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EXPERIENCIA INFANTIL EN LA NATURALEZA.
EFECTO SOBRE EL BIENESTAR Y LAS
ACTITUDES AMBIENTALES EN LA INFANCIA.

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Departamento de Ecología

Doctorado Interuniversitario en Educación Ambiental

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RESUMEN

Antecedentes: los problemas ambientales a los que la humanidad se enfrenta hoy en día se deben, en gran medida, al comportamiento del ser humano. Por ello, a la hora de buscar estrategias para la conservación del medio natural, es necesario conocer la relación entre las personas y la naturaleza. Durante años se han estudiado los efectos beneficiosos que grupos de población general obtienen del contacto directo con elementos naturales. Uno de estos beneficios es el denominado efecto restaurador de la naturaleza que consiste en la recuperación de los recursos adaptativos disminuidos debido a las demandas del día a día. El efecto restaurador de la naturaleza ha sido descrito en la población infantil, aunque las evidencias empíricas son limitadas. Trabajos realizados con adultos demuestran que los beneficios restauradores de la naturaleza promueven el comportamiento pro-ecológico.

Otro de los efectos positivos que parece aportar el contacto con la naturaleza es el aumento de las actitudes ambientales de las personas, principalmente de la dimensión afectiva de éstas. Sin embargo, se conoce muy poco sobre el desarrollo de las actitudes ambientales en la infancia y los factores que afectan a dichas actitudes. Estudios empíricos muestran que esta dimensión afectiva parece tener su origen en el contacto con la naturaleza durante la edad infantil y, además, influye positivamente en el comportamiento pro-ambiental de las personas, tanto de adultos como de niños.

Objetivos: el objetivo general de esta investigación es el de explorar la relación entre los niños y la naturaleza. Específicamente, se analiza el impacto que el contacto con la naturaleza cercana a los lugares frecuentados por la población infantil (casa y colegio) tiene sobre el bienestar infantil y las actitudes y comportamientos ambientales. Además, se evaluará el impacto que una estancia prolongada en la naturaleza tiene en las actitudes ambientales de los niños. Se estudiarán las variables sociodemográficas y contextuales que afectan al desarrollo de las actitudes ambientales así como los posibles procedimientos psicológicos que dan lugar al comportamiento pro-ambiental.

Metodología: esta investigación se plantea mediante cinco estudios empíricos. En los dos primeros se analiza el efecto moderador de la naturaleza cercana sobre el nivel de estrés de la población infantil y, por otro lado, la restauración percibida por los niños. Para ello ha sido necesario adaptar la *Perceived Restorativeness Components Scale for Children (PRCS-C)* al español. Los dos siguientes trabajos empíricos evalúan la influencia del contacto directo con la naturaleza cercana en las actitudes ambientales de los niños, y los factores socio demográficos y contextuales que tienen un impacto en ellas. Para ello se han adaptado la *New Environmental Paradigm (NEP) Scale for children* y la *Children Environmental Perceptions Scale (CEPS)* al español y se han recogido datos de niños de áreas rurales y urbanas. El último estudio se ha llevado a cabo en cuatro campamentos de verano (tres en la naturaleza y uno urbano) y se ha evaluado la influencia de pasar tiempo en un campamento con naturaleza en las actitudes y comportamiento ambiental de la población infantil.

El análisis de datos se ha llevado a cabo mediante análisis factoriales exploratorios y confirmatorios, correlaciones, pruebas de *t*-Student, ANOVAS, análisis de regresión, de ruta y de mediación, entre otros.

Conclusiones: este trabajo de tesis doctoral destaca la importancia del estudio de la relación que la población infantil tiene con el medio natural. Se muestran evidencias del efecto restaurador de la naturaleza en niños así como del aumento de las actitudes y comportamientos pro-ambientales de la población infantil a través del contacto con el medio natural. Se han adaptado tres escalas (PRCS-C, escala NEP para niños y escala CEPS) para su uso con población infantil hispanoparlante. Además, se ha comprobado que los ambientes naturales son percibidos como más restauradores que los no naturales y que la edad influye en la restauración percibida, pero no el género.

Por otro lado, se han encontrado diferencias entre niños de áreas rurales y urbanas en cuanto a sus actitudes ambientales, influyendo también la edad y el género. Se ha demostrado que las experiencias gratificantes en la naturaleza, tales como las experiencias restauradoras, promueven el comportamiento pro-ambiental infantil. Igualmente, el pasar un periodo de tiempo prolongado en contacto con la naturaleza, mediante un campamento de verano, aumenta las actitudes ambientales de los niños y su intención de comportarse ecológicamente.

A pesar de las limitaciones teóricas y metodológicas que puede presentar este trabajo doctoral, los resultados permiten concluir que el contacto de la población infantil con la naturaleza es importante para su bienestar y para el desarrollo de actitudes ambientales. Futuros trabajos deberán seguir estudiando los instrumentos adaptados a la población hispanoparlante así como llevar a cabo más experimentos de manera que puedan generalizarse los resultados.

En el capítulo final se sugieren futuras líneas de intervención en Educación Ambiental y en el diseño de las ciudades. Se espera que esto contribuya a la creación de una sociedad más sostenible.

ABSTRACT

Antecedents: environmental problems are mainly due to human beings' behaviour. When developing conservation strategies, it is important to understand the relation that people have with the natural world. Empirical evidence shows that people obtain benefits from being in contact with nature. One of these benefits is the restorative effect of nature which implies the recovery of the adaptive resources depleted due to everyday demands. The restorative effect of nature has been described in childhood, although the empirical evidence is limited. Research carried out with adults show that restorative experiences in nature motivate environmentally friendly behaviour.

Another positive effect that seems to be promoted by contact with nature is an increase in pro-environmental attitudes, mainly the affective dimension of them. However, very little is known about the development of environmental attitudes in childhood and the possible factors that influence them. Empirical research show that the affective dimension of pro-environmental attitudes appears to be based on the frequency of contact with nature during childhood and it positively influences people's pro-environmental behaviour.

Objectives: the general objective of this dissertation is to study the relation between children and nature. Specifically, the impact that contact with nearby nature (in the home & school areas) has in children's wellbeing as well as in their pro-environmental attitudes and behaviour is assessed. The possible

influence of a onetime prolonged stay in nature in children's environmental attitudes will also be studied. The sociodemographic and contextual variables that seem to affect the development of children's environmental attitudes will be evaluated as well as the psychological paths that lead to children's pro-environmental behaviours.

Methodology: this investigation is divided into five empirical studies. The moderating effect of nearby nature on children's stress level and children's perceived restoration are evaluated in the first chapter. In order to do this, the Perceived Restorativeness Scale for Children (PRCS-C) has been translated into Spanish. The two following studies assess the influence that contact with nearby nature has on children's environmental attitudes and the sociodemographic and contextual factors that have an impact on them. With this aim, the New Environmental Paradigm (NEP) Scale for children and the Children Environmental Perceptions Scale (CEPS) have been translated into Spanish and data have been collected in rural and urban areas. The last study was conducted in four summer camps (three of them organized in a natural area and the last one in an urban one). The influence that a prolonged experience in nature may have on children's environmental attitudes and behaviours has been evaluated.

The data analyses conducted include exploratory and confirmatory factor analyses, correlations, *t*-Students, ANOVAS, regression analyses, path analyses and mediation analyses, among other.

Conclusions: this dissertation highlights the importance of the relation between childhood and nature. Our findings show evidence of the moderating effects that nature has regarding the adversity to which children are exposed on a daily basis. Moreover, three scales have been adapted into Spanish (PRCS-C, NEP scale for children and CEPS). It has been shown that children perceive natural environments as more restorative than non natural ones. Children's place of residence and contact with nature influence their environmental attitudes, as well as their age and gender. It has been demonstrated that children's perceived restorativeness mediates the relation between type of school yard (natural vs. non natural) and preference. Restorativeness also influences children's pro-environmental behaviours as well as spending a prolonged period of time in nature through a summer camps. The psychological paths that lead to children's pro-environmental behaviour are also described.

Even though this dissertation has theoretical and methodological limitations, our findings show that children's contact with nature is important for their wellbeing and their environmental attitudes. Future studies should continue to evaluate the scales used in this dissertation. Also, more experiments should be carried out so that results can be generalized.

Implications for environmental education and for cities' design are described at the end of the dissertation. The possible applicability of these findings may contribute to a more sustainable society.

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INTRODUCTION

There is no doubt that environmental problems are one of the main issues that the world faces nowadays and that they highly depend on people's behaviours. People's lifestyle in developed countries is unsustainable, and changes in humans' behaviours need to be made in order to diminish the environmental hazard that challenges our own survival. Bearing this general objective in mind, this dissertation focuses on studying the relationship between childhood and nature, the benefits that children may obtain from contact with the natural world, the evaluation of children's ecological behaviours and the psychological paths that lead to them.

In order to deal with environmental issues, it is important to understand the relation between people and the environment, the attitudes that people have towards the environment, how these are formed and how they can promote people's pro-environmentally behaviours. Researchers emphasize the need for studies about the development of children's environmental attitudes and behaviours as well as the factors that may be influencing on them (Cheng & Monroe, 2012; Evans et al., 2007; Wells & Lekies, 2006). This dissertation contributes to clarifying these issues, has implications for Environmental Education (EE) programs as well as for city design and opens up new lines of research. It is focused on children, from 6 to 13 years old.

There are two main objectives in this dissertation. The first one is the study of children's contact with nearby nature (nature that they have access to every day or almost every day) and the possible benefits that children may obtain from this contact. The second main objective consists of evaluating the effect that contact with nature (nearby nature and a onetime prolonged experience in nature) may have in children's environmental attitudes and behaviours. Attitudes are understood as "a general evaluative reaction towards an object, a person, an issue, a behaviour or other entity" (Oskamp, 1977; cited in Staats, 2003, p. 172). This evaluative reaction is the main characteristic of an attitude but it can also be related to or caused by cognitions about the attitude object and to behavioural tendencies (Staats, 2003, p. 172).

The dissertation is divided into 6 chapters. It is presented to obtain the European Doctorate Certification and, therefore, Chapters 1, 2, 5 and 6 are written in English. The rest of the chapters are written in Spanish.

The first chapter constitutes a bibliographical review of the main theoretical and empirical background on which the studies of this dissertation are based. It starts reviewing the type of contact that modern children have with nature and the social and cultural changes that brought society to what has been called an alienation from nature (see, for example, Louv, 2008). The main reasons for children's disconnection from the natural world are reviewed. Most of them are linked to the process of urbanization such as the increase of traffic or the presence of strangers in places where children play. An increase in

technology use that entertains children indoors has been pointed out as a reason for diminishing the need of going outdoors to spend their free time (Clements, 2004; Karsten, 2005). It is highlighted that children might be suffering from Nature Deficit Disorder, defined as “the human costs of alienation from nature, among them: diminished use of senses, attention difficulties, and higher rates of physical and emotional illness.” (Louv, 2008, p. 36).

Once the type of contact with nature that children have is established, the bibliographical review moves to studying two types of impact that contact with nature has on children. First of all, the influence that contact with nature has on children’s wellbeing. We consider wellbeing as a construct difficult to register. Because of this, we focus on people’s restoration from depleted directed attention and stress levels as indicators of wellbeing. The restorative effect that contact with nature has for children is described. The two principal restorative theories – Attention Restoration Theory (ART; Kaplan & Kaplan, 1989) and Psycho-evolutionary theory (Ulrich, 1983) - are reviewed and the concept of restorative environments is examined.

Following, the main empirical evidence of nature as a restorative environment for children is reviewed. The physiological and psychological benefits that children obtain from contact with nature are described, such as better motor coordination (Grahn, Martensson, Lindblad, Nilsson & Elkman, 1997) or an increase in children’s self-discipline (Taylor, Kuo & Sullivan, 2002). Then, Chapter 1 moves to reviewing children’s perceived restorativeness

– the likelihood that an environment has of being restorative according to the person who perceives it. The instruments used to measure children’s perceived restorativeness are also described.

After describing the restorative effects that nature has in children, the bibliographical review in Chapter 1 moves to the second objective of this dissertation: evaluating the influence that experiences of nature have in children’s environmental attitudes and behaviours. Several researchers have highlighted the impact that childhood experiences in nature seem to have on these children when they become adults, specifically being more pro-environmental than those who did not spend time in nature during childhood (Bixler, Floyd & Hammit, 2005; Chawla, 1999; Chawla & Cushing, 2007; Ewert, Place, & Sibthorp, 2005; Wells & Lekies, 2006). The main limitation of these studies is that they are based on participants’ memories about their childhood which might compromise their internal validity. To the best of our knowledge, there are no longitudinal studies evaluating whether childhood experiences in nature have an impact on children’s environmental attitudes and behaviours when they become adults. At this point, Chapter 1 focuses on reviewing studies that deal with current experiences that children have in nature and their impact on children’s environmental attitudes and behaviours. Nearby nature (mainly at home) seems to be a positive influence for children’s environmental attitudes and behaviours (Cheng & Monroe, 2012; Sivek, 2002) as well as parents’ values toward nature and environmental education programs (Cheng & Monroe, 2012; Evans et al., 2007). The majority of these studies do

not explain the process by which gratifying experiences in nature enhance children's environmental attitudes and behaviours. Two related hypothetical reasons are reviewed within this chapter. First of all, restorative experiences in nature appear to influence adults' (Hartig, Kaiser & Strumse, 2007) and college students' (Hartig, Kaiser & Bowler, 2001) ecological behaviours. A plausible explanation is that "opportunities to experience nature could be the basis for more self-interested environmental protection" (Kaiser, Hartig, Brügger & Duvier, 2012, p. 5). In other words, it could be that people do not only protect the natural environment based on altruistic considerations in an unselfish way but they may also be willing to protect nature because they obtain certain benefits from it. Specifically, gratifying restorative experiences might be a motivation to protect nature mainly based on the restorative benefits that it offers.

