



Urban residents' perceptions of neighbourhood nature: Does the extinction of experience matter?



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ABSTRACT

Today's children have less direct contact with nature than ever before, resulting in an "extinction of experience". Research has suggested that such loss of daily interactions decreases people's appreciation of the natural world, but this remains quantitatively unexplored. We conducted a questionnaire survey of undergraduate university students in Tokyo, Japan, and determined the effects of frequency of contact with nature on emotional connectedness to nature and perceptions of neighbourhood nature. A total of 255 students participated in the surveys. Students' perceptions of neighbourhood nature were measured by to what extent they valued cultural ecosystem services derived from neighbourhood natural environments, birds and butterflies. Results showed that students valued neighbourhood natural environments, birds and butterflies for many different reasons, such as relaxation, beauty of natural scenes, an indicator of seasonality, and opportunities for education. Linear mixed models revealed that both current and childhood frequencies of contact with nature were positively related not only to students' emotional connectedness to nature but also their perceptions of neighbourhood nature. Students' emotional connection to nature and perceptions of neighbourhood nature were positively associated with each other. Our results suggest that, given the rapid decrease in children's daily contact with nature, public appreciation of the value of the natural world is likely gradually also to decrease. This can be a major obstacle to reversing global environmental challenges. People should therefore be encouraged to experience neighbourhood natural environments and biodiversity, and city planners and policy makers will play a vital role in connecting people with nature.

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1. Introduction

Today's children have less direct contact with nature than ever before. Indeed, there is clear evidence demonstrating that children today spend less time playing outdoors and exploring nature than did previous generations (e.g., Clements, 2004; Hofferth, 2009; Pergams and Zaradic, 2006; Soga and Gaston, 2016). For example, a survey of > 18,000 Japanese children showed a substantial increase during the last decade in the proportion who have never experienced common nature-based activities, such as mountaineering, climbing trees, fishing, catching insects and bird-watching (National Institution for Youth Education, 2016). Likewise, a recent national survey in the U.K. found that 12% of children had never visited the natural environment in the previous 12 month period (Natural England Commissioned Report, 2016). Although there is still much debate as to what are the barriers,

in much of the world, and especially in developed countries, children are increasingly experiencing an "extinction of experience" of nature (Miller, 2005; Pyle, 1993; Soga and Gaston, 2016).

Research has shown that loss of childhood nature experiences decreases people's emotional connection to nature (Hinds and Sparks, 2008; Zhang et al., 2014). It is well-known that those who do not directly interact with nature at an early age are likely to lose emotional bonds with and interest in it (Cheng and Monroe, 2012; Soga et al., 2016; Wells and Lekies, 2006; Zhang et al., 2014). Previous studies have also demonstrated that people who do not frequently experience nature in their childhood exhibit less positive feelings towards nature (Hinds and Sparks, 2008; Wells and Lekies, 2006), suggesting that extinction of experience has a long-lasting impact over the life course (Soga and Gaston, 2016). This loss of emotional connection towards nature is closely associated with not only the decline in people's willingness to protect nature (Nisbet et al., 2009; Zaradic et al., 2009; Zhang et al., 2014), but also reduced psychological wellbeing (e.g., Capaldi et al., 2014; Nisbet et al., 2011). As such, the extinction of experience has increasingly been recognised both as a public health issue and as one of

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the fundamental obstacles to reversing global environmental degradation (Miller, 2005; Soga and Gaston, 2016).

Along with loss of emotional connection to nature, extinction of nature experience can decrease people's recognition of the worth and value of nature. Indeed, both quantitative and qualitative research shows that people perceive a wide range of benefits through direct contact with nature (Buchel and Frantzeskaki, 2015; Carrus et al., 2015; Fuller et al., 2007), and thus daily interaction with nature is viewed as a key factor influencing individual levels of appreciation for the natural world (Miller, 2005; Soga and Gaston, 2016). Recent studies also indicate that people who have lower emotional connection towards nature are less likely to view natural scenes and settings as attractive and fascinating (Shanahan et al., 2015; Tang et al., 2015), implying an indirect pathway between loss of nature experiences and reduced positive perceptions of nature. Undoubtedly, the decline in people's appreciation of nature would have serious consequences for conservation; to quote Miller (2005), “[if] people no longer value nature or see it as relevant to their lives, will they be willing to invest in its protection?”. Despite this, however, questions still remain regarding how the loss of contact with nature affects individual's perceptions and valuation of nature.

Given the rise in associated populations, cities and towns are the central, and perhaps the only, areas for many people in which they can engage with nature and recognise its value in their everyday lives (Andersson et al., 2014; Cox and Gaston, 2016; Dearborn and Kark, 2010). In urban areas, cultural ecosystem services – nonmaterial and intangible benefits from nature, such as aesthetic and recreational values – may play a key role in both raising the public appreciation of nature and enhancing human quality of life (Clark et al., 2014; Jennings et al., 2016), as they are often called a “gateway” for connecting people with nature (Andersson et al., 2015). Indeed, this type of benefit, unlike other ecosystem services that are distant from the daily lives of most people, is directly perceived by urban residents through direct experiences with nature (Maraja et al., 2016). Nevertheless, there has been remarkably little attention paid to what drives individual's perceptions of cultural ecosystem services from urban nature. Furthermore, there is a serious geographical bias in the existing published studies exploring people's perceptions of urban nature: approximately 80% coming from Europe, North-America and Oceania (see Schwartz et al., 2014a).

