances Attributes of a setting which provide potential for action.

connectedness to nature The extent to which individuals feel emotionally connected to the natural world and consider nature as part of their identity.

directed attentional fatigue A neurological symptom, also referred to as 'mental fatigue', which occurs when parts of the central executive brain system become fatigued.

environmental education Organized efforts to raise sensitivity, awareness, and understanding of the linkages and interdependencies among humans and the natural environment.

ethnographic studies A type of qualitative research where researchers observe and/or interact with a study's participants in their real-life environment.

flow experience An experience in which people are so involved in an activity that they forget everything around them.

green space A term mostly used by policy makers to refer to nature in and around urban areas.

hands-on-learning A form of environmental education in which children are encouraged to become actively engaged with the natural environment, and experience it with all their senses.

health inequities Disparities in health resulting from differences in social and economic status.

magical moments Experiences with nature that appeal to children's need for the mystical and sense of wonder.

nature A broad concept that encompasses natural areas such as forests as well as agricultural landscapes, urban greenery, and natural elements and features such as trees and lakes.

nature deficit disorder The possible negative health consequences of the growing disconnection between children and nature.

pro-environmental behaviour Behaviour which harms the environment as little as possible or even benefits it.

restoration The physiological and psychological process of recovery from stress and mental fatigue.

peak experience A rare, exciting, deeply moving experience that stands out from everyday events.

significant life experience A deeply touching forming experience which permanently changes one's vision on life.

stranger danger The idea that strangers can potentially be dangerous to children or adults.

SUGGESTIONS FOR FURTHER READING

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REVIEW QUESTIONS

1. Describe what Louv means with 'nature-deficit disorder' and why this could be alarming for society.
2. Explain what 'hands-on-learning' is and how this can strengthen children's connectedness to nature.
3. Describe, if possible, an impressive experience with nature from your own childhood. Which type of experience was it? How did it affect you?
4. Give two examples of green interventions that may be used to reduce health inequities between children from families with a low and high socio-economic status.

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