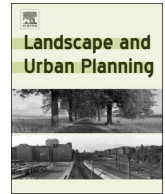




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Research Paper

# What are the drivers of and barriers to children's direct experiences of nature?



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## ABSTRACT

In our increasingly urbanised world, children are becoming disconnected from the natural world. This progressive separation of humans from nature, “extinction of experience,” is viewed both as a major public health issue and as one of the fundamental obstacles to halting global biodiversity loss. Thus, it has become increasingly important to understand what drives and limits children's direct experiences of nature. We administered a large-scale questionnaire to 5801 children from 45 elementary schools in Tochigi, central Japan. Children were asked to provide information on frequency of nature experiences, extent of nature relatedness, time pressure, inclination towards screen-based media, and their family members' attitudes towards nature-based activities (family members' nature orientation). We also calculated the proportion of urbanised areas within a 1-km radius of each school. Results showed that the frequency of children's nature experiences was significantly positively associated with individual nature relatedness and family members' nature orientation; time pressure and inclination towards screen-based media were not significantly negatively related to children's frequency of nature experiences. Degree of urbanisation had significant negative influences on the frequency of direct experiences of nature. Male children participated in nature-based activities more frequently. Overall, our study demonstrates that children's direct engagement with neighbourhood nature is shaped by multiple opportunity- and orientation-related factors, which has important policy implications as it implies that there can be no simple, straightforward way to promote children's nature experiences. Thus, to minimise the ongoing extinction of experience, a variety of different and complementary approaches must be taken.

## 1. Introduction

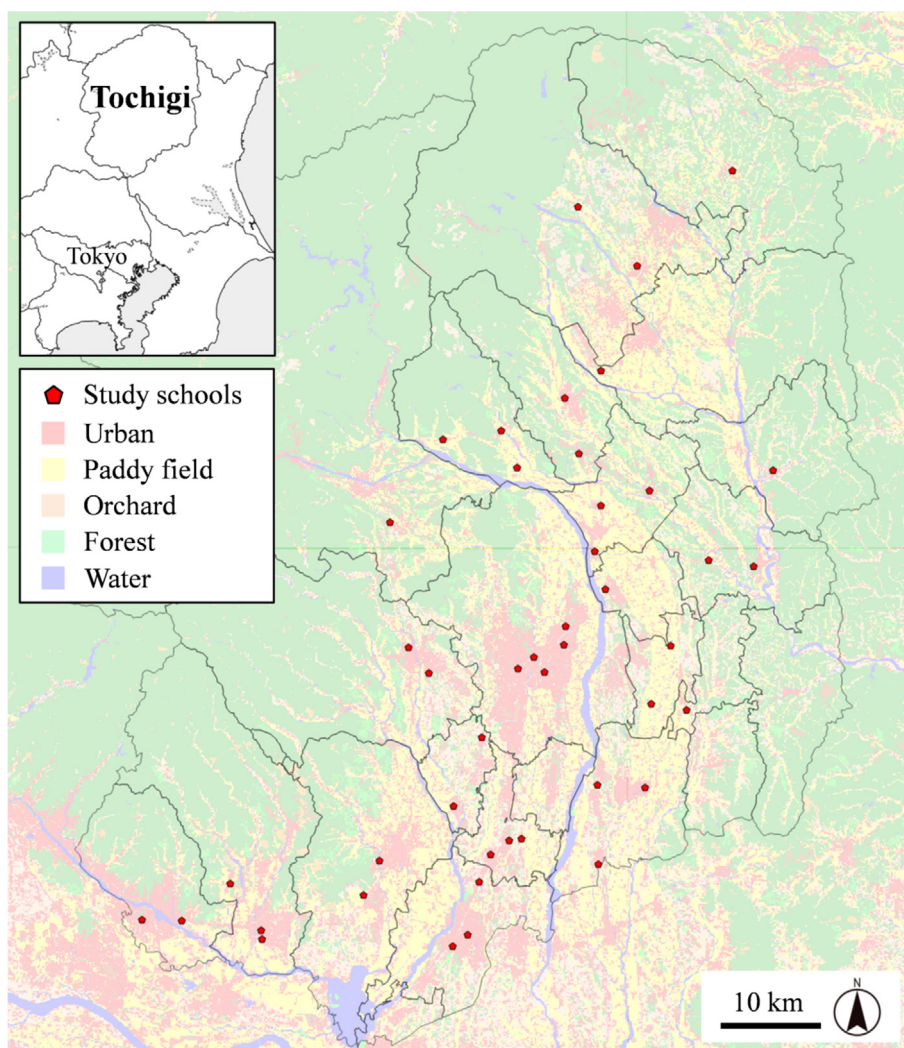
In much of the world, especially developed countries, children are spending less time than ever before outdoors interacting with nature (e.g., Clements, 2004; Soga & Gaston, 2016; Soga, Gaston, & Kubo, 2018). This progressive, large-scale separation of humans from nature, or “extinction of experience” (Pyle, 1978, 1993), is of great concern for two reasons. First, it implies a loss of health benefits from the natural world; direct interaction with nature provides children with multiple benefits relating to health and wellbeing (Chawla, 2015; Gill, 2014; McCurdy, Winterbottom, Mehta, & Roberts, 2010; Tillmann et al., in press). It has also been reported that daily interactions with nature have positive impacts on cognitive function in youth (Dadvand et al., 2015; Taylor & Kuo, 2006; Wells, 2000). Second, given that people's pro-environmental attitudes and behaviours towards nature are crucially influenced by their experiences of nature in everyday surroundings