Related to this idea is the study of people's feeling of connection with the natural world, also seen as a result of gratifying experiences in nature. This recent line of research has become very common amongst adults samples (Clayton & Opatow, 2003; Hinds & Sparks, 2008; 2009; Kals, Schumacher & Pansa, 1999; Müller, Kals & Pansa, 2009; Nisbet, Zelensky & Murphy, 2009; Schultz, 2001) but little research have been carried out with children (Cheng & Monroe, 2012; Ernst & Theimer, 2011). These authors have shown that direct contact with nature promotes a feeling of connection to nature which, in turn, enhances environmental behaviours. These researchers follow the theoretical ground established by Millar and Millar (1996) who described that direct

experiences with an attitudinal object (in this case nature) promote more affectively charged attitudes than indirect experiences, that enhance more cognitively charged attitudes. Regarding children, Cheng and Monroe (2012) showed that children's past experiences in nature, home nearby nature, environmental knowledge and parents' values toward the natural environment predicted children's connection with nature which, in turn, predicted children's interest in participating in nature-based activities as well as their interest in environmentally friendly practices.

Once the theoretical and empirical background has been reviewed, the main objectives, research questions and hypotheses of the dissertation are described in Chapter 2.

Chapters 3, 4 and 5 are focused on the empirical studies carried out. All the studies, except study 5, have been conducted in the community of Castilla – La Mancha, in Spain. Study 5 includes participants from all over Spain.

Chapter 3 is focused on studying the effects that contact with nearby nature may have on children's wellbeing. In order to do this, two empirical studies were conducted. Study 1 focuses on the moderating effect that nearby nature in the residential and school areas may have on children's stress level. A sample of 172 children participated in the study. The aim was to evaluate the relation between the amount of nature existing in children's daily environments and the way children deal with stressful events. Every day, children are exposed

to situations that cause them stress. Taking into account previous studies, it is thought that the greener the place where children spend their time, the better they cope with adversities (Wells & Evans, 2003). Thus, when comparing the stress level of children who are exposed to the same frequency of adverse situations, those who have more daily contact with nature show less stress than those who do not spend time in nature. This effect from nearby nature is called a buffering or moderating effect (Wells & Evans, 2003). Study 1 provides empirical evidence of the moderating effect caused by the existence of nature in the residential and the school environment. Therefore, the results show that children who have more access to nature increase their resilience, showing a lower stress level than children whose contact with nature is less frequent.

The second study in Chapter 3 focuses on children's perceived restorativeness. Several studies have shown that when children's attention capacity is diminished, they cannot focus, they find it hard to cope with stressful situations and they are more likely to take unnecessary risks (Taylor et al., 2002; Taylor & Kuo, 2011; Wells, 2000; Wells & Evans, 2003). A large number of studies have demonstrated that natural environments boost the restoration of attention capacity more than urban or semi urban environments (e.g., Berto, 2005; Johansson, Hartig & Staats, 2011; Kaplan & Kaplan, 1989; Laumann Gärling, & Stormark, 2001; Van den Berg, Koole, & Van der Wulp, 2003). Several instruments have been used to measure perceived restorativeness in adults in different environments (Hartig, Korpela, Evans, & Gärling, 1997; Laumann, Gärling, & Stormark, 2001) however, little attention has been paid to

designing tools to measure children's perceived restorativeness. In this study, the Perceived Restorative Components Scale for Children II (PRCS-C II; Bagot, Kuo & Allen, 2007) has been adapted to a Spanish sample. It has been used to assess the perceived restorativeness of 20 schoolyards with 832 children. The results show that the factorial structure of children's perceived restorativeness is similar to the one obtained by the authors of the instrument (Bagot, 2004; Bagot et al., 2007) as well as the one found with adults samples (Laumann et al., 2001). For the first time, it was demonstrated that the scale could distinguish between environments that theoretically differ in their restorative potential (natural environments versus non natural ones). As suggested by Bagot (2004), age differences were found, with younger children (6 to 9 years old) perceiving their playground as more restorative than older ones (10 to 13 years old). Contrary to Bagot (2004), no gender differences were found. It was also shown that restoration (in this case perceived restorativeness) partially mediates the relation between the type of school playground (natural vs. non natural) and the preference that children show toward their playground.

The remaining empirical chapters are focused on the second main aim of the dissertation: studying the impact that direct contact with nature may have on children's environmental attitudes and behaviours. Chapter 4 includes two empirical studies focused on children's contact with nearby nature and Chapter 5 includes the last study of the dissertation aimed at evaluating the possible impact that a onetime prolonged experience in nature may have on children's ecological attitudes and behaviour.

Study 3 intends to adapt the New Ecological Paradigm (NEP) scale for children (Manoli, Johnson & Dunlap, 2007) to Spanish and to evaluate the possible influence of sociodemographic and contextual factors on children's ecological beliefs. The structure and cohesion of 574 Spanish children's ecological beliefs system, from rural and urban areas, is studied. Urban and rural areas were chosen as a way of registering children's contact with nature (Hinds & Sparks, 2008; Müller, Kals, & Pansa, 2009). An exploratory factor analysis was carried out followed by a confirmatory factor analysis using AMOS. The best solution was a second order model that includes three first order factors. Hence, there was a single dimension that is common to all the responses given by the participants, called "general ecocentrism" and it could be detailed in three first order dimensions with higher descriptive capacity. These three dimensions were: 1) respect for nature, 2) eco-responsibility and 3) eco-deterioration. Moreover, older children were more ecocentric than younger ones. Similarly, children with more frequent contact with nature, living in rural areas, scored higher in ecological beliefs than those living in urban areas.

Study 4 focuses on adapting the Children Environmental Perceptions Scale (CEPS; Larson, Green & Castleberry, 2011) to Spanish and on checking the influence of different factors on children's environmental perceptions. The same sample of Study 2 (N = 832) participated in the study. The results show that the factor solution of the scale can be interpreted as unidimensional, including items about children's environmental attitudes toward nature, a wish to

learn about nature and to protect environmental values. This construct was called *Orientation towards nature*.

Differences in children's orientation toward nature according to their place of residence were found. Children living in the rural mountain range area scored higher than those living in the rural agricultural one. No differences were found between children living in rural areas (either agricultural nor mountain range) and those living in urban ones. It appears that contact with nature might be important for the development of environmental orientations but also the type of contact, which may differ between participants living in the mountain range to those living in the agricultural area. Younger children and females scored higher than older ones and males.

As stated before, promoting children's environmental behaviour is essential for a sustainable future. It is known that frequent contact with nature during childhood positively influences adults' environmental attitudes and behaviours (Wells & Lekies, 2006). Children also seem to be sensitive to nature experiences, showing higher environmental attitudes after spending time in nature. Two possible psychological processes leading to ecologically friendly behaviours have been examined. First of all, a theoretical model was proposed and confirmed with AMOS. Children's restorative experiences seem to positively influence children's orientation toward nature as well as their environmental behaviours. These results are similar to the ones obtained by Hartig, Kaiser, and Bowler (2001) and by Hartig, Kaiser and Strumse (2007).

Secondly, the last empirical chapter - Chapter 5 - aims at evaluating the impact that a onetime prolonged experience of nature through a summer camp has on children's emotional affinity towards nature, children's ecological beliefs and children's ecological behaviours. Recent research has shown that both, affective and cognitive determinants of environmental attitudes are important when predicting behaviour (Pooley & O'Connor, 2000). Based in these insights, study 5 evaluates the influence of four summer camps – three in nature and an urban camp- on children's environmental behaviours and the process through which stays in nature lead to environmentally friendly behaviour. Three different types of behaviours were taken into account: 1) Willingness to carry out environmental citizenship behaviours (e.g., I'm willing to become a member of an environmental organization), 2) Intentions to visit nature more often (In the future, I'm going to visit natural places more often) and 3) Willingness to conduct daily conservation actions (e.g., I'm willing to switch off the electrical appliances when I'm not using them). Our results show that nature experiences increase children's emotional affinity towards nature as well as promote their ecological beliefs. Emotional affinity towards nature and ecological beliefs mediate the direct effect that exposure to nature has on children's willingness to carry out different ecological behaviours and the strength of each mediator differs according to the type of ecological behaviour.

Chapter 6 includes the general conclusions and discussion of the dissertation's results. It also describes the implications that the results found have for environmental education as well as for city design. Finally, the

limitations of the empirical studies are explained together with the possible future lines of research.

The work described in this dissertation is the result of my profound interest in the human-nature relationship. I studied environmental sciences and I have always been fascinated by the research that my professors, such as José A. Corraliza, carry out from the Environmental Psychology perspective. I am interested in studying ways of promoting pro-environmental attitudes and behaviours, especially in children. Since I finished my degree I always thought that, in order to promote people's environmental attitudes and behaviour, being an expert on environmental sciences does not seem enough and that some knowledge about psychology was needed. Because of this, I have tried to work from the Environmental Education and the Environmental Psychology perspectives through the studies presented in this document as, in my opinion, these disciplines complement each other.

Children are underrepresented in environmental psychology studies and very little is known about how to promote ecologically friendly behaviours in them. In my opinion, this lack of research needs to be overcome as the children of today will be the ones making the decisions about environmental protection and conservation in the future. Moreover, I have always been interested in the benefits that children obtain from their contact with nature and in ways of designing cities in order to promote children's contact with the natural world.

Even though it was difficult at the beginning to adapt myself to the psychological perspective and, taking into consideration that I still have a lot to learn, I consider this dissertation to be a step forward in order to understand children's experiences in nature and the effect that these experiences have in their wellbeing as well as in their environmentally friendly behaviours. Hopefully the findings described in this document inspire future research as well as intervention practices.

CHAPTER 1.- CHILDHOOD AND NATURE: CONCEPTUAL FRAMEWORK

Environmental problems are a major issue in today's society. Global environmental issues, such as climate change, are increasing and callings for global and local actions have come from different sources such as governments, environmental organizations and researchers. It is indisputable that natural settings are essential for human's physical and mental health (see for example Kaplan, 1995). Although natural environments seems to be indispensable for people's wellbeing, they are in danger essentially due to the negative consequences that human actions have on them, to our lifestyle and to the way our society is organized in all its dimensions (economical, political, industrial, etc.). Almost four decades ago, Maloney and Ward (1973) affirmed that human society is responsible for the current ecological crisis due to our "maladaptive behaviour". Technological solutions might help to ameliorate environmental problems, but human behaviour needs to be studied and behavioural changes are required in order to promote a sustainable society. Children play an essential role in the future of the planet, as they will be the ones facing environmental issues in the next decades.

The aim of this dissertation is to contribute to the literature on children's experiences of nature. The empirical studies that will be reviewed in the following sections have used children from various age ranges, including infancy, middle childhood and adolescence. The word children used throughout

this document refers to participants from 3 to 13 years of age and the word teenagers to those from 14 to 19 years old.

Overall, the Thesis is focused on the benefits that exposure to nature might have on children's wellbeing and at trying to understand the variables and processes that promote children's pro-environmental attitudes and behaviours. As stated before, we consider wellbeing as a construct difficult to measure so we will take people's restoration from depleted directed attention and stress as an indicator of their wellbeing. The positive effects that exposure to nature has on physical and psychological health has been widely analyzed (Kaplan & Kaplan, 1989; Ulrich, 1983). However, the number of studies carried out specifically with children is limited. Moreover, there is a marked paucity in research studying the development of children's environmental attitudes (Evans et al., 2007) whereas the amount of studies carried out with general population samples (mainly college students and adults) has experienced an increase growth in past three decades (see, for example, Davis, Le & Coy, 2011; Ferguson, Branscombe & Reynolds, 2011; Gardner & Stern, 1996; Raymond, Brown & Robinson, 2011). This lack of research on children's experiences of nature and their influence on children's wellbeing, environmental attitudes and behaviour guided the investigations conducted in this dissertation.

People's relationship with the surrounding environment has been studied from the conceptual framework of Environmental Psychology. This discipline is focused on assessing people's behaviours in the scenarios where they take place,

those being built or natural (Aragonés & Américo, 2010). According to Günther (2009, p. 363), in the past, environmental psychology has been mainly focused on studying *local* issues, including specific places such as school, home, office or nature and concepts like affiliation, territory or identity. However, an increasing number of environmental psychologists have started to assess more *global* issues such as pro-environmental behaviour, conservation or climate change. Günther (2009) emphasizes that:

“the task of environmental-behaviour studies lies in studying the impact on the environment and the consequences of the thus modified environment on humans, while the specific tasks of environmental psychology lies in finding ways and means to bring about the necessary behavioural changes to assure human sustainability.” (p. 364).

Similarly, the main aim of Environmental Education (EE) is to promote environmental behaviour (Mangas & Martínez, 1997). EE is a discipline “aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work towards their solution” (Stapp et al., 1969, p. 31). Regarding children, the Tbilisi Declaration (UNESCO, 1978, p. 27) highlights the need of addressing the efforts to people from every age, but with special “emphasis on environmental sensitivity to the learner’s own community in early years”. Understanding the psychological variables that influence children’s pro-environmental behaviour is essential for the future of the planet. It

will help to develop efficient intervention strategies and, ultimately, to promote a more sustainable society. In the following sections the theoretical and empirical evidence about the type of experiences that modern children have in nature, the benefits that contact with nature brings to this population group as well as the factors that seem to influence children's environmental attitudes and behaviours are reviewed, both from the EE and environmental psychology perspectives. Children's environmental attitudes are understood as a general evaluative reaction towards an object, in this case nature. This evaluative reaction is the main characteristic of an attitude but it can also be related to or caused by cognitions about the attitude object and to behavioural tendencies (Staats, 2003, p. 172).

