Biological Conservation 226 (2018) 1–8

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Routine experiences of nature in cities can increase personal commitment toward biodiversity conservation

Anne-Caroline Prévot[a,b,*], Hélène Cheval[a,1], Richard Raymond[c,2], Alix Cosquer[a,c,3]

[a] Centre d'Ecologie et des Sciences de la Conservation (CESCO UMR7204), MNHN, CNRS, Sorbonne Université, CP135, 57 rue Cuvier, 75005 Paris, France
[b] Laboratoire Parisien de Psychologie Sociale (LAPPS, EA4386), Université Paris Ouest, Dpt psychologie, 200 avenue de la république, 92000 Nanterre, France
[c] UMR CNRS 7733 CNRS University of Paris 1 Panthéon-Sorbonne, LADYSS Lab, 2 rue Valette, 75005 Paris, France

ARTICLE INFO

Keywords:
Biodiversity conservation
Connection to nature
Ecological knowledge
Experience of nature
Pro-biodiversity practices
Urban contexts

ABSTRACT

This study examines individual commitment to biodiversity during adulthood. We studied the interrelations between everyday experiences of nature, knowledge about biodiversity, connectedness with nature, and implementation of specific pro-biodiversity practices, through a survey covering 473 adults in Paris surroundings (France). More specifically, we showed that people involved in experiences of nature in which attentiveness to biodiversity is explicit (citizen science, nature watch association, environmental association) have more knowledge about biodiversity and conservation than both people involved in experiences of nature in which attention to biodiversity remains implicit (community garden, allotment, community-supported agriculture), and people without such kinds of experience of nature. However, we found that people experiencing nature as part of a daily routine, whatever the type of experience, were more connected to nature and more likely to implement active pro-biodiversity practices. With this interdisciplinary study that links conservation biology and conservation psychology, we help understand more precisely the levels of commitment of urban and sub-urban adults toward biodiversity conservation.

1. Introduction

Historically focused on the protection of wilderness for itself, the conservation of biodiversity has progressively highlighted the importance of individual behaviors and lifestyles in addressing the biodiversity crisis (Howard, 2000). Indeed, many individual practices have a direct impact on biodiversity, including consumption choices (Koger and Winter, 2010) and the management of private gardens (Gaston et al., 2005). Other individual practices have indirect consequences because they become part of social processes that can support conservation, such as voting (Koger and Winter, 2010).

The understanding and promotion of individual changes in behaviors have been the subject of numerous studies in social sciences, including in environmental and conservation psychology (see e.g., Clayton, 2012). A wide diversity of individual and social factors has been shown to influence significantly the adoption of individual pro-environmental behaviors (see review in Gifford and Nilsson, 2014), including age and gender, personal values and identity, attitudes and knowledge, collective norms, context, and ease or difficulty of implementing the behaviors (Stern, 2000). One component of the individual identity that encourages pro-environmental behaviors is the level of connectedness with nature (see review in Tam (2013)), i.e. an individual's trait level of feeling emotionally connected to the natural world (Mayer and Frantz, 2004). Knowledge about environmental issues is correlated with attitudes and behaviors (e.g., Frick et al., 2004). However, knowledge "must be regarded as a necessary but not sufficient condition for salutary decision-making" (Gifford and Nilsson, 2014: 142). For instance, Liefländer et al. (2013) showed that education at school can increase pupils' connectedness with nature, but only in the very short term. In particular, it is worth noting that individual motivation and willingness to implement new behaviors cannot make individuals change their practices without appropriate social and contextual conditions. For instance, Cialdini and Goldstein (2004) highlighted the influential role of conformity in individual choices, i.e. the motive to "change one's behavior to match the responses of the others" (p. 606). Uren et al. (2015) highlighted in Australia the role of

* Corresponding author.
E-mail addresses: anne-caroline.prevot@mnhn.fr (A.-C. Prévot), helene.cheval@syrphea-conseil.fr (H. Cheval).
[1] Present address: 27 rue Baraillerie, 84000 Avignon, France.
[2] Present address: UMR 7506 Eco-anthropologie et Ethnobiologie, MNHN, CNRS, 57 rue Cuvier, 75005 Paris, France.
[3] Present address: UMR 5175 CEFE-CNRS, 1919 route de Mende, 34000 Montpellier, France.

https://doi.org/10.1016/j.biocon.2018.07.008
Received 24 November 2017; Received in revised form 25 June 2018; Accepted 13 July 2018

social world visions and myths in the design of private gardening practices.

Individuals construct their identity mostly during childhood, and many studies have confirmed the link between children's nature-based activities and further involvement toward nature. For instance, Guiney and Oberhauser (2009) showed that ecovolunteers developed a connection to nature during their childhood. More generally (see review in Chawla, 1998), significant life experiences during childhood, including time spent in nature, presence of role models, and nature book reading, foster individual connection and further involvement toward nature (Stevenson et al., 2014). Other authors, such as Giusti et al. (2014), showed the importance of regular access to ordinary nature during childhood (so-called "nature routines") in the construction of connectedness with nature.

