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Effect of frequency and mode of contact with nature on children's self-reported ecological behaviors

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ABSTRACT

The relationship between spending time in nature and behaving in an ecological manner seems to be contingent on various factors. This cross-sectional study evaluates the association of Frequency of Contact with Nature (FCN) on children's Environmental Attitudes (EA) and self-reported Ecological Behaviors (EB) considering three different types of daily experiences in nature: (1) Work-related and (2) non work-related in rural areas, and (3) non work-related in a city. FCN was expected to be linked to children's EB both directly and indirectly, through EA. A multigroup structural equation model revealed that the relationship between FCN, EA and EB differs among the three groups of children. The strongest association between FCN and EB was found for urban children and the weakest for those in the work-related rural area. No direct association of FCN and EB was found in the non work-related rural area, and a negative one in the work-related rural area.

1. Introduction

Several researchers have found that the more time spent in nature as a child, the more pro-environmental a person is during childhood (Cheng & Monroe, 2012) and adulthood (Hinds & Sparks, 2008; Thompson, Aspinall, & Montarzino, 2008). This has led researchers and educators to see direct contact with nature as an inexpensive, readily available tool to enhance pro-environmentalism (Cheng & Monroe, 2012; Collado, Staats, & Corraliza, 2013; Thompson et al., 2008). However, the relationship between spending time in nature and obtaining positive benefits such as restorative effects (Kaplan, 1995), improved environmental attitudes (Collado & Corraliza, 2013) and/or behaviors (Hartig, Kaiser, & Strumse, 2007) does not seem to be a simple one. For instance, Von Lindern, Bauer, Frick, Hunziker, and Hartig (2013) found that, for adults, working in nature hinders the restorative effects of spending free time in natural areas. They attribute these results to differences in the way of experiencing nature that professionals working in natural settings have compared to non-professionals. Similarly, it is widely believed that living in a rural area implies experiencing nature differently than living in an urban one, mainly because people in rural areas tend to have more contact with nature than those in urban ones (Gifford & Nilsson, 2014). Nevertheless, this does not imply that rural residents will be more pro-ecological than urban citizens (Berenguer, Corraliza, & Martin, 2005; Bjerke & Kaltenborn, 1999). Berenguer et al. (2005) found that urban adults are more pro-environmental than rural ones. On the contrary, Müller, Kals, and Pansa (2009) demonstrated that youngsters from rural areas were more pro-environmental than those in urban ones and claim that frequency of contact with nature (higher in rural areas) is one of the reasons for this result. Similar outcomes were found with children (Corraliza, Collado, & Bethelmy, 2013). These results suggest that not only contact with nature but also type of experience in the natural world may influence the outcomes obtained, such as improved environmental attitudes and behaviors. In the present study we investigate the effect that children's frequency of direct contact with nearby nature (FCN) may have on their self-reported ecological or environmental behaviors (EB). In our approach we consider children's type of daily experience with nature, paying attention to three kinds of children's actual experiences: Non work-related experience of manicured nature in an urban area (E1), non work-related experience of wild nature in a rural area (E2), and work-related experience of

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nature in a rural area (E3). With the latter we refer to the experiences of children whose relationship with nature is somehow linked to work by, for instance, helping their parents in the agricultural family business. We take into consideration children's Environmental Attitudes (EA), together with FCN, as predictors of self-reported EB. EA are understood as a general evaluative reaction towards nature, including eco-affinity (e.g., "I like to learn about nature") and eco-awareness (e.g., "Plants and animals are important to people") (Larson, Green, & Castleberry, 2011). The following sections review relevant literature about the influence of experiences of nature on children's EA and EB, as well as the relation between children's EA and their EB.

1.1. Experiences of nature: positive and negative outcomes

Retrospective studies have shown that childhood experiences of nature predict EB later in life (Chawla & Cushing, 2007; Hinds & Sparks, 2008; Thompson et al., 2008; Wells & Lekies, 2006). For instance, Thompson et al. (2008) found that having visited natural places on a daily basis as a child motivated adults to spend time in natural areas more often than those whose contact with nature during childhood was scarce. A similar pattern has been found when considering children's direct exposure to nature and its impact on their current pro-environmentalism. For example, Evans, Brauchle, et al. (2007) reported that children's ecological beliefs (e.g., plants and animals are equal to people) improved after a 5 day Environmental Education program in nature. Children's environmental knowledge (e.g., knowledge of tree parts) also increased after a one or two-day forestry visit (Powers, 2004). More recently, Collado et al. (2013) found that exposure to nature, both as part of an Environmental Education program or by itself, improved children's willingness to perform EB, such as visiting nature more often, becoming a volunteer in an ecological organization or carrying out pro-environmental behaviors in the household. With regard to nearby nature, Cheng and Monroe (2012) concluded that the amount of nature near a child's home (as reported by the child) predicted his or hers EA. The authors also found that children's previous experiences in nature have a direct impact on their interest in participating in nature-based activities (e.g., fishing) as well as on their interest in environmentally friendly practices. Similarly, Collado and Corraliza (2013) reported that children's psychological restoration, a positive, gratifying experience in nature, predicts their EB (e.g., "To save water, I use less water when I take a shower or bath").