1.1. Children's disconnection from the natural world

Childhood used to be a time for children to spend time outside, mainly in the surroundings of the houses (Karsten, 2005; Kellert, 2002). The process of urbanization occurred in the last decades and today's lifestyle has reduced the amount of nature accessible to children, resulting in less direct contact with the natural world and more indirect and vicarious contact (Kellert, 2002). Pyle (1993) has referred to the *extinction of the experience* to talk about the trend in modern society to be away from nature, which has impoverished children's opportunities for experiencing the natural world. In Pyle's description of the *extinction of the experience*, the author argues that "direct, personal contact with

living things affects us in vital ways that vicarious experience can never replace” (Pyle, 1993, p. 145) and he affirms that this lack of experience will lead to disaffection towards the natural world, having negative consequences for people’s involvement in nature conservation.

Empirical evidence supports the idea of the *extinction of the experience* during modern childhood in developed countries. For example, Pergams and Zaradic (2008) studied the decline in the frequency of adults participating in four different nature-related activities in three countries: United States of America, Japan and Spain. The nature-related activities taken into account were: 1) visits to public nature lands (e.g., National Parks), 2) number of USA game licenses (e.g., fishing licenses), 3) time spent camping and 4) time spent backpacking or hiking. Their results show that there is a decline in frequency of nature-recreation activities, which started between 1981 and 1991. These findings are important for children as their access to nature and recreational choices highly depend on decisions taken by adults. In another study, Zaradic and Pergams (2007) explain how this shift from nature based recreation to a more sedentary lifestyle which bases its recreational time on electronic media might affect children’s development. In their theoretical paper, the authors gather the results of several empirical studies that emphasize the positive effects that contact with nature has for children (see, for example, Wells, 2000) and, on the other hand, the negative effects that children’s sedentary lifestyle has for children’s health. For instance, they mention the study conducted by Christakis, Zimmerman, DiGiuseppe and McCarty (2004) in which it was seen, with a sample of 2.600

children at ages 1 to 3, that early television viewing is associated with an increased probability of suffering attentional problems at age 7, even when confounding factors such as prenatal substance abuse, gestational age, maternal psychopathology and socioeconomic status were controlled. The authors define our “new human tendency to focus on sedentary activities involving electronic media” as *videophilia* (Zaradic & Pergarms, 2007, p. 141) as opposed to *biophilia*, or the innate tendency to focus on life and lifelike processes (Kellert, 1997; Wilson, 1984). These authors propose large-scale longitudinal studies to evaluate the impacts of videophilia on children’s development and future outcomes, by following a controlled group of children from birth to adulthood. According to Zaradic and Pergarms (2007), sedentary life negatively affects children’s healthy development and it may diminish their environmental consciousness. The empirical studies conducted until now have been focused on the benefits that contact with nature has for people’s wellbeing and environmental consciousness, usually as compared to a control group with no contact with nature. However, the opposite (i.e., less contact with nature reduces wellbeing and environmental consciousness) has not been studied. For example, would people living in a rural area show less environmental consciousness after spending a period of time in an urban one? This hypothesis awaits future research.

Studies carried out directly with children corroborate that they are spending less time in nature than previous generations did a few decades ago. The causes of this disconnection have also been described. For instance,

Hofferth and Sandberg (2001) found that children in the USA spend on average only 30 minutes of unstructured time outdoors per week. In Spain, Freire (2011, p. 22) points out that children spend 990 hours watching TV, playing with the PC or with other electronic media. In a study carried out in the USA, Clements (2004) interviewed 830 mothers that had children between the age of 3 and 12 about their own experiences outdoors during childhood as well as about their children's current experiences outdoors. According to the author's results, the interviewees were aware of the benefits of playing outdoors, such as reducing stress or better physical development. However, 85% of the mothers agreed that their children played outdoors less often than they did when they were children and that modern childhood is more passive, inactive and mainly indoors than the one of the previous generation. Also, the games played outdoors are different from the ones previous generations played. Modern children spend more time playing organized activities (e.g., organized sports) than their mothers, who played more imaginative or made-up games. Mothers were also asked the reasons why their children did not play outdoors and dependency on TV watching and/or playing computer games were the two main reasons. The interviewees agreed that there are many amenities indoors, so children do not need to go outdoors to find fun. Crime and safety issues were also mentioned as reasons for not allowing children play outside. Most of the mothers claimed that they do not have enough time to spend outside with their children, which is also a motive for children spending most of their time indoors, under adult supervision. Similar results were found in Europe by Karsten (2005). She carried

out a study with children in the city of Amsterdam, comparing the use of three representative streets in 2003 to the use that children in the 50's and 60's gave to the same streets. The author conducted interviews with adults who used to live in each of the streets and with people who have been living in the same street for a long period of time. Moreover, she compared the data obtained from the interviews with historical sources. Interviews were also carried out with children and parents living in the streets nowadays. Her results show that modern children play outside less frequently and for shorter periods of time than children in the 50's and 60's and also their movement range is more limited. According to the researcher, this is mainly due to traffic safety and to the lack of adequate urban places for children (lack of places where children can play, absence of places where children can relate with others, etc.). Karsten (2005) concludes that in the 50's and 60's playing meant playing outdoors, children had freedom of movement and the private space inside the home was hardly used to play. In contrast, according to the researcher, nowadays there is more diversity among children and two new geographical childhoods have emerged for modern childhood: indoor children and children of the backseat generation. Karsten (2005) concludes that modern children can be classified in three groups: 1) Outdoor children, or those who live in a safe neighborhood, with small green parts and quiet streets. These children still play outdoors almost every day, but the amount of children included in this category has been highly reduced compared to a few decades ago. 2) Indoor children: Those who rarely play outside because they feel that the streets are not safe and the conditions of the

neighborhood are poor. They usually spend their time indoors watching TV. And 3) backseat generation children: Those who have a tight schedule prepared by parents and that are daily brought from music class to sport lessons, as well as to visit museums and other cultural activities. These children do not have time to play outside and, if they play outside, is because their parents organize time for it.

To sum up, in the past decades there has been a social and cultural change that has provoked a shift in children's way of spending their free time, from mainly outdoors to mainly indoors. Unstructured play has been taken over by more organized activities such as organized sports. Children's contact with the natural world is diminishing, but, is it important for children to experience nature? Intuition and empirical results point to a positive answer. Different studies have shown how direct and visual contact with nature positively affects children's physical (Grahn et al., 1997) and psychological health (Wells, 2000). Exposure to natural environments has also been seen as an important factor enhancing people's environmental attitudes and behaviours (Hinds & Sparks, 2009). It is because of these recognized benefits of contact with nature that the disconnection between childhood and the natural world has attracted the attention of several researchers (Kahn, 2002; Kellert, 2002; Larson et al., 2011; Wells & Lekies, 2006). Most of them suggest ways of reconnecting youngsters with nature. Since the journalist Louv (2005) launched his book *The Last Child in the Woods*, many initiatives all around the world have been promoted in order to reconnect children and nature. For example, in the USA, the No Child Left

Inside Act (2007) and, in Spain, Freire (2011) encourages parents and teachers to bring children closer to nature. In her book *Educar en Verde* she suggests different ways of reconnecting childhood and nature such as picking mushrooms, swimming in a nearby river or birdwatching. Louv (2005) compiles the evidence available that shows the positive effect that contact with nature has for children and he claims that today's children are suffering from Nature Deficit Disorder.

1.1.1. Nature Deficit Disorder.

Louv (2005) uses the term nature deficit disorder to talk about the main negative consequences that people, but specially children, suffer from not spending enough time in nature. In his own words, this phenomenon “describes the human costs of alienation from nature, among them: Diminished use of senses, attention difficulties, and higher rates of physical and emotional illnesses. This disorder can be detected in individuals, families, and communities.” (p. 36). The author highlights that this is not a recognized illness but that there is some evidence of its existence. The main consequences explained in his book and supported by several empirical studies can be classified into three groups:

Physical consequences.

Different studies have proven that children's and adults' physical activity is positively related to the presence of nature within the neighborhood (De Vries et al., 2011). For example, Liu, Wilson, Qi and Ying (2007) assessed the relation between the amount of vegetation surrounding children's residences and the risks for childhood overweight. They argue that inadequate physical activity increases the risk of children suffering from overweight. The amount of vegetation was measured using geographic information systems. Children's Body Mass Index (BMI) was calculated as an indicator of children's risk of overweight. More than 7.000 children between 3 and 18 years old from urban areas participated in the study. Their results show that, after controlling for individual sociodemographics and neighborhood socioeconomic status, increased neighborhood vegetation was associated with reduced risk of childhood overweight.

Similarly, Ozdemir and Yilmaz (2008) found that the physical characteristics of the school play yards, including presence of trees and water, influence children's BMI as well as their perceptions and satisfactions with the playground. Those students who walked to school had lower BMI than those who were transported to school. The same results were found for children who played in larger school playgrounds. Taking into consideration students' preferences, children preferred larger yards with vegetation and described their ideal school playground as one that includes green elements such as trees and

lawn areas. According to these authors, children should play in natural spaces every day.

Grahn et al. (1997) carried out a study in Sweden with two different day care settings. Twenty six children from 3 to 7 years old participated in the study. One of the centres was considered a typical urban centre, surrounded by tall buildings, including also low plants and a brick path for cycling. The other area of study was an *outdoor in all weather* centre. The playground was surrounded by nature and children played outside a considerable amount of time per day, no matter the weather. Children attending the *outdoor in all weather* care centre showed better motor coordination and were sick fewer days than children in the urban centre.

Psychological consequences.

The psychological benefits that spending time in nature has for children have been studied in different ways. For example, in the already mentioned study by Grahn et al. (1997), pre-school children's concentration abilities were checked with the Attention Deficit Disorders Evaluation Scale (ADDES; McCarney, 1995) and it was found that children in the *outdoors in all weather* centre had better attentional concentration abilities than children in the urban centre. It has also been proven that children's attention capabilities improve after moving from houses with a low amount of nature to houses with more nearby nature (Wells, 2000). Children's self-discipline (Taylor, Kuo & Sullivan, 2002)

and resilience against stressful events (Wells & Evans, 2003) are better when they have more access to nature. These results are significant after controlling for possible confounding factors such as the quality of the house or socioeconomic status.

Consequences related to changes in environmental attitudes and behaviours.

Empirical evidence supports the idea that direct contact with nature encourages children's and adults' environmental attitudes and behaviours (Chawla, 1999; Larson et al., 2011; Wells & Lekies, 2006). If direct contact with nature is diminishing it could result in children not bonding with nature in an affective way which may cause disaffection toward the natural world (Pyle, 1993). To the best of our knowledge, there are no empirical studies showing that less time spent in nature implies a decrease in children's environmental consciousness. For example, would children who live in a rural area surrounded by nature show less pro-environmental attitudes after spending the summer in an urban area with no contact with nature? Nevertheless, there are studies showing that direct contact with nature increases adult's and children's feelings of connection with the natural world which, in turn, is related to ecological behaviour (see, for example, Cheng & Monroe, 2012; Mayer, Frantz, Bruehlman-Senecal & Dolliver, 2009).

From the literature review, it appears that children who have more access to nature in their daily environments –home and school- tend to have a less sedentary lifestyle than those who do not have access to natural elements. This implies that more nearby nature is related to better physical health, mainly less obesity problems but also other benefits such as better coordination skills. It also seems that having regular contact with nature offers psychological benefits to children as well as influences their environmental attitudes and behaviours. This dissertation is focused on the last two types of consequences (psychological consequences and consequences related to changes in environmental attitudes and behaviours). The positive consequences that contact with nature has for children’s psychological wellbeing and environmental attitudes and behaviours are discussed in the following sections.

1.2. Contact with nature during childhood: impact on children’s wellbeing and environmental attitudes and behaviours

Human genome has changed very little since the first *Homo Sapiens Sapiens* appeared on Earth (between 40.000 and 90.000 years ago). This means, as stated by Gardner and Stern (1996), that due to this genetic predisposition there are certain patterns that people in general follow and that mark the way individuals perceive, think and behave (p. 176). Following this genetic predisposition, Wilson (1984) formulated the biophilia hypothesis which, as stated before, implies that people feel the need to be in contact with natural

environments similar to the ones in which human beings evolved. Not being in contact with nature, mainly due to urbanization of the world, with an increased number of people living in cities, would be harmful for people's psychological and physical health. According to this hypothesis, humans have a biological tendency or genetic inclination to affiliate with natural processes and diversity. On an empirical level, studies have shown that in fact there are some behavioural patterns that are in line with the biophilia hypothesis. First of all, it has been proven that, in general, natural places are preferred over man-built places (see, for example, Appleton, 1975; Kaplan & Kaplan, 1989; Ulrich, 1983). Also, spending time in contact with nature can restore our psychological capabilities diminished during an intense or prolonged cognitive task (Kaplan & Kaplan, 1989) and/or our physiological resources depleted due to stressful events, together with promoting more positive moods (Ulrich, 1983). Moreover, recent research has shown that, in general, individuals feel a connection with nature and that this connection, according to their supporters (e.g., Hinds & Spark, 2008; 2009; Mayer & Frantz., 2004; Schultz, Shriver, Tabanico & Khazian, 2004) is based on our genetic predisposition to affiliate with the natural world. Kellert and Wilson (1993) emphasize the psychological benefits linked to being in contact with nature. In fact, the authors of the two main restorative theories - Attention Restoration Theory (ART; Kaplan & Kaplan, 1989) and Psycho-evolutionary theory of stress reduction (Ulrich, 1983) - agree on the evolutionary basis of the restorative effects of contact with natural environments. Similarly, the main theories about people's preferences of natural places over

urban ones have an evolutionary starting point (Appleton, 1975; Kaplan & Kaplan, 1989; Ulrich, 1983).

As Gardner and Stern (1996) claimed, it is not clear that people's predisposition toward nature is entirely genetic. There may never be enough evidence to claim that human's predisposition toward nature is due to our genes and not to our culture or learning experiences. In fact, one of the authors of the biophilia hypothesis (Kellert, 2002) describes this biophilic tendency as weak, requiring learning experiences, culture and experiences in nature in order to increase it. Nevertheless, the high number of studies showing the positive effect of being in contact with nature, humans' preferences for natural places and people's feelings of connection to the natural world are consistent with the biophilia hypothesis.