Educating and providing nature experiences to children is therefore of prominent importance. However, because becoming a nature-connected child does not mean staying a nature-connected adult, and because the biodiversity crisis will hardly wait for one or two more generations, initiatives to connect adults with nature should be also encouraged. Some qualitative and isolated studies suggest that adults can also increase their interest toward the biodiversity in their neighborhood and adopt pro-conservation practices. For instance, Cosquer et al. (2012) showed that participation in a butterfly's dedicated citizen science program can induce changes in gardening practices, toward more biodiversity-friendly practices. Van Heezik et al. (2012) showed that people that agreed to include their garden in a scientific ecological protocol progressively increased their knowledge and changed their attitude toward biodiversity, due to regular communication and exchanges with scientists.

Yet, despite the increasing understanding of pro-environmental behaviors, three gaps still need to be closed to address the biodiversity crisis: behaviors specifically addressing biodiversity issues are rarely specified; the types of experiences of, or contact with, nature are rarely detailed; and most studies relate to children. In this study, we aimed to close these gaps, and studied how individual everyday experiences of nature in adulthood are correlated with 1) knowledge about biodiversity, 2) a personal sense of connectedness with nature, and 3) practices toward biodiversity (referred to here as "conservation practices").

Following Clayton et al. (2017), we defined the experience of nature as a "process including interactions between individuals and natural entities; social and cultural context; and consequences for new skills, knowledge, or behavioral changes" [notably toward nature] (Clayton et al., 2017: 2). We compared people who do not experience nature in their everyday lives, people engaged in experiences of nature with explicit attention to biodiversity (i.e., taking part in a nature citizen science program, being a member of a nature watch association or environmental association), and people engaged in experiences of nature with implicit attention to biodiversity (i.e., involvement in community supported agriculture, in a community garden or using an allotment). Among the different kinds of knowledge (see Kaiser and Fuhrer, 2003), we assessed the so-called "declarative knowledge" about biodiversity, i.e., according to the ecosystems' functioning and conservation issues. Among the numerous existing scales of individual connectedness with nature (Tam, 2013), we used the Inclusion of Nature in Self (INS) developed by Schultz (2002). Finally, based on expert-based assessments, we explored six different conservation practices that have a positive impact on biodiversity: 1) nest boxes, which may attract birds (Gaston et al., 2005); 2) maintaining wild-flower patches, which are more biodiversity-rich than cultivated flower or vegetable beds (Lindemann-Matthies and Marty, 2013); 3) consumption of organic products, because organic agriculture favors biodiversity in rural areas (Winqvist et al., 2012), 4) consumption of seasonal products, because growing fruits outside of their natural growing seasons can have adverse effects on both climate and the environment (Tobler et al., 2011); 5) composting, because its effects are both local, as it reduces the use of chemical products and/or provides habitats for biodiversity in gardens (Gaston et al., 2005), and global as it reduces domestic waste quantities (Cox et al., 2010); and 6) voting intentions based on candidates' positions on conservation issues, because this is considered by some scholars as one of the most powerful individual commitments to preventing environmental problems (Koger and Winter, 2010; S. Clayton, personal communication).

We tested three hypotheses: a) experiences of nature and knowledge about biodiversity are closely correlated; b) connectedness with nature is positively correlated with experiences of nature; c) individual pro-biodiversity practices are interrelated with experiences of nature, knowledge about biodiversity, and connectedness with nature. We included in all the analyses the following individual characteristics: gender, age, urbanization level of current habitat, and socio-professional category. We conducted this study in a Western urban context, by means of a survey based on a questionnaire completed by 473 adults living in Paris (France) and its urbanized surroundings.

2. Materials and methods

We conducted a questionnaire survey from May to August 2010. The questionnaire was presented as an interdisciplinary scientific study to assess opinions about biodiversity. The questionnaire could be completed online or through face-to-face interviews. For the online responses, we used the snowball sampling technique (Biernacki and Waldorf, 1981). In the face-to-face interviews, we presented the questionnaire to adults encountered in urban public areas (e.g., urban parks, railway stations) in Paris (France) and its periphery. In addition, we made specific contacts with people involved in the six everyday experiences of nature in which we were interested, in the places where these experiences were occurring (gardens, nature watch trips). A total of 275 adults filled in the questionnaire in the face-to-face interviews, and 375 adults did so online. However, because some forms were incomplete, we ultimately obtained 473 different questionnaires (217 online and 256 from face-to-face interviews) to use in our subsequent analyses (Table 1).

2.1. Questionnaire

The questionnaire was designed to elicit four types of information, as follows: knowledge about biodiversity; individual connectedness with nature; individual practices toward biodiversity; and individual characteristics.

Table 1
Number of questionnaires collected according to the different everyday life experiences of nature, (together with their categorization). The numbers in brackets represent the number of questionnaires collected on line and face-to-face.

Everyday life experiences of nature	Explicit/implicit attention	Number
Member of a naturalist association	Explicit	35 (15–20)
Volunteer in a citizen science program	Explicit	43 (43–0)
Member of a nature conservation association	Explicit	28 (21–7)
Mixed group: Naturalist + nature conservation association	Explicit	24 (19–5)
Total explicit		130 (98–32)
Allotment gardener	Implicit	68 (0–68)
Member of a Community garden	Implicit	45 (0–45)
Member of Community Supported Agriculture (CSA) group	Implicit	56 (6–50)
Mixed group: Allotment + member of a CSA group	Implicit	25 (25–0)
Total implicit		194 (31–163)
Control group		149 (88–61)