(Bögeholz, 2006; Chawla, 2007; Soga, Gaston, Yamaura, Kurisu, & Hanaki, 2016; Wells & Lekies, 2006), it is possible that an erosion of their direct experiences with nature during childhood could lead to a loss of public support for nature conservation. As such, extinction of experience is today viewed as one of the fundamental obstacles to slowing global biodiversity loss (Miller, 2005; Soga & Gaston, 2016).

Recognising the significance of the extinction of experience, it has become increasingly important to understand what impedes children's direct engagement with nature (Skar, Wold, Gundersen, & O'Brien, 2016). There are two major factors that facilitate extinction of experience (Soga & Gaston, 2016). The first is the *loss of opportunity* to interact with nature, which is primarily a function of the majority of the population living in urban areas (Lekies & Brensinger, 2017; Zhang, Goodale, & Chen, 2014), where both the quantity and quality of nature sites may be lower (Miller, 2005; Turner, Nakamura, & Dinetti, 2004). Along with the rapid growth of urban population, an over-scheduling of

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**Fig. 1.** Map of Tochigi with survey schools (red filled circles;  $n = 45$ ). The six elementary schools that did not finally participate in the survey were excluded from the map (see the main text). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

children's lives is also likely to reduce their opportunities for nature experiences (i.e., a loss of time allowed for exploring nature freely) (Skar et al., 2016). The second factor is the *loss of orientation* towards engaging with nature; this may be associated with the prevalence of electronic media (e.g., TV, computer games, and smartphones) (Clements, 2004; Pergams & Zaradic, 2006; Robison & Ridenour, 2012), as well as a loss of interest in, and appreciation for, nature-based activities (Mjaavatn, Frostad, & Pijl, 2016).

Whilst it is widely acknowledged that both loss of opportunity and of orientation result in the extinction of experience, their relative importance remains uninterrogated (Soga & Gaston, 2016). Indeed, most studies in this field have considered the opportunity and orientation separately (e.g., Cheng & Monroe, 2012; McFarland, Zajicek, & Waliczek, 2014; Zhang et al., 2014; Soga, Gaston, Koyanagi, Kurisu, & Hanaki, 2016), but no study has attempted to assess in a quantitative manner the relative contributions of these two components in determining children's direct experiences of nature. From a practical viewpoint, this oversight has created a great drawback because to deal with the loss of both opportunity and orientation, arguably completely different and contrasting types of policies are required. Opportunity requires a focus on space and time that allows children to explore nature (e.g., expanding neighbourhood greenspace); orientation requires the development and fostering of children's positive feelings and attitudes towards nature (e.g., developing educational programmes)

(Soga & Gaston, 2016).

It is likely that children's opportunities and orientation to engage with nature are substantially influenced by family members' (e.g., parents) attitudes towards nature-based activities (i.e., family members' nature orientation). For example, if a child's parents hold favourable feelings and preferences towards nature-based activities, that child will come to have positive nature orientation (Ahmetoglu, in press; Cheng & Monroe, 2012), which is likely to promote their own use of nature (McFarland et al., 2014). Likewise, children whose parents frequently take them to natural places for recreational purposes are more likely to interact with nature, simply because of their increased opportunities for nature experiences. Conversely, if parents prevent or restrict their children from playing outside, children's opportunity and orientation are both likely to decrease (Hand et al., 2018; Miles, 2008), which may in turn lead to an extinction of experience (Soga & Gaston, 2016). Despite such potentially substantial effects of family members on children's experiences of nature, their role remains poorly understood.

Studies examining the drivers of, and barriers to, children's engagement with nature tend to be based on data from local-scale surveys with small sample sizes (e.g., Ahmetoglu, in press; Cheng & Monroe, 2012; Hand et al., 2017; McFarland et al., 2014), thereby making it difficult to draw a definite and generalised conclusion. One notable exception is a study by Skar et al. (2016); they performed a nationwide survey of 3160 parents in Norway, who identified major barriers for

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