1.2.1. The restorative effects of nature.

For many years, people had the intuition that contact with nature has psychological and physical benefits for human beings (Kaplan & Kaplan, 1989, p. 1). This mere intuition has been corroborated by empirical research conducted during the past three decades. Researchers have demonstrated that spending time in direct and/or visual contact with nature offers positive effects to people. People living in cities may be under information overload from an environment that highly demands the use of psychological resources (attention, memory, etc.). This is due to the need of processing many inputs at the same time or

because the inputs come very fast, making it difficult to process the first input before the second comes (Milgram, 1970, p. 1462). Information overload can provoke negative effects on people such as negative feelings or inability to focus. When trying to adapt to the environment, especially to an environment as demanding as the urban one, our resources (physical, psychological or social) become depleted. If these resources are not restored, a person's health and well being can suffer. Restoration has been defined as "the renewal or recovery of resources or capabilities that have become depleted in meeting the demands of everyday life" (Hartig, 2011, p. 41). It includes a "set of resources in need of restoration, an activity that enables restoration, and an environment that supports that activity" (Hartig, 2001, p. 475). Restoration is seen as an adaptive process that can take place in various ways, for example, sleeping. Another way of achieving restoration is through contact with environments that promote restorative experiences. Researchers have focused on studying the qualities that certain types of environments have and that make them restorative (Kaplan & Kaplan, 1989; Ulrich, 1983). It is important to point out that the absence of demands in an environment does not imply that the environment is restorative. A restorative environment would be one that not only imposes few demands but also promotes restoration of the depleted resources (biological, psychological and/or social) (Staats, *in press*). Therefore, an environment with no negative characteristics, such as stressors, can permit restoration but an environment with restorative characteristics will promote restoration. It has been proven that natural environments promote restoration better than urban environments (see,

for example, Hartig, Evans, Jammer, Davis & Gärling, 2003) and that being in contact with nature has many restorative benefits for adults and children (Kaplan, 2001; Raanaas, Patil & Hartig, 2010; Taylor & Kuo, 2011; Wells, 2000; Wells & Evans, 2003).

1.2.1.1. *Main Restoration Theories.*

From its origins at the beginning of the 80's, the concept of restoration has been explained from mainly two, apparently different, points of view. There is a group of researchers that define restoration as the process of reduction and recovery from stressful experiences (Ulrich, 1983). A second group of researchers claims that restoration is the process of recovery from mental fatigue which, in turn, is the result of maintaining directed attention for a long and/or intense period of time (Kaplan & Kaplan, 1989). Both ways of understanding restoration, its antecedent situation, process and outcomes have been translated into two theories. One of them emphasizes the affective/physiological outcomes of being exposed to nature - (1) Psycho-evolutionary theory of stress reduction (Ulrich, 1983) - and the other one focuses on the cognitive/psychological outcomes - (2) Attention Restoration Theory (Kaplan & Kaplan, 1989)-. The differences between these two approaches led to a polemic discussion reflected in the paper of Kaplan (1995).

a) Psycho-evolutionary theory of stress reduction (Ulrich, 1983)

Ulrich (1983) assumes that an individual's first level of response toward the environment is mainly affective and he defines structural properties of the visual configuration of the scene that provoke this affective, automatic response. For Ulrich (1983), the restorative effects of certain environments are reflected in the physiological processes of people as well as in emotional changes. According to the author, natural environments are restorative because they possess a series of characteristics that people perceive and that provoke positive emotions on them, capture the involuntary attention (attention that do not require effort), block negative thinking and evoke moderate levels of arousal. These characteristics include presence of a focal point, presence of water, degree of depth in the scene, complexity and absence of threat, among others. For an environment to be restorative it has to be unthreatening.

Empirical studies support this theory. For example, Ulrich (1984) studied the influence of a hospital's window view on surgery patients' recovery. The sample was formed by 23 patients who had views to a natural setting and 23 that had a view to a brick wall. His results show that those patients with nature views had shorter postoperative hospital stays, needed to take fewer analgesic doses and had more positive comments from their nurses than those with a brick wall view.

One of the most relevant studies carried out under this theory is the one conducted by Ulrich, Simons, Losito, Fiorito, Miles and Zelson (1991). The authors presented a stressful movie to 120 participants in order to raise their stress levels. Following, the individuals were divided into six groups to watch a 10 minutes video of an everyday setting (two natural and four urban). Ulrich et al. (1991) registered several physiological measurements, such as skin conductance, pulse transit time or frontalis muscle tension. They found that those participants who watched the nature videos had a faster and more complete recuperation than those who watched the urban environments. Participants' affective responses were also measured and the results demonstrated that natural videos elicited more positive affects, less anger/aggression and less fear than the urban videos.

b) Attention Restoration Theory (ART; Kaplan & Kaplan, 1989)

ART focuses on the capacity to direct attention, the depletion of this capacity and its restoration. It emphasizes cognitive responses over physiological and affective ones.

Based on the work of James (1892), Kaplan and Kaplan (1989) propose that human beings have two attentional mechanisms: directed, effortful forms of attention and involuntary, effortless forms of attention. Both mechanisms underlie attention and they are not used at the same time. Voluntary attention is used when attending tasks or situations that do not catch our attention but that

are important to pay attention to nonetheless (e.g., writing a paper, studying for an exam or driving when there is a lot of traffic). These kinds of tasks or situations require sustained attention and this, in turn, requires the ability to inhibit distractions. Kaplan and Kaplan (1989) used the term *directed attention* to refer to *voluntary attention* and it possesses the following properties: (1) “requires effort, (2) plays a central role in achieving focus, (3) is under voluntary control, (4) is susceptible to fatigue, and (5) controls distraction through the use of inhibition” (Kaplan, 1995, p.170).

After a prolonged period of time using directed attention, the capacity to focus becomes depleted. This state of mind is very well known. Anyone who has been working for a long period of time or for a short period of time but intensively on a task that requires directed attention (e.g., writing a paper) feels mentally tired after it. However, it does not imply that the task at hand is disliked by the person. According to Kaplan (1995, p. 170), “even a thoroughly enjoyable project is likely to lead to this same outcome (*directed attention fatigue*)”.

According to ART, the mechanism of directed attention is essential for human everyday functioning and life effectiveness. There are several negative consequences of being mentally fatigued. For instance, not being able to focus negatively affects problem solving. Also, a mentally fatigued person is not able to inhibit impulses and inclinations, he/she becomes highly distracted, has difficulties planning and following a plan or behaves in an inappropriate way.

Negative feelings such as irritability can also appear as a consequence of attention fatigue.

As it has been mentioned before, directed attention can be recovered by letting it rest, for example, through sleeping, although according to Kaplan (1995) sleeping is not enough. Another way of resting the depleted directed attention is through using involuntary attention, by getting involved in activities that draw primarily on this kind of effortless attention.

Kaplan (1995) refers to involuntary attention as *fascination* and argues that fascination can be enhanced by processes, such as sunrise or learning, by content, such as wild animals or water, and even by objects or settings. There are two types of fascination: hard and soft. Hard-fascination is the one elicited by, for example, watching a horror movie. Kaplan and Kaplan (2011) explain that this kind of fascination “entails fast motion, loud noises, and other strong stimulus patterns” (p. 309). Other stimuli such as “strange things, wild animals, bright things...” (James, 1892, p. 231) have been also pointed out as examples of hard fascination. According to Kaplan and Kaplan (2011), this kind of fascination requires little effort but can also deplete directed attention due to the distracting and conflicting impacts that these kinds of stimuli have on people (e.g., watching a Formula 1 race). On the contrary, soft fascination is engaged by, for instance, walking in a natural area. This kind of fascination is promoted by some natural areas and is one of the four characteristics of a restorative environment.

Restorative environments according to ART and the process of restoration.

As mentioned before, a restorative environment “promotes as well as permits restoration” (Hartig, 2011, p. 42). Kaplan and Kaplan (1989) proposed four theoretical components of a restorative environment, which are mainly present in natural environments: fascination, being away, extent and compatibility. Different environments vary in the degree in which they restore people’s attention capacities, some environments being more restorative than others. The restorative components are not part of the environment or part of the person, but an interaction between the person and the environment (Kaplan, 2001). Therefore, the restorative effect of a certain environment can vary across people and through time. However, as a general trend, it has been proven that natural environments are more likely to be restorative for everybody than built environments (Berto, 2005; Hartig et al., 2003; Johanson et al., 2011; Kuo, 2001). Restorative environments are those which possess the following characteristics:

- Fascination: a fascinating environment is one which attracts one’s attention without effort and keeps us from getting bored. As mentioned before, an environment can be fascinating because of its content (water, shiny elements, trees, etc.) or because of the processes that occur in that environment (sunrise). The kind of fascination that a restorative environment elicits is soft fascination.

- Being away: it implies that the person obtains psychological and/or physical distance from their every day worries. Physical distance would involve, for example, a vacation in a place different from the normal one. A psychological distance could be enhanced by, for instance, looking through a window and forgetting every day's worries. In general, it implies getting away from fatiguing tasks of daily life.
- Extent: an environment that has extent is one that is "rich enough and coherent enough so that it constitutes a whole other world" (Kaplan, 1995, 173). Kaplan and Kaplan (1989) define extent by the presence of two components: connectedness and scope. A connected environment is one in which its elements are related in a sensible way. An environment has scope when there is more (to see, to experience) than the immediate environment. It means that the environment gives the opportunity to think, to experience and to see enough things so that one's mind is engaged to the environment.
- Compatibility: this component refers to the fact that there should be compatibility between the purposes and inclinations of the person in the environment and the possibilities offered by the environment. As Kaplan (1995, p. 173) explains, "in a compatible environment one carries out one's activities smoothly and without struggle."

Kaplan and Kaplan (1989) argue that restoration can occur when only one component is present, but restoration is enhanced when the four components are included in one environment. As pointed out by Van den Berg, Hartig, and

Staats (2007), what the empirical evidence shows is that natural and built environments differ in their restorative potential, taking into consideration the presence of restorative qualities. Non natural environments have also been proven to be restorative, such as monasteries (Ouelette, Kaplan, & Kaplan, 2005) or museums (Kaplan, Bardwell, & Slakter, 1993). However, the general trend is that natural environments possess characteristics that are restorative for most people whereas built environments, such as museums or monasteries, are restorative for certain kind of people (Kaplan et al., 1993). For an environment to be restorative, it has to be accessible (Kaplan, 1995) and monasteries and museums are not accessible settings for everybody. For instance, monasteries will be a restorative option for those able to afford a stay in them and who are keen on spending time in this type of place (Staats, *in press*) and museums were found to be restorative for those who were used to visiting them (Kaplan et al., 1993).

Regarding the process of restoration, Kaplan and Kaplan (1989) distinguish four sequential, interrelated stages, each one representing a greater level of restorativeness than the previous one. The first level of restoration, *clearing the head*, implies removing the cognitive distractions leftover from previous tasks that still remain in one's head. This first level requires less time and a lower-quality restorative setting to be accomplished than the second one, which is allowing directed attention to rest. The third stage relates to paying attention to personal matters that remain unresolved. Finally, the deepest level of

restorativeness implies reflection about one's life, priorities, possibilities, actions and goals.

Similarities and differences between the theories.

The two restorative theories have similarities and differences. Regarding the similarities, both theories have an evolutionarily basis (Staats, *in press*). They propose the restorative process as an adaptive one, generated by evolution, following the biophilia hypothesis. Because human beings lived most of their history in natural environments, our brain still retains the adaptive processes that made us survive. In Ulrich's (1993) view, human beings prefer those environments that were important for survival, especially savanna landscapes. He affirms that a stressed person will benefit from these preferred environments, experiencing a quick recovery and being ready to face adversity. Similarly, according to Kaplan (1995), the restorative characteristics described above have been important for human beings' survival through evolution. He claims that our predecessors had to be vigilant in order to face the unexpected stimuli of the natural world. This implies focusing on interesting stimuli for a short period of time or, in other words, natural stimuli tend to be fascinating.

The second similarity described by Staats (*in press*) is that the two theories agree on the kind of natural environments that are restorative. Both groups of researchers point out some similar characteristics of natural environments such as an intermediate level of complexity, coherence (presence

of homogeneous textures) or legibility (the scene allows anticipation and easy locomotion).

Regarding the differences, Staats (*in press*) claims that the antecedent condition for restoration according to ART is mental fatigue, which is the result of a cognitive process that, as mentioned before, does not need to be unpleasant. However, Ulrich (1983) describes restoration as the process of recovery from a negative state of stress, accompanied by negative feelings. The process of restoration is also seen as different depending on the authors. While in ART involuntary attention is used allowing directed attention to rest, from Ulrich's (1983) point of view, a restorative experience blocks the negative feelings and thoughts produced by a stressful situation, leaving space for positive moods. Finally, the temporal course of restoration according to both theories differs. Physiological and self-reported emotional improvements have been seen quite quickly (10 to 20 minutes; Ulrich et al., 1991) while cognitive performance effects seem to take longer to appear. For example, Hartig et al. (2003) found differences across participants being exposed to natural settings compared to those exposed to urban ones. The authors concluded that physiological differences between participants in both environments were no longer found after 40-50 minutes of exposure to a certain environment but affective and cognitive effects were reported. These authors found that physiological differences occurred after a short period of time but were not apparent later on.

