



The social value of conservation initiatives in the workplace



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HIGHLIGHTS

- We explored how biodiversity-friendly initiatives at work can influence employees.
- Biodiversity knowledge, perception, connectedness to nature and behaviour were explored.
- Initiatives can have small but significant impact on conservation awareness and behaviour.
- Initiatives can help connect people to nature averting the extinction of experience.
- Benefits of conservation action at work are thus two-fold (social and ecological).

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ABSTRACT

The success of conservation efforts largely depends on broad-based public support. However, the growing separation between people and elements of nature, due to global processes such as urbanization, may decrease individual connection with nature and public support for conservation. Encouraging interactions between people and nature becomes, therefore, of major importance. As people spend most of the daily time at work, enhancing the interaction between people and biodiversity in their work places could sustainably benefit people and conservation directly (protecting biodiversity) and indirectly (via people's actions). Yet, to date, little effort has been made to explore biodiversity in workplaces and its influence on the knowledge, perception and behavior of employees.

In this study, we explored how top-down biodiversity-friendly initiatives (management of the outdoor areas, communication campaign with signs, exhibitions of nature photography) at work (power plant in rural France) can influence employees' biodiversity-related knowledge, attitudes and behaviors, using a before-after survey. We showed that the influence of such initiatives in the workplace can have small but significant impacts on awareness and behavior of employees in their private everyday life. By implementing new settings in the everyday life of the employees, the studied company (the French electricity company EDF) may have defined new social norms in the workplace. Thus conserving biodiversity in workplaces may mutually benefit conservation directly through preserving local biodiversity and indirectly by influencing and strengthening people's relationship to it.

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1. Introduction

Biodiversity continues to decline, despite the increase in conservation efforts (Rands et al., 2010). Halting or decelerating this decline will largely depend on people's daily actions and on the ability to generate strong public support for encouraging governments

to implement effective conservation policies (Keniger, Gaston, Irvine, & Fuller, 2013). The support and enthusiasm of people are therefore essential (Ehrlich, 2002). Yet, although most people are increasingly aware and concerned about environmental issues, very few do modify their behaviors accordingly (Koger & Winter, 2010). One reason invoked to explain this gap between awareness and actions is related to the decreased feeling of interconnections between people and nature, resulting from an increased separation due to global processes such as urbanization (Turner, Nakamura, & Dinetti, 2004; Miller, 2005; Strohbach, Haase, & Kabisch, 2009). This issue is profoundly concerning, given the mounting evidence regarding the positive health and wellbeing outcomes of interact-

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ing with nature (Bratman, Hamilton, & Daily, 2012; Keniger et al., 2013; Shanahan et al., 2015), but mostly since these interactions may influence the way people value nature and its conservation (Fuller & Irvine, 2010).

Today, the majority of the world's population lives in cities and spend most of their time indoors (Koger & Winter, 2010), in particular at work, with limited interaction with elements of nature in their daily life (Miller & Hobbs, 2002). This life style gradually separates people from the biological reality and contact with flora and fauna, resulting in an "extinction of experience" (Pyle, 1978; Miller, 2005). This extinction of experience is a major environmental and societal issue, because it can modify the way people value nature and, therefore, undermine conservation efforts (Soga & Gaston, 2016). Indeed, some evidence already demonstrates that the experience of nature during childhood was (1) influential for those active in conservation (Chawla, 1999); (2) related to people's affinity for biodiversity (Lindemann-Matthies, Junge, & Matthies, 2010; Schwartz, Cheval, Simon, & Julliard, 2013) and also that this nature-deficit (Louv, 2008) could (3) influence the construction of individual environmental identity (Clayton, 2003), which consequently may decrease individual awareness and support for conservation (Noss et al., 2012). This extinction of experience is not merely an environmental concern, because it is well established that interaction with nature leads to a multitude of health and wellbeing benefits for people (reviewed by Keniger et al., 2013).

Averting this extinction of experience involves increasing both the *opportunity* to directly experience nature and the *orientation* towards engaging with nature (Lin, Fuller, Bush, Gaston, & Shanahan, 2014; Soga & Gaston, 2016). One straightforward way to achieve this goal is to promote daily interaction with biodiversity in the places where people live and work (Miller & Hobbs, 2002). Urban policies and practices have already started to enhance biodiversity in urban areas (e.g., Skandrani & Prévot, 2015), which in turn may increase individual health and wellbeing (Maas, Verheij, Groenewegen, De Vries, & Spreeuwenberg, 2006; Fuller, Irvine, Devine-Wright, Warren, & Gaston, 2007). Today, an average person spends much of his/her live at work (on average 8.0 h per day during weekdays for Americans; BLS, 2012), making the workplace the most dominate everyday life surrounding. It is therefore important to understand to what extent interaction between people and biodiversity can be enhanced in the workplace and how this interaction could influence individual attitudes and behaviors.