Here, we conducted a questionnaire survey of university students in Tokyo, Japan, and determined the relationships between frequency of contact with nature, emotional connection to nature, and perceptions of neighbourhood natural environments and biodiversity. As a proxy for neighbourhood biodiversity we used two well-known higher taxa – birds and butterflies; interaction with these taxa has been found to offer people psychological benefits (Belaire et al., 2015; Fuller et al., 2007; Hedblom et al., 2014). We first explored university students' perceptions of neighbourhood natural environments, birds and butterflies. To do so, we asked them to report their levels of perceptual awareness of cultural ecosystem services provided by neighbourhood nature, such as relaxation, aesthetic beauty, an indicator of seasonality, and opportunities for environmental education. Second, we examined how the frequency of contact with nature is related to students' emotional connection to nature and perceptions of neighbourhood nature. We expected that students who have frequent experiences with nature report a stronger emotional connection towards nature and have more positive perceptions of neighbourhood nature.

2. Methods

2.1. Participants and questionnaires

The surveys were conducted at Tokyo Gakugei University in Koganei city, a western suburb of Tokyo metropolis, Japan, in January 2016. Koganei city covers 11.30 km² and has an estimated population of 121,516 residents (Koganei city, 2016). The participants were drawn from undergraduate university students at the department of

education, and were recruited with the assistance of as many course instructors as possible, who announced the study in their classes. In total, 255 undergraduate students from first- to fourth-grade (female = 127, male = 120, blank = 8), aged 18–26 years old (Mean = 20.1; SD = 1.4), were invited to participate. Only those who were willing to take part in the study were surveyed. No incentive was given for participation.

Questionnaires were conducted with every class. We told the topic of the survey to the participants, but did not explain its purpose to avoid bias. Each student received a four-page questionnaire written in Japanese (approximately 15 min to complete). To avoid confusion, we clearly defined the term “neighbourhood natural environments” as all publicly accessible open greenspace with some vegetation cover (e.g., parks, woodlands and greenways) around the university and provided several sample pictures. Likewise, “neighbourhood birds and butterflies” were defined as birds and butterflies that inhabit the neighbourhood around the university, rather than a specific bird or butterfly species. The questionnaire asked about three topics: (1) frequency of direct contact with nature (both current and during childhood), (2) emotional connection to nature, and (3) perceptions of neighbourhood natural environments, birds and butterflies.

2.2. Frequency of contact with nature

To measure the frequency of both current and childhood contact with nature, students were asked three questions about how frequently they participated in three major nature-based activities. Childhood was defined as aged from 6 to 12 years (elementary school age). The questions included: 1) “How frequently do/did you visit neighbourhood natural places?”, 2) “How frequently do/did you touch or pick plants or flowers in neighbourhood natural places?”, and 3) “How frequently do/did you observe or touch animals (e.g., birds, insects) in neighbourhood natural places?”. Responses were scored on a four-point scale (1 = visit every 1 year or 2 years, 2 = every half a year to 1 year, 3 = almost every month, 4 = almost every week). The mean of these three items was used as a measure of the frequency of contact with nature (scores ranged from 1.0 to 4.0). The internal consistency (Cronbach alpha) of the scale was acceptable (current: 0.86; childhood: 0.84).

2.3. Perceptions of neighbourhood nature

To measure each student's perceptions of neighbourhood natural environments, birds and butterflies, they were asked to answer 21 questions (seven questions for each natural environments, birds and butterflies, respectively). A complete list of the questions is shown in Fig. 1, which was adapted from Belaire et al. (2015). This list aimed to measure how students value cultural ecosystem services derived from neighbourhood natural environments, birds and butterflies. Positively worded items illustrate nonmaterial or intangible benefits that students may perceive from neighbourhood nature (e.g., “I value neighbourhood natural environments because these are pleasing to the eye”; “I value neighbourhood birds because they have pleasant songs”; “I value neighbourhood butterflies because they make me feel better”). Negatively worded items describe something that students may find to be bothersome when they see neighbourhood nature (e.g., “I find neighbourhood natural environments to be bothersome because these are sources of harmful wildlife”; “I find neighbourhood birds to be bothersome because they can be intimidating”; “I find neighbourhood butterflies to be bothersome because they are generally dirty”). Responses were scored on a 7-point Likert scale, from 1 (disagree strongly) to 7 (agree strongly). Scores for negative statements were reversed appropriately. The mean of each of the seven items was used as a measure of perceptions of neighbourhood natural environments, birds and butterflies, respectively (scores ranged from 1.0 to 7.0). The internal

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