1.2.1.2. Empirical evidence of restoration.

Over the past three decades, many studies have been supportive of both restoration theories (Staats, *in press*). Within general population (mainly adults and college students), there is a wide amount of studies showing the restorative effects of nature (e.g., Berto, 2005; Cimprich, 1993; Felsten, 2009; Hartig, Catalano & Ong, 2007; Hartig, et al., 2003; Hartig & Staats, 2006; Kaplan, 2001; Kaplan & Kaplan, 2011; Kuo, 2001; Staats, Kieviet & Hartig, 2003; Van den Berg et al., 2003). Only one of these studies is described in detail here as the focus of this dissertation is children. Hartig et al's (2003) work has been chosen because both restorative theories were taken into consideration in their experiment. Participants (n=112) were exposed to an environmental treatment condition (natural, urban) and a pre-treatment condition (task, no-task). Participants' systolic and diastolic blood pressure were monitored as well as emotions, overall happiness and performance on tasks that demand attention. Part of the participants had to carry out attention demanding tasks during one hour before the treatment (natural or urban) and some did not have to perform any task. Then, participants spent the first part of the treatment (ten minutes) sitting in a room with a tree view (nature treatment) or in a viewless room (urban treatment), followed by a fifty-minutes walk either in a natural or an urban environment. Emotions and attention were measured before, during and after the treatment. Systolic and diastolic blood pressure measures were taken every ten minutes and an additional measure was taken during the seated part of the treatment. Their results show that subjects who had a window view with trees

(whether they conducted the task or not) showed a more rapid decline in diastolic blood pressure than those who spent the seated part of the treatment in a room with no view. Also, the fifty-minutes walk in nature promoted a greater stress reduction (measured by blood pressure change) than walking in the urban environment. Attention capacities improved (the decrement was smaller) for participants who had the nature treatment. These results show that the physiological and the attentional restoration theories could complement each other, with different kind of outcomes appearing at different times through the restoration process. It is also important to point out that two forms of contact with nature were taken into consideration in this study. One of them was passive or indirect contact with nature through a window view and the other a direct contact with nature by moving through a natural environment. Nature views through a window can provide micro-restorative experiences that may restore attention capacity (Kaplan, 2001) or interrupt stress arousal. Walking in a natural environment, even for a short period of time, may also have positive effects on physiological and psychological health. These brief restorative experiences could have, over time, cumulative benefits (Van den Berg et al., 2007).

Empirical evidence of restoration in childhood.

ART has not been proposed to any specific age group, although most of the empirical studies have been carried out with adults and college students. In fact, the first empirical results about ART were based on a sample of teenagers who spent time in an outdoor challenge program (see Talbot & Kaplan, 1986). In

general, studies conducted with children are based on ART and focused on the outcomes that exposure to nature has on children's social behaviour and type of play (Taylor, Wiley, Kuo & Sullivan, 1998), self discipline (Taylor, Kuo & Sullivan, 2002), cognitive abilities (Wells, 2000) and capabilities to cope with stress (Wells & Evans, 2003), among others. The physiological outcomes of spending time in nature have also been assessed (e.g., Grahn et al., 1997) but to a lesser degree.

Children, like adults and teenagers, may suffer from attentional fatigue. As explained by Taylor et al. (1998), during the day children have to carry out different tasks such as school work or extra-school classes. These require directed attention and must be conducted in a context which includes distractions. Children's own thoughts can also be a source of distraction that might, in turn, affect their attention capacity. Moreover, Taylor et al. (1998) emphasize that children's attention capacity is not fully developed, which may make it more difficult for them to inhibit distractions than for adults. Therefore, it seems reasonable to think that children, as adults, can benefit from spending time in restorative environments.

a) Empirical evidence with children with normal attentional capabilities.

a.1) School environments.

Trancik and Evans (1995) were the first researchers mentioning that ART could be applied to children. The authors conducted a study in which they analyzed different aspects of the design of preschool centres. The researchers conclude that daycare centres should include spaces with natural areas or, in other words, spaces that support restoration. They argue that children, as well as adults, are susceptible to mental fatigue, especially when adapting to a new environment and, therefore, youngsters could benefit from being in contact with nature during the school time. According to Trancik and Evans (1995), restoration is considered as an important design criterion that affords the development of competency in preschool children. Although these authors did not assess the restorative effects of nature on children, their idea has been empirically proven by several following studies.

Lindhom (1995) found that school play yards with more vegetation promote children's creative play. She took ten different schools and divided them into good schools (five of them) and bad ones (five of them). The schools were classified this way according to interviews carried out with the teachers. They were asked questions about whether they considered the amount of outdoor activity sufficient, how many teaching parts took place outdoors and if they considered they had suitable areas for outdoor activities at their disposal. The

more activities were carried out in the playground and the more variety, the better the school was considered. The author found that the activities conducted in the good schools were different to the ones in the bad schools. In the good schools, children got involved in more activities and they were conducted in a greater variety of places than in the bad ones. According to Lindhom (1995), the variable that determined the amount of activities children got involved in and the variety of places where the activities were conducted was the presence of natural areas close to the playgrounds (e.g., woods) that would stimulate children's imagination. Students in the more natural playgrounds got involved in more creative activities which might, in turn, be due to the restorative effect that natural areas have on children's psychological well-being (Taylor et al., 1998).

Similarly, Grahn et al. (1997) found that children who attended classes in a centre surrounded by nature and in which contact with nature was encouraged had better attentional concentration capabilities compared to those in an urban centre.

More recently, Matsuoka (2010) related students' behaviours and academic performance to the amount of nature in the school. She evaluated the physical characteristics of 101 public high schools in Michigan. Participants' exposure to nature was registered in three ways: (1) views of nature from the school cafeteria and classrooms, (2) vegetation present in the campus: each campus was divided into three areas (athletic fields, parking lots and landscaped area) and the acreage of each one was calculated using GIS data. These areas

were divided by the number of students in each school. The campus vegetation in the landscaped area was also registered by the tree density, the shrubs per landscaped area and the lawn per landscaped area. Finally, (3) the students' potential access to vegetation was measured with building windows sizes and school policies (e.g., allowing students to eat lunch outdoors). At the same time, the participants' performance was registered (e.g., graduation rates or intentions to study a four-year degree) as well as their behaviour (e.g., students' social tension, bullying and criminal activity). The author controlled for school socio-economic status, ethnicity, number of students enrolled and building age. Using regression analyses, it was found that students' exposure to nature during the school day was positively related to their performance. Participants in more natural schools obtained higher grades, planned to study a four-year degree, obtained more merits awards and showed fewer criminal activities than those in less natural ones. The author points out that not all forms of vegetation were positively associated with school performance. Trees and shrubs were positively related with student's performance and behaviour but lawn areas were negatively associated. Tree density is negatively correlated to the lawn per landscaped area ($-0.22, p < .05$), as the more trees in the campus the less lawn area. However, the emphasis of Matsuoka (2010) is not on the correlation between both types of vegetation (as a negative relation between the presence of both types of vegetation was to be expected), but on the fact that trees and shrubs and, therefore, not lawns, are positively associated to students' performance. The possible explanation given by author is that within landscape

research, flat landscapes lacking trees and shrubs are often aesthetically less preferred as compared to other natural settings (Kaplan & Kaplan, 1989). On the other hand, views of less preferred landscapes are associated with less satisfaction (Kaplan, 2001) and less satisfaction has previously been linked to less school performance and productivity (e.g. Chow, 2007). Matsuoka (2010) claims that more research is needed in order to corroborate this hypothesis. Whether a similar relation between contact with nature during the school time and students' performance is found in primary schools still awaits future research.

a.2) Home environments.

One of the investigations that had more repercussion on children's restorative environments research is the one conducted by Wells (2000). She carried out a longitudinal study with 17 children from 7 to 12 years old from low-income families. Participants were included in a self-help housing program which consisted on relocating the families from poor housing to better housing. This design gave Wells (2000) the possibility of studying the characteristics of the houses, specifically the amount of nature present in each type of house before and after the families moved, and relate this to children's cognitive functioning. In order to measure the nearby nature in the residential area, the author developed a *Naturalness* scale of the residential environment. The instrument took into account the naturalness of the views from different parts of

the house (living room, kitchen, bedroom, etc.) as well as the material of the nearby outdoors. Children's cognitive functioning was registered using the Attention Deficit Disorder Evaluation Scale (ADDES; McCarney, 1995). The questions included in the scale were answered by the mothers of the participants. Families were visited in their first house and in the new one, with approximately one year between both measurements. Wells (2000) found that the new houses were significantly greener than the old ones. The researcher conducted a hierarchical regression analysis with children's cognitive functioning (post move) as the dependent variable. After controlling for children's pre move cognitive functioning score, it was found that change in naturalness (increase from pre move to post move) was a significant predictor of the post move attentional capacity. Participants who experienced the highest increase in naturalness were the ones who showed better attention capacities. The house quality did not predict post move attention performance. It has to be noticed that the amount of children included in the study is very low for the statistic analyses conducted. Therefore, future research should be carried out to check whether this effect is replicated with a bigger sample.

It is important to mention that Wells (2000) refers to natural elements and restorative characteristics as equal through the paper. Based on ART, it seems reasonable to link the presence of natural elements to a higher restorative potential of a certain environment. However, this was not assessed in Wells' (2000) paper. Also, as the author suggests, her *Naturalness* scale takes into

account the nature that can be seen from the house windows, but does not pay attention to actual contact with nature that children have.

In the discussion of Wells' (2000) research, the author suggests two aspects that are relevant for the present dissertation. First of all, the importance of studying school's playground characteristics, including the naturalness of the playground, and the effects that different characteristics might have on children's cognitive functioning. Schools are, after home, the places where children spend more time and their characteristics could influence children's physical and psychological development.

The second aspect that she points out is the possibility of nature being a moderator variable of the negative effects produced by the stressful events children are exposed to. A few years later, Wells and Evans (2003) evaluated this research idea. They carried out a study with 337 children from rural areas in the state of New York. Their aim was to check whether the presence of nature near the children's home would have an indirect, moderating effect on children's stress levels. The authors took into account the presence of nearby nature in the residential area using a scale similar to the one used by Wells (2000). In this case, they registered the naturalness of the views from the living room and kitchen, the number of plants in the living room and the material of the common areas of the neighborhood. Children's stress level was measured through their mothers' response to the Rutter Child Behaviour Questionnaire (Rutter, 1967) and through children's answers to the Global Self-Worth subscale of the Harter

Competency Scale (Harter, 1982). The stressful events scale of Lewis (Lewis, Siegel & Lewis, 1984) was also used to register the frequency of exposure to stressful events that children suffered. The results of their study show, first of all, that the nature of the residential area was a positive predictor of children's self-worth and a negative predictor of children's psychological distress. Also, stressful events were a negative predictor of self-worth and a positive predictor of children's psychological distress. Moreover, Wells and Evans (2003) found that the amount of nearby nature in the residential area buffered the psychological distress produced by the daily stressful events. The psychological negative effects produced by events such as moving to another house, being punished or listening to parents' arguments were different depending on the amount of nature present nearby the house. A stressful event had lower impact on those children who had more nearby nature in the residential area. The most vulnerable children, those who suffer stressful events more often, were the ones who obtained more benefits from having nearby nature in the home area. According to the author's results, nearby nature in the residential area acts as a protective factor for children's well-being.

Nearby nature in the residential area was also taken into consideration by Taylor et al. (1998). The researchers assessed the relation between vegetation in the residential area and two important variables for children's (262 participants) social and cognitive development: Children's play behaviour and access to adults. The area of research was one public housing development which was observed on four different occasions. On each occasion, the number of adults

and children in the area observed, the activities they were carrying out and their location within the space were registered. The vegetation of different courtyards was studied using aerial photographs, from very little or no vegetation to a relatively high level of vegetation (mainly tree cover) and the spaces were divided into two groups: high-vegetation settings and low-vegetation ones. The activities observed in the spaces were included in six categories, play being one of them. Access to adults, understood as children's interactions with adults during their time in the courtyards, was also registered and divided into four categories (e.g., no access to adults). Their results showed that more play occurred in high-vegetation settings than in low-vegetation ones, with almost a double number of children playing in the spaces with trees compared to the ones playing in the spaces without trees. Non-significant differences were found between treed scenarios and non-treed ones when non-play activities were taken into account. The authors also studied different types of play and it was found that the amount of trees in a space encourages creative play more than other types of play. Also, it was confirmed that children who played in greener places had more access to adults (i.e., more social interaction with adults) than those who played in places with less vegetation. Taylor et al. (1998) concluded that when designing children spaces, city planners should consider vegetation as a way of promoting children's healthy development.

The researchers do not explain their results in the frame of ART. However, as suggested by Bagot (2010), it can be deduced that spending time in natural places, which contain restorative characteristics, may restore children's

attention capacity which might, in turn, promote more creative forms of play. Play is taken as a type of children's behaviour and it has been proven that capacity of directed attention mediates the relation between the amount of residential nature and the reduction of adults' negative behaviours such as aggression (Kuo & Sullivan, 2001). Therefore, it could be that children's restored directed attention is promoting a type of children's positive behaviour (creative play). These results are similar to the ones obtained by Lindholm (1995) in which it was seen that children in the more natural play yards were involved in more creative types of play.

Another aspect studied about children's life-functioning related to contact with nature is self-discipline. Taylor et al. (2002) assessed urban children's self-discipline and whether it was influenced by the amount of natural elements present in the residential area, as it could be seen from the house windows. The researchers claim that self-discipline draws on directed attention capacity so that when children are suffering from attentional fatigue their self-discipline diminishes. Their idea is that children's natural views from home promote restoration from attentional fatigue which, in turn, leads to more self-discipline. Taylor et al. (2002) took into account three different forms of self-discipline: concentration, inhibiting initial impulses and delaying gratification. It is necessary to point out here that it could also be the other way around. It could be that the capacity of delaying gratification, inhibiting initial impulses and the ability to concentrate enhances children's directed attention. In fact, Taylor et al. (2002) define concentration as "overcoming the tendency for the mind to

wander, and sustaining attentional focus despite distractions, boredom, frustration, or fatigue” (p. 59). This definition is quite similar to the one given by Kaplan and Kaplan (1989) to the ability to direct attention, which also includes the second measure used to register self-discipline, the ability to inhibit impulses. Therefore, it appears that directed attention and self-discipline are two highly related concepts that, according to Taylor et al. (2002), have the same underlying mechanism.