To date, little effort was made to explore biodiversity in the workplace (Sneep, WallisDeVries, & Opdam, 2011) and its influence on the perception of the employees (Kaplan 2007). Workplaces often consist of a mixture between grey and green infrastructures (e.g., buildings, private gardens). From ecological perspective, these green spaces could increase connectivity (Sneep, Van Ierland, & Opdam, 2009; Löfvenhaft, Björn, & Ihse, 2002), host diversity of common species and sometimes offer refuges for endangered species (Sneep et al., 2011). Moreover, the roofs and balconies of many workplaces could be converted to green roofs that can create several microhabitats (Bates, Sadler, & Mackay, 2013) and enhance biodiversity (Madre, Vergnes, Machon, & Clergeau, 2013). These "living roofs and walls" are designed as opportunities to reconcile humans and biodiversity in the urban environment (Francis & Lorimer, 2011). From the social perspective, Kaplan (1993) pioneering study has pointed out that proximity and availability of nature in the workplace can foster many desired outcomes and even the simplest contact with nature (i.e., nature views from the office window) provides significant psychological benefits for employees. In a more recent work, she further demonstrated that employees preferred nature settings to places with major buildings areas (Kaplan, 2007). A recent study covering over seven thousand participant from 16 countries has demonstrated that having internal green spaces in the workplace can increase happiness and inspiration of

employees and reduce boredom and anxiety (Human Spaces, 2015). Yet, it is not clear to what extent efforts to conserve biodiversity at the workplace could influence employees' relationship with nature and conservation.

In this study, we explored how the implementation of biodiversity-friendly initiatives in a workplace (a power plant) influenced employees' relationship with biodiversity. From January 2012, the management team of the studied power plant in the west of France implemented several biodiversity-friendly practices in outdoor areas within the site. Together with these initiatives, a communication campaign (i.e., signs and exhibition of nature photography) was conducted, in order to inform employees in those practices. We explored the outcomes of these initiatives on employees' relations to biodiversity by conducting a before-after survey. Specifically, we aimed to understand (1) how those initiatives influenced biodiversity-related perceptions, knowledge and connectedness of employees with nature, and (2) to what extent these initiatives were translated into individual nature-related behavioral changes.

2. Material and methods

2.1. Study area

The study was conducted in an industrial site, a power plant that produces electricity using coal and fuel oil in the western France. The power plant is located on the estuary of the Loire River to the Atlantic Ocean, about 30 km west of the Nantes metropolis (one of the largest metropolis in France with about 900,000 inhabitants). The power plant and the small town adjacent to it 'Cordemais' (3000 inhabitants) are located within the European network of protected areas 'Natura 2000'. This protected area is mainly composed of extensively managed grassland and wet meadows grazed by cattle and surrounded by a dense network of hedgerows.

The industrial site is managed by the French electricity company EDF. During the recent years EDF has adopted a biodiversity-friendly approach for the management of its sites. This approach primarily aims at gathering environmental knowledge to better assess potential impacts on nature of EDF sites, so as to minimize those impacts by protecting ecosystems and the services they provide. More specifically, practices were selected to increase the diversity of local flowering species in order to promote the presence of pollinating insects and insectivore fauna. EDF started implementing the program in the Cordemais power plant from January 2012, introducing five practices as following: (1) creating flower-meadows using over 38 local species in three separated locations (near the reception, administrative and cafeteria buildings); (2) late mowing of remnant meadows located near the reception and cafeteria buildings; (3) identifying non-indigenous plant species in order to remove them; (4) reducing the use of pesticides; and (5) using mulching by leaving behind mowed grass to allow natural soil enrichment and creating a composting platform for valuing green waste of the site, which was commissioned in January 2013.

The change toward more sustainable management of open spaces within the power plant was accompanied with a communication campaign aiming to explain the implemented actions process and to increase conservation awareness of employees and visitors. Two photo exhibitions about nature were installed, the first in summer 2012 and the second in summer 2013. They were both installed in two areas: one on the access road to the power plant and the other within the site. In addition, educational panels were placed in the power plant: two about the overall approach for biodiversity-friendly management and one near each flowering meadow areas or late mowing areas. Employees were also encouraged to read some informative articles and explanations about

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