Above mentioned researchers and several others (Chawla & Cushing, 2007; Hartig et al., 2007; Hinds & Sparks, 2008; Mayer & Frantz, 2004; Tam, 2013) agree that contact with nature brings positive, pleasant experiences to people and that it should be encouraged as a way of enhancing pro-environmentalism. However, there is also evidence showing that contact with nature can evoke negative feelings such as fear or disgust (Bixler & Floyd, 1997; Kaplan & Kaplan, 1989; Larson et al., 2011). For instance, Bixler and Floyd (1997) found that nature can be scary, disgusting and uncomfortable for urban children. These authors describe nine fear-evoking situations, like getting lost or being chased by a swarm of bees, and conclude that these kind of responses to nature largely reflect social influence and cultural shaping. They also suggest that children raised in urban areas are afraid of being in the woods and are disgusted by the dirtiness of the outdoors.

More recently, Von Lindern et al. (2013) highlighted the importance of the sociocultural context, such as place of residence or professional occupation, when trying to evaluate people's relation to natural environments. These researchers studied if and how people's professional occupation influences the positive outcomes (e.g., psychological benefits) that could be obtained when spending time in nature. Von Lindern et al. (2013) focused on adults' work-related experience of forests and found that spending time in forests for professional reasons constrains psychological restoration through forests visits in free time when compared to people who only visit forests during their leisure time. In other words, people's daily relation to the natural world partly determined the way they viewed and experienced nature as well as the benefits they obtained from spending time in natural environments. Focusing on EA and/or EB as possible positive outcomes of spending time in nature, Larson et al. (2011) interviewed 66 children in summer camps about their relationship with the natural environment. Children were then divided into those who mostly expressed positive thoughts regarding outdoor experiences in nature and those who expressed indifferent or negative ones. Most of the participants (53 out of 66) were classified in the second group, meaning that children's relationship with nature mainly evoked negative feelings and thoughts. Moreover, they concluded that children who viewed spending time in nature as positive and felt better about it, scored higher in eco-awareness (e.g., "Nature is easily harmed or hurt by people"), eco-affinity (e.g., "I like to learn about nature") and environmental knowledge than those who had negative/indifferent feelings and thoughts towards being in nature.

Of special interest to the current research is the retrospective study conducted by Wells and Lekies (2006). The authors found that adults' EA and EB are influenced by childhood experiences in nature. Participation in *wild* nature activities (e.g., playing outdoors) as well as in *domesticated* nature activities (e.g., growing plants) had a direct and positive effect on adults' EB and an indirect effect mediated by EA. Moreover, the effect of *wild* nature activities was stronger than the one of *domesticated* activities, indicating that different types of experiences in nature seem to differ in their impact on pro-environmentalism. It is also interesting to highlight that spending time in nature with other people had a significant negative effect on EA. The authors attribute this result to possible negative experiences in nature, such as compulsory activities or unpleasant ones.

The results described above suggest that contact with nature may improve children's pro-environmentalism when they have positive feelings and thoughts towards spending time outdoors in the natural world. However, for those who have negative feelings or thoughts towards being in nature, frequent contact with the natural world may not stimulate their EB. Taking this into consideration, the relationship between FCN, EA and EB might be influenced by the type of exposure to nature children have on a daily basis, mainly determined by their sociocultural context.

1.2. Relation between children's environmental attitudes and ecological behavior

The relation between EA and EB has been described as being somewhat weak (Kaiser & Gutscher, 2003; Staats, 2003). For instance, Corraliza et al. (2013) found a positive but weak ($r = 0.14$, $p < 0.01$) relation between children's ecological beliefs and EB (e.g., switching off the lights when leaving a room). Moreover, Evans, Juen, Corral-Verdugo, Corraliza, & Kaiser (2007) evaluated children's EA and EB in four different countries and did not find a significant relationship between them. Similar conclusions were drawn in a sample of children from the USA (Evans, Brauchle, et al., 2007). The authors attribute these results to the young age of the participants (6–8 years old) and suggest that a stronger link between EA and EB might be found as children mature. Nevertheless, findings of other studies support the predictive role of EA when explaining EB. For instance, Collado and Corraliza (2013) have reported that EA predicted children's EB, with other variables such as fascination (Kaplan & Kaplan, 1989) playing a role when predicting