The study included twelve apartment buildings with a different amount of vegetation and it was conducted only on the 2nd, 3rd, and 4th floor. 169 children between 7 and 12 years old participated in the study. Interviews were conducted with each of the child-parent pairs in their apartments. The nearby nature in the residential area was measured by asking the parents about how much of the view from their house was natural and how much was built, from 0 to 4. Their results show that, for girls, living in houses with natural views helps them to have higher self-discipline. This means that girls who had a greener view scored higher in concentration measures (Symbol Digit Modalities; Alphabet Backwards, Digit Span Backwards and the Necker Cube Pattern Control), inhibit initial impulse (Matching Familiar Figures Test, Stroop Color-Word Test and Category Matching) and delaying gratification (time waited to receive a larger bag of candy instead of not waiting or waiting a little bit and receiving a small one). However, boys did not seem to be affected by how natural the views were. The reason given by the authors to this gender difference is that what is really influencing girls’ self-discipline is direct contact with home

nearby nature and not the views from the house. It is known that boys play further from home than girls and, therefore, the amount of nature that boys have access to would not have been registered in the study. Girls would obtain benefits from the nearby home nature that can be seen through the windows but not boys. Gender differences of a similar kind were also found in a previous study by Taylor, Kuo and Sullivan (2001) with children with Attention Deficit Disorder (ADD) or Attention Deficit and Hyperactivity Disorder (ADHD).

b) Empirical evidence with children with depleted attention.

The studies reviewed in the previous section show that contact with nature is important for children's everyday life-functioning and they focus mainly on the depletion of directed attention and its recovery through contact with nature. Researchers have also evaluated the effect that contact with natural elements has on children whose attentional capacities are already depleted. These children suffer from attention deficit disorders, and have been professionally diagnosed with ADD or ADHD. The group of research formed by Taylor, Kuo and colleagues have carried out a series of studies showing the positive impact that contact with nature has for ADD/ADHD children's attention capabilities. Taylor et al. (2001) conducted a study with 96 children from 7 to 12 years old. The parents of these children were interviewed about the naturalness of their children's play settings, the naturalness of their residential setting and their children's attentional capacity. Aiming at helping parents to rate the

naturalness of the different settings, pairs of photos were presented to them. For example, in order to help them rate the level of nature in their child's play environment during the previous week, they were shown two pictures from places indoors (windowless rooms) and two pictures of places where there might be wild elements such as flowers, trees or animals. Parents were helped to rate the naturalness of the family residence by showing them pictures of houses' yards with different tree cover and pictures with different grass cover. They were also asked how severe their children's symptoms were when not on medication, from 1- very mild- to 5 – very severe. Their results showed that the greener the child's play environment during the previous week, the less severe his/her ADD/ADHD symptoms. Taylor et al. (2001) rejected other possible explanations, such as that it is the activities carried out outdoors and not the naturalness of the environment what influences children's attention capacity. Other possible explanations like the social context, the level of physical activity, children's preference for outdoor green activities or coincidence of the activities with medicated periods were also rejected.

However, the greenness of the children's residential settings was not related to the severity of their symptoms. The authors explain these findings by the possibility that children do not spend much time playing in their house surroundings or due to gender differences. Seventy five percent of the participants in the study were boys and when parents were interviewed, they pointed out that boys rarely played in their own yard. However, these possible explanations have not been tested yet.

Following, Kuo and Taylor (2004) conducted a study with 452 children diagnosed with ADHD. As in the previous research, parents were interviewed. The after effects of after-school and weekend activities on children's symptoms were evaluated. Parents rated common after-school and weekend activities proposed by the researchers. These included activities carried out in green outdoor settings (e.g., parks, farms or green backyards) to those conducted in built outdoor (e.g., parking lots, downtown areas or neighbourhood space) or indoor settings. For example, the activity *reading* was evaluated in different settings (indoors, green outdoor setting, built outdoor setting). Parents were asked to rate the after effects of the weekend activities on four ADHD symptoms: (1) difficulty in remaining focused on unappealing tasks, (2) difficulty in completing tasks, (3) difficulty in listening to and following directions, and (4) difficulty in resisting distractions. According to the authors, green outdoor activities reduced the ADHD symptoms more than activities conducted in other settings.

In a more recent study conducted by Taylor and Kuo (2011), the effects that routine exposure to green spaces (every day or nearly every day exposure) has on children and teenagers with ADD/ADHD was assessed. A total of 421 parents or legal guardians of children from 5 to 18 years old diagnosed with ADD/ADHD participated in an Internet based survey. Parents answered questions about participants' symptoms severity and children's everyday play settings during the last week. Parents were provided with 10 descriptions of places where youngsters usually play and six of them were also accompanied with

pictures to facilitate the task. Then, parents were asked if the place they have chosen is where their children usually play, and 89% of the parents answered yes. They also reported how severe their children's symptoms were when not medicated. Their results show that children and teenagers with attention deficits usually play outdoors and that playing in green settings, especially in open grass areas, was related to milder ADHD symptoms, as reported by the parents. Taylor and Kuo (2011) suggest "doses" of exposure to nature as a possible new treatment for managing attention deficits.

These three studies provide evidence of the fact that those children with attention deficits who usually play in more natural places show fewer symptoms than those who play in more urban settings. However, the results were based on parents' reports and not on objective measures. In order to obtain a deeper understanding of the mechanisms underneath these positive results, Taylor and Kuo (2009) conducted a study using controlled exposures to different settings and measured attention objectively. They took into consideration relatively isolated *doses* of nature, choosing settings that were not familiar to the children. The participants were seventeen children, fifteen boys and two girls, from 7 to 12 years old who had been professionally diagnosed with ADHD. Three settings were chosen for their experiment: an urban park, a downtown area and a residential area. Each participant was exposed to each of the settings in three different sessions. The order of exposure was counterbalanced, with children randomly assigned to being exposed to the settings in one out of the three different possible orders. Before going on their walks, children completed a

series of puzzles aimed at creating attention fatigue. After that, each child and a guide walked together through the setting at hand during 20 minutes. After the walk, children completed tests of concentration and impulse control. Participants also had to report about their walk experience, indicating whether they found each walk fun, relaxing, interesting, scary, boring, weird, and/or uncomfortable. Children concentrated significantly better after walking in a park than after walking downtown or in a residential area. Also, participants indicated that the walk in the park was a more positive experience than walking in any of the other two settings. No significant differences were found between the downtown area and the residential area. Similar to Taylor and Kuo (2011), the authors conclude that *doses* of nature could be an accessible and cheap potential treatment for ADHD. Taylor and Kuo (2009) claim that inclusion of nature in settings where children spend time, such as schools, should be encouraged. This could improve children's school performance by enhancing their attention. The researchers affirm that not only children with attention deficits could benefit from contact with nature during the school day but also those with normal attention performance. In fact, as already mentioned, high school students who have more access to nature during the school day obtain higher grades and more merits awards than those with less access to nature (Makusota, 2010).

From the literature review, it seems that being in contact with nearby nature in the neighbourhood (e.g., Wells, 2000), the park (e.g., Taylor & Kuo, 2009) or the school (e.g., Lindholm, 1995) has important psychological (e.g., better concentration capabilities), social (e.g., more interaction with adults) and

affective benefits (e.g., expression of more positive feelings) for children with normal attention capabilities as well as for children with attention deficit disorder. In most of these studies, the conclusion is that nature and restorative qualities should be considered when designing places that will be used by children. However, it has not been until recently when an instrument to measure restorative characteristics that can be used with children has been designed.

1.2.1.3. Instruments to measure perceived restorativeness.

Research on restorative experiences has focused on different outcomes of the restorative process, which can be divided into actual or potential restoration. Actual restoration refers to restoration that has actually occurred. Hartig (2011, p. 56) states that it “captures changes in resources as they are underway or just after a period spent in a given environment”. For example, Johanson et al. (2011) evaluated the moderation of affective and cognitive effects of a walk in the park and in an urban street. The authors measured affective states, for instance, revitalization, tranquility, anxiety or anger, as well as participants’ attention performance as a way of measuring actual restoration. As explained by Hartig (2011), these types of measurements are costly to obtain and require large samples.

A widely used measure of restorative outcomes, with the advantage of being less costly, is perceived restorativeness. According to Hartig (2011, p. 59), “it is seen as tapping qualities of experience in environments that have actually

supported restoration to some degree or that could be expected to support restoration in some future occasion.” With this approach, people are asked to rate a certain environment according to its restorative qualities. Hartig (2011) claims that people’s responses will be built on their previous experience in environments that promote restoration and, therefore, are retrospective and prospective. In fact, ART proposes that people’s reports of perceived restorativeness predict the actual restoration that will occur in a certain environment after time spent in it. Within the restorative research, perceived restorativeness has been heavily studied because, among other reasons, it permits the evaluation of different settings from the users’ point of view and adapt or design the environments so that they have a higher restorative potential.

Instruments to measure perceived restorativeness with general samples.

Different instruments have been designed to measure how adults perceive the restorativeness offered by different environments. The most popular ones are the Perceived Restorativeness Scale (PRS; Hartig, Korperla, Evans, & Gärling, 1997) and the Restorative Components Scale (RCS; Laumann, Gärling & Stormark, 2001). These scales, specially the PRS, have been used broadly in different countries, such as Italy (Berto, 2005), Spain (Hernández, & Hidalgo, 2005), Taiwan (Chang, Hammitt, Chen, Machnik, & Su, 2008), Sweden (Tenngart & Hagerhall, 2004) or the Netherlands (Kieviet-Stijnen, 2000). They have also been the basis for designing other instruments to measure

restorativeness, such as the Perceived Restorative Components Questionnaire (PRCQ; Pals, Steg, Siero & Van der Zee; 2009) designed to assess the perceived restorativeness of zoos. Bagot (2004) has used the PRS and the RCS to develop the Perceived Restorativeness Components Scale for Children (PRCS-C).

Hartig et al. (1997) conducted four different studies to design and validate the PRS, which is meant to measure the theoretical components of restorative environments according to ART. The authors evaluated natural as well as built environments using videos, on site evaluations and photographic slide simulations with participants from America, Sweden and Finland. Their results show that the PRS is a 16-item instrument and suggest combining being away, fascination and compatibility in one subscale, called General Restorativeness and having another subscale called Coherence. Similarly, Laumann et al. (2001) carried out two studies aimed at developing a measure of the four restorative components described by Kaplan and Kaplan (1989). In the first one, participants imagined themselves either in a city area or in a mountain area and in the second one they watched videos of natural or built environments. After imagining themselves in the areas proposed by the researchers or after watching the videos, participants filled in the questionnaires aimed at developing the scale (the RCS). In both studies, Laumann et al. (2001) made sure that participants were mentally fatigued before watching the videos or before imagining themselves in the settings proposed, by collecting the data from individuals who had attended a lecture. Their results show a scale formed by 22

items that can be divided into 5 subscales, with the *being away* factor splitting into two factors: being away physical and being away psychological.

Instruments to measure children's perceived restorativeness.

Children's perceived restorativeness has just started to be studied with only one available published measure. Previously in this section it was pointed out that natural environments are restorative for children. The restorative qualities of the environments included in the studies were inferred by the fact that they were natural settings and ART supports the idea that natural settings are more restorative than built ones. However, a measure of the restorative qualities of children's environments would be useful to assess how children perceive the possibilities of restoration in the environments they use.

Bagot (2004) has designed a scale aimed at measuring the restorative components of children's environments through children's perspective. This is, to the best of our knowledge, the first and only scale that has been adapted to its use with children and it is focused on ART. Bagot (2004) acknowledged the absence of a perceived restorative measure that children could complete and designed the Perceived Restorativeness Components Scale for Children (PRCS-C) based on adults' scales (PRS and RCS). Her goal was to develop a tool that could measure ART's components and differentiate between environments that theoretically are different in terms of restorativeness. 230 children, aged 8 to 11, participated in her first study. The settings chosen to be evaluated were the

school playground and the school library, as compared to the children's classrooms. The items used in the scale were items from the PRS and RCS, but adapted to children. The instrument included more specific phrasing than the adults' scales in order to make the items clearer to children and to make sure that participants were responding to the environment they were being asked about. Each child had to complete the scale for both environments (playground and library) with a 10 minutes break between the two questionnaires.

Conducting a factor analysis (principal axis factoring with oblimin rotation), the author concluded that the PRCS-C is formed by 15 items and 5 factors: (1) fascination, (2) being away-physical, (3) being away-psychological, (4) compatibility and (5) extent. Moreover, the author also suggests using a total restorativeness score, by adding the scores of each of the factors. The reliability of the total score, as measured by Cronbrach alpha was adequate (.78 for the playground and .81 for the library). Pearson correlations between factors were significant, except the one between fascination and being away-physical in the schoolyard. The strongest correlation was between fascination and compatibility in the library (.48, $p < .01$) and the weakest the one between compatibility and being away-physical in the library (.16, $p < .05$).

In order to validate the scale, Bagot (2004) checked whether it was able to distinguish the perceived restorativeness of two environments with theoretically different restorative potential: the playground, expecting restorativeness to be higher in this environment, and the school library. In

general, the playground obtained higher scores than the library, excluding fascination. The author explains these results suggesting that the school library, with modern amenities such as the Internet or computers, might be more interesting for children than their playground.

It is known that restorative experiences vary across people and time (Kaplan, 2001). The influence of age on adults' perceived restorativeness has not been checked yet. Bagot (2004) assessed the possible influence of age on children's perceived restorativeness. She divided the participants into two groups: younger children (8 and 9 years old) and older ones (10 and 11 years old). No differences were found according to children's age. Bagot (2004) suggests further examination of this issue as she expects that children in different developmental stages will perceive the same environment differently. Gender differences have not been shown in the study of restorative environments on adults' samples. Nevertheless, as expected by Bagot (2004), gender differences were found among children, with boys scoring higher on playground being away-psychological and on library being away- physical. When the total perceived restorativeness was taken into account, boys perceived their playground as significantly more restorative than girls.

The PRCS-C is a step forward in considering children when studying perceived restoration and opening a wide branch of research opportunities such as studying the relation of perceived restorativeness with other variables like aesthetic preference or environmental attitudes and behaviours. However, there

are some limitations that leave space for future improvement. First of all, internal reliability of two of the factors was low (.55 for being away-psychological and .52 for extent). Future development of the scale might improve these two factors.

Secondly, Bagot (2004) explains that, theoretically, the playground should be perceived as more restorative than the library because of the potential presence of nature in it. However, naturalness has not been measured. The author did not register the amount of nature present in the play yard and, even though the results are consistent with her hypothesis, a comparison of children's places with nature and without or with less nature still remains unstudied. Bagot's (2004) hypothesis is usually correct, with a play yard containing more nature than a library, but there are many school's play yards that are just a square of cement and there are libraries in which natural elements, such as plants or flowers, are included.

Bagot, Kuo and Allen (2007) conducted another study with 595 children (aged 8-11 years) in order to improve the extent factor of the PRCS-C and to carry out a factor analysis with a larger sample. They assessed the perceived restorativeness of children's playground and they did not check differences according to different types of environments or to sociodemographic characteristics (age or gender). After conducting an exploratory factor analysis (principal axis factoring with oblimin rotation) and studying the item content and reliability of each factor, one fascination and one compatibility item were

excluded from the instrument and an additional extent item was included. This modified scale was called the PRCS-C II, it is formed by 15 items and the same 5 factors of their previous study, replicating the ones found for adults (Laumann et al., 2001).

Overall, it appears that the PRCS-C II is a valid, reliable tool that could be used to take children into account when designing places that will be used by them and that opens new possibilities to conduct studies with children in the restorative environments research.

From this literature review it can be concluded that both theory and evidence support that contact with nature brings positive benefits to children's health and that the restorative theories can also be applied to children. From now on, the bibliographical review moves to a different effect that contact with nature has on people: it seems to enhance people's environmental attitudes and behaviours.

1.3. Contact with nature during childhood and environmental attitudes and behaviours

For many years, people's environmental attitudes and behaviours have been thought to be mainly influenced by environmental knowledge (Hungerford & Volk, 1990). Therefore, Environmental Education (EE) programs have focused on increasing adults and children's environmental knowledge hoping that this would lead to pro-environmental actions (Rickinson, 2001). Although it has been proven that knowledge does, in fact, influence young people's pro-environmental behaviour (Cheng & Monroe, 2012; Duerden & Witt, 2010), empirical evidence shows that the variables that motivate ecological actions are complex and knowledge is just a part of the equation. One of the factors that seems to be influencing people's environmental behaviour is frequency of contact with nature during childhood (Bixler et al., 2002; Chawla, 1999; Chawla & Cushing, 2007; Cheng & Monroe, 2012; Hinds & Sparks, 2009; James, Bixler & Vadala, 2010; Thompson, Aspinall & Montarzino, 2008; Wells & Lekies, 2006). There is a lack of empirical evidence about whether, how and what types of experiences in nature affect children's environmental attitudes and behaviours (Cheng & Monroe, 2012; Ernst & Theimer, 2011; Larson et al., 2011). This section of the dissertation describes an area of research that, compared to the restorative studies, is in its infancy. In a moment in which children's contact with nature is diminishing (Clements, 2004) and empirical evidence is showing the positive effect of contact with nature for children's health (see, for example,

Taylor & Kuo, 2011), the idea of the positive impact that contact with nature might have on children's and adults' environmental attitudes and behaviours has just started to be explored.

There are two theoretical perspectives that are useful for addressing issues regarding the influence of contact with nature on young people's environmental attitudes and behaviours. The first one is Kellert's (2002) theoretical model that looks at the developmental impact that direct, indirect and vicarious nature experiences have on children's and teenagers' development. The second one is the theoretical and empirical work of Fazio, Zanna and Millar (Fazio & Zanna, 1978; Millar & Millar, 1996) in relation to attitude development according to the type of experience –direct or indirect- with a certain object.

Kellert's (2002) model assesses the developmental impact of direct, indirect and vicarious experiences in nature on three modes of children's learning: cognitive (i.e., intellectual), affective (i.e., emotional) and evaluative (i.e., moral). Direct experiences with nature involve physical contact with natural settings and nonhuman species. The author describes this contact as the one that occurs spontaneously in a forest, creek, neighborhood park, backyard, etc. According to Kellert (2002), direct experience with nature is the one that takes place in a setting that is largely free from human intervention. He affirms that when a child experiences nature directly, he/she spontaneously plays in nature. These experiences are unplanned, in contrast to the second type of

experience, indirect experience, which is more formally organized. Indirect experience is the one that takes place in direct contact with nature but in a much more controlled environment, such as a zoo, an aquarium, a science museum and also with domesticated animals like cats and dogs. Finally, vicarious or symbolic experiences of nature are those that occur when there is not physical contact with the natural environment, for example by watching a documentary about nature or by reading about it. As Kellert (2002) points out, this type of contact can show real images of nature but nature can also be shown in a metaphorical or symbolized way. The author concludes that direct experiences in nature during childhood play “a significant, vital, and perhaps irreplaceable role in affective, cognitive, and evaluative development” (p. 144). Kellert (2002) argues that direct contact with nature improves children’s cognitive development (e.g., knowledge formation and comprehension), affective development (development of children’s feelings and emotions, and their evaluative development (e.g., naturalistic values). He emphasizes that these effects on children’s development are greater when the type of contact with nature is direct. Although Kellert’s (2002) framework has not been directly tested, he refers to the empirical evidence about the restorative effects of nature during childhood as a support of the author’s framework. Also, Kellert (2002) includes in his explanation about the effect of direct contact with nature on children’s affective development the impact that childhood experiences in nature seem to have in the affect that these children show towards nature when they become adults (see, for example, Chawla, 1999). Finally, the author mentions nine basic values that children

develop toward nature and that are enhanced when in direct contact with it. For example, aesthetic, moralistic or utilitarian (see Kellert, 2002, p. 130). Kellert (2002) indicates that “more study, of course, is needed before this conclusion (*referring to the vital role of direct experiences with nature*) can be confidently accepted” (p. 133). Nevertheless, it appears that different types of experiences in nature influence people in diverse ways. For instance, Kahn, Friedman, Gill, Hagman, Severson, Freier et al. (2008) assessed the influence of three types of nature views (from a window, from a plasma screen or no view) on the stress level of people working in an office. The researchers concluded that those participants who had the views of nature from the window experienced a greater reduction of their stress level than those who viewed nature from the plasma screen and the windowless group.

Regarding the influence that direct versus indirect experiences with nature have on environmental attitudes and behaviour development, some insights can be found in the research of Millar and Millar (1996). According to these authors, attitudes formed through direct experience with the attitude object are more affectively charged and those formed by indirect experiences are more cognitively based. The results of three consecutive studies show that, in fact, direct experiences lead to affectively based attitudes and to fewer cognitive responses. They also found that different kinds of behaviours were predicted by different kinds of attitudes. Intrinsically motivated behaviours, those which imply an intrinsic enjoyment of the activity, are better predicted by affective based attitudes, formed by direct experiences. Extrinsically motivated

behaviours are better predicted by cognitive based attitudes. Millar and Millar (1996) conclude that “attitudes formed through direct experience with attitude objects predict behaviour better than attitudes formed through indirect experience with attitude objects” (p. 561).

Several environmental psychologists and environmental educators have used Millar & Millar’s (1996) insights to explain why frequent direct contact with nature might positively impact people’s affective connection with the natural world (Duerden & Witt, 2010; Hinds & Sparks, 2008; Müller et al., 2009). For example, Hinds and Sparks (2008) carried out a study with 199 college students in the UK. Among their objectives, the authors aimed at assessing the influence of participants’ affective connection to nature in their intentions to engage with the natural environment in the future. Following Millar and Millar (1996), Hinds and Sparks (2008) found that those students who had had more frequent contact with nature during childhood showed a higher affective connection to it and stronger intentions to engage with the natural world in the future. Similarly, Duerden and Witt (2010) examined the difference of two types of experiences with nature on attitude formation toward the environment. They chose an EE program which included two phases. The first part was a preparatory one, carried out indoors (vicarious experience). The second one was conducted in an over-sleep camp (direct experience). Although the authors expected participants to show higher environmental affective attitudes after the direct experience compared to the vicarious one, the gains in environmental attitudes in both experiences were similar. Their explanation for

these findings is that the program is scheduled in a way in which participants' environmental knowledge grows in the preparatory part of the program but will not be activated or used until the field trip. Therefore, participants' knowledge, and not only attitudes, improved during the direct experience of the program. These direct experiences provide the opportunity of applying the already acquired knowledge. A comparison between two different programs, one including direct experiences in nature and the other one including indirect experiences could be more useful in order to clarify the possible different influence that various types of contact with nature have on attitude development.

The two frameworks described provide an approach to understanding the possible impact of different kinds of experiences of nature on children's environmental attitude development. However, the limited results available suggest that more research is needed in order to obtain a deeper understanding of how experiences of nature influence children's environmental attitudes and behaviours.

1.3.1. Adults and children's memories in nature and environmental attitudes and behaviours.

In an attempt to understand why people behave in an environmentally friendly way, several studies have been conducted in which people who have devoted their lives to taking care of the environment are asked about their reasons to have begun doing so. The area of study referred to as Significant Life

Experience (SLE) focuses on significant experiences that adults and youth report, in a retrospective way, and that they recall as important in their lives. Within the Environmental Education (EE) research, attention has been paid to the significant life experiences that have made an impact on people's decisions to get actively involved in the protection of the environment. Based on the SLE framework, Chawla (1999) interviewed 56 environmentalists from Kentucky and Norway about their reasons to commit to environmental protection. The two reasons more frequently mentioned were positive experiences of natural areas during childhood and the influence of role models, especially family members, but also peers and teachers. Formal education, being a member of an environmental organization such as Scouts and religious beliefs were also mentioned as influencing factors. In a series of studies carried out by Palmer and colleagues, the researchers identified the SLE and the formative influences that had an impact on environmental educators all over the world (Palmer, 1993; Palmer & Suggate, 1996; Palmer, Suggate, Bajd & Tsaliki, 1998; Palmer, Suggate, Robottom & Hart, 1999). Participants were asked what they thought to be their most SLE to develop a sense of commitment with environmental protection. The most frequently mentioned reason was childhood experiences of nature and the outdoors. The profession that the participants currently have, tertiary education and close family members, friends and teachers were also mentioned, among others. These authors highlight the importance of providing young people with opportunities for positive experiences of nature in order to enhance their environmental attitude and behaviours.

Other studies have shown the same pattern for the general public. Wells and Lekies (2006) interviewed 2.004 adults about their current environmental behaviours and attitudes as well as about their experiences in nature and in environmental education programs before the age of 11. Using structural equation modelling, the researchers concluded that participating in *wild nature* activities like walking, playing in nature, camping or hiking and in *domesticated nature* activities, like picking flowers, planting trees or taking care of indoor or outdoor plants as a child predicts adults' environmental attitudes and behaviours. The effect of participating in EE programs was non-significant. Adults' environmental attitudes partially mediated the relation between childhood experiences in nature and adults' pro-environmental behaviour, such as recycling, "green" voting, and participating in programs like Earth Day.

Similarly, Ewert et al. (2005) examined which early-life (from childhood to 18 years old) outdoor recreation activities best explained adults' environmental attitudes. The researchers took into account three categories of outdoor recreation activities: (1) appreciative activities, such as bird-watching or enjoying the scenery. These kinds of activities have little impact on the environment. (2) Mechanized activities, which imply the use of mechanical devices in nature, like all-terrain vehicles and (3) consumptive recreational activities, when something is taken from the environment (e.g., fishing or hunting). Apart from these, they also registered early-life participation in formal education, use of media (books or TV), negative experiences in nature like watching an outdoor area being developed and participating in organizations that

took trips into the outdoors. Using a modified version of the New Ecological Paradigm Scale (NEP; Dunlap, van Liere, Mertig, & Jones; 2000), Ewert et al. (2005) registered the ecocentric and anthropocentric beliefs of 576 university students. After carrying out a hierarchical regression analyses, the researchers found that early-life appreciative experiences were a significant predictor of ecocentrism while consumptive experiences were positively related to anthropocentrism. These two variables explained 14% of the ecocentrism/anthropocentrism variance. In addition, media and negative experiences related to nature explained an additional 5.6% of the variance. Although Ewert et al. (2005) did not examine the process by which early-life outdoor experiences lead to adults' ecological beliefs, they suggest three possible explanations. The first one implies that childhood outdoor experiences contribute to the formation of values. In their own words, "the values that a child forms through experiences such as direct play in the natural environment may serve to precondition him or her to developing a proenvironment, or ecocentric set of beliefs and attitudes about the environment later in life" (p. 234). The second explanation suggested is the social influence that peers and families have on children's environmental attitudes. Parents may have an impact on children's attitudes toward nature by discussing environmental topics with them, or by bringing them to nature. Finally, place attachment is seen as a possible explanation. It could be that spending time in nature as a child generates a feeling of attachment to the natural environment which may, in turn, result in more ecocentric attitudes.

It is worth noticing that, as in Wells and Lekies' (2006) study, participation in EE programs did not predict ecological beliefs. However, the type of EE intervention in which the participants of these studies were involved is not specified. Wells and Lekies (2006) claim that their findings should not be interpreted as if EE had no effect, but rather as problem of not using the adequate instruments or due to adults not recalling EE programs accurately.

In the UK, Thompson et al. (2008) showed that the *childhood factor*, or “the frequency of people’s visits to woodlands or green open spaces in childhood” (p. 137) predicts adults patterns of visits to these places. The researchers carried out a study in Scotland and England using a focus group method followed by the development of a questionnaire. Their results show that those adults who more frequently visited natural areas as children are more likely to visit them as adults. They are also more likely to relate natural areas to energetic feelings and felt more comfortable visiting natural settings alone than those whose frequency of visiting natural places was lower. Thompson et al. (2008) conclude that childhood experiences in nature seem to have a significant impact at a psychological level that last into adulthood.

Regarding children, Cheng and Monroe (2012) conducted a study with 9 to 10 years old children. The authors studied possible factors explaining children’s interest in participating in nature-based activities and their interest in participating in environmentally friendly practices. Children’s previous experiences in nature were among the factors that Cheng and Monroe (2012)

took into consideration. Their results show, with two different path analyses, that children's past experiences in nature predict their current interest in participating in nature based activities, as well as their interest in participating in environmentally friendly practices.

Taken as a whole, these studies show consistency in the variables that seem to have a positive impact on the development of environmental attitudes, mainly previous direct contact with nature and influence of parents and peers. Childhood participation in EE programs appears to have little effect on adults' environmental attitudes and behaviours. However, EE activities have been proven to influence people's current environmental attitudes, knowledge and behaviours (e.g., Duerden & Witt, 2010). Therefore, it could be that people simply do not recall the influence of EE programs (Wells & Lekies, 2006). In fact, the studies described rely on participants' retrospective self-reports, which may compromise their internal validity. For instance, the time spent in nature as a child could have been overestimated as a romantic distortion (Fischerlehner, 1993 cited by Kals et al., 1999). It could also be that adults who perceive themselves as more pro-environmental might overestimate time spent in nature during childhood or that those who are less pro-environmental underestimate it. There has been some debate about the validity and reliability of retrospective studies (see, for example, Chawla, 2001). Another possibility is the diversity of EE programs. The researchers do not specify the type of EE program they are referring to when they ask the participants, so the concept could have been understood differently from different participants. They could think about EE

programs in the school, or outdoors, long or short or even a visit to a sciences museum. It could also be that when participants are asked about frequency of experiences in nature, they include outdoor EE activities in this category, so the possible effect of EE programs as a different effect from being in nature *per se* is not being recalled.

To the best of our knowledge, there are no longitudinal studies assessing whether childhood experiences in nature influence children's environmental attitudes when they become adults. Nevertheless, there are studies conducted directly with children that support the underlying premise that children are sensitive to nature experiences and that these experiences tend to increase their environmental attitudes.

1.3.2. Children's current experiences in nature and environmental attitudes and behaviours.

The empirical evidence available points to contact with nearby nature and outdoor EE programs as factors influencing youngsters' environmental attitudes and behaviour.

Regarding nearby nature, Sivek (2002) carried out a study in which he registered the reasons why high school students from Wisconsin decided to commit to environmental protection. The study had two phases. The first one

consisted of a qualitative part in which he interviewed the participants. With the information obtained in this phase, he collected data from another sample of students with a pencil-and-pen survey. Most of the participants claimed that their main reason for their environmental commitment was to have access to nearby nature in the residential and school areas. Role models, such as teachers and relatives were also mentioned.

In the already mentioned study of Cheng and Monroe (2012), children's perceived nearby nature in the residential area was found to be a predictor of children's affective attitudes towards the natural environment which, in turn, predicted their interest in participating in nature-based activities and in environmentally friendly practices. This study is the first one in which the positive influence of children's home nearby nature on their environmental attitudes and behaviours has been proven.

Most of the studies about children's experiences of nature have been carried out within the research area of EE. The majority of them have focused on evaluating the outcomes that an EE program (school-based or out-of-school programs) has on the participants. There is empirical evidence showing that EE programs promote changes on children's worldviews (Evans et al., 2007; Manoli et al., 2007), environmental attitudes (Ernst & Theimer, 2011) and environmental knowledge (Stern, Powell & Ardoin, 2008).

Regarding children's ecological worldviews, Evans et al. (2007) adapted the New Ecological Paradigm (NEP) scale for the use with children. The researchers developed three games aimed at measuring four dimensions of the NEP scale: anthropocentrism, limits to growth, the balance of nature, and concern about environmental catastrophe. The NEP scale measures the "primitive beliefs" of a person about the people-environment relationship. It has been widely used with adults and it has recently begun to be used with children. Evans et al. (2007) measured children's ecological beliefs before and after attending an outdoor nature day camp that lasted 5 days. Their results show that children's ecological beliefs were significantly higher after attending the EE program. Similarly, Manoli et al. (2007) adapted the NEP scale to be used with children, in this case in a questionnaire format, and also registered the influence of an outdoors, sleepover EE program on children's ecological worldviews. Children's ecological beliefs were significantly higher after attending the EE program.

The studies just described have taken into account EE programs that took place outdoors. However, there has been some debate about whether the context of the EE program (normally outdoors vs. indoors) has a different impact on the outcomes achieved. For instance, Kals and Ittner (2003) assessed the possible differences on the outcomes of an indoors vs. outdoors environmental program focused on bats, compared with a control group without any intervention. The results show that participants in both interventions (indoors and outdoors) scored

higher on environmental identity after the program, as compared to the control group, with no differences in the outcomes according to the context.

In the meta-analysis carried out by Zelezny (1999), participating in a classroom EE intervention was found to be more effective encouraging pro-environmental behaviours than participating in programs conducted in out-of-the-school-settings. However, the variety of out-of-the-school-settings was wide (workshops, nature camps and field trips) as well as the participants' age range (children, teenagers and adults), indicating that these results need to be considered with caution. With this in mind, among the studies conducted in out-of-the-school-settings, the one that took place in a nature camp with children had the greatest effect on behaviour. Dettmann-Easler and Pease (1999) compared EE programs carried out in different settings (in class vs. sleepover EE programs) but focused on the same topic (wildlife) and found that sleep over programs were more effective in fostering positive attitudes toward wildlife than in-class EE programs.

As mentioned before, Duerden and Witt (2010) evaluated the effect of an intervention that included two phases. The first one involved indoors preparatory activities and the second outdoor activities in a sleepover camp that lasted between 7 and 14 days. 108 students (mean age = 14.5) participated in the EE program and the outcomes were compared with 49 students who did not receive any EE intervention (mean age = 13.6). The preparatory program included between 9 and 12 sessions aimed at increasing the participants' knowledge about

the settings where the sleepover part was going to be held. During the outdoors phase, students participated in cultural, scientific and service activities. After the sleepover phase, participants had to design and implement a service project focused either on their own community or on the community they visited during the field trip. Participants self-reported environmental knowledge, attitude, and behaviour were registered before the program started (using retrospective pre-tests), immediately after the preparatory phase (indoors), after the field trip and between three and seven months (depending on the group of participants) after the field trip, as a follow up. Duerden and Witt (2010) also measured students' perceived behavioural control and social norm. Their results show that participants in the program scored higher on environmental knowledge, attitudes and behaviours than the control groups, although the impact was greater on environmental knowledge. The authors expected the direct experience part of the program, offered in the sleepover phase, to influence participants' environmental attitudes more than environmental knowledge. In order to check this hypothesis, Duerden and Witt (2010) calculated Cohen's D effect sizes for environmental attitudes and environmental knowledge during each phase of the program. They found that participants' environmental knowledge gains were greater than the ones on environmental attitudes in both parts of the program, although the greatest difference in terms of growth was experienced during the preparatory part. The researchers argue that these findings are due to the way the program is scheduled. They suggest that knowledge is acquired on the first phase of the program but it cannot be applied until the second one. Because of this,

knowledge, and not only attitudes, increased in the oversleep phase. Finally, the authors conducted hierarchical regression analyses for each phase of the program, with environmental behaviour as the dependent variable. It was found that during the preparatory part of the program, environmental attitudes were a stronger predictor of environmental behaviour than environmental knowledge. Environmental attitudes were a significant predictor of environmental behaviour ($\beta = .32, p = .01$) whereas environmental knowledge was not. Both predictors had the same strength when predicting environmental behaviour during the field part of the program, both of them being significant and with similar β 's ($\beta = .25^{**}, p = .01$ for environmental attitudes and $\beta = .34^{**}, p = .01$ for environmental knowledge).

According to Duerden and Witt (2010), these findings show that the relation between experiences of nature, environmental attitudes, knowledge and behaviour is complex. The authors call for research that brings insights about the outcomes of different types of nature experiences in order to better understand attitudes development and to more accurately design EE programs.

Duration of the EE programs has also been studied. As stated by Stern et al. (2008), researchers assume that “increased duration produces more positive outcomes for students, but little empirical evidence exists regarding the influence of EE program duration” (p. 32). For instance, Bogner (1998) found that a 5-day outdoor program had a positive effect on children’s ecological behaviour while a 1-day program had no effect. Similarly, Stern et al. (2008)

found differences on the effect of a 3-day sleepover EE program compared to a 5-day one. The longest program had a higher impact on children's stewardship, interest in discovery, and awareness of environmental issues. They also registered the influence of the program three months after participating in it and found that, for those who attended the 5-day program, the awareness scores were higher after three months than for those attending the 3-day program.

The inconclusive results about the outcomes that different types of experiences in nature have on people as well as the importance of the program duration and context strengths the need for further research about this issue.

1.3.3. Contact with nature, environmental attitudes and behaviour, how are they related?

The studies reviewed suggest that frequent contact with nature, especially during childhood, is an important factor eliciting positive children's and adults' environmental attitudes and behaviours. However, little is known about the process. A few researchers have tried to explain the process through which various experiences of nature promote environmentally friendly behaviours. The main idea shared by the researchers is that positive and gratifying experiences in nature might be a motivational source to protect the environment (Chawla & Cushing, 2007; Cheng & Monroe, 2012; Hartig et al., 2001; Hinds & Sparks, 2008; Kaiser et al., 2012; Müller et al., 2009; Teisl & O'Brien, 2003). One strategy used by environmental educators and psychologists to promote

ecological behaviours has been to put emphasis on the negative effects that human actions have on nature. For example, negative feelings, such as indignation about insufficient nature protection –a responsibility related emotion- motivates people to protect the environment (Kals et al., 1999). Similarly, Kaiser (2006) included guilt feelings, for example “my conscience would bother me if I did not buy organically grown products” in the model of Theory of Planned Behaviour (Ajzen, 1991) and found that they predicted ecological behavioural intentions. Although negative feelings appear to enhance ecological behaviours, this approach can also provoke the opposite reaction, with individuals feeling that nothing can be done to protect the environment and/or thinking that the message is too alarmist (Gardner & Stern, 1996). This is especially true with children because, according to Sobel (1996), their sense of time, place and self are still forming. Abstract environmental problems such as rainforest depletion or climate change can be overwhelming for youngsters, creating fear and a sense that nothing that they do is going to help the environment.

On the other hand, pro-environmental actions are not only seen as a way of avoiding the destruction or pollution of the environment, but also as a way of maintaining the environment as the person knows it, due to positive personal experiences that one might have in certain types of environments. Kaiser et al. (2012) have made a distinction between an altruistic, unselfish motivation to protect nature, such as moral obligations, and a self-interest one. The latter is related to people’s gratifying experiences in nature as a motivational source for

its protection. The authors suggest that contact with natural elements offer benefits to people and, because of this, people may want to protect nature as a way of protecting the environment that offers them benefits (e.g., spiritual, restorative). For example, Teisl and O'Brien (2003) showed that participating in outdoor recreation activities such as hiking or camping, which are believed to be positive experiences in nature, encourages people to take care of the environment. Restorative experiences in nature and an affective connection to the natural environment have been pointed out as results of gratifying experiences in nature that might, in turn, lead to ecological behavior.

1.3.3.1. Restorative experiences and environmental attitudes and behaviour.

Hartig and colleagues have conducted two studies in which restorative experiences in nature are taken as gratifying experiences that motivate people to behave in an environmentally friendly way (Hartig et al., 2001; Hartig et al., 2007). Restorative experiences in nature, as described in the previous section, promote individuals' recovery from stress and from attentional fatigue, as well as positive moods (Ulrich et al., 1991; Johanson et al., 2011) and people's wellbeing (Kaplan & Kaplan, 2011). It is known that natural environments tend to be more restorative than built environments (e.g., Hartig et al., 1997). According to Hartig and colleagues, restorative experiences in natural places or in settings that contain natural elements might be a positive motivational source

to protect these kinds of places, because they are useful and gratifying for their users. Individuals who have greater need for psychological restoration show higher preference for walking in natural areas versus walking in an urban centre (Hartig & Staats, 2006; Staats & Hartig, 2004; Staats, Kieviet & Hartig, 2003). Polluting or destroying natural environments eliminates opportunities for restoration which might motivate people to protect the environment in order not to lose these kinds of experiences. In other words, the use of nature for psychological restoration is seen as a personal motivation to protect the settings that enhance restorative experiences.

In their first study, Hartig et al. (2001) found the restorative qualities that students perceived in an unspectacular, familiar natural environment to be a motivator for ecological behaviours. As Hartig (2011, p. 59) claims, rating of the restorative potential of an environment is “built on substantial experience with environments that have supported restoration to varying degrees, thus it is simultaneously retrospective and prospective”. Therefore, when taking the restorative qualities of a specific environment into consideration, we are considering the person’s history of restorative experiences. A sample of 488 participants rated the given environment, using the PRS plus ten additional items included to strengthen the construct. In order to register ecological behaviour, the General Ecological Behavior Scale (GEB; Kaiser, 1998) was used and social desirability was also taken into account. Through structural equation modeling, the authors found that ecological behaviour was related to the perceived potential of restoration in the natural environment. In fact, perceived restoration

explained 23% of the variance of ecological behaviour. Fascination was the only direct predictor of proenvironmental actions, and it mediated the relation of compatibility, being away and extent with ecological behaviour, which were only indirectly related to ecological actions. From the participants, those who assessed the natural setting as more restorative scored higher on ecological behaviour. The authors concluded that the restorative qualities of an environment are positive motivators for ecological behaviour.

More recently, Hartig et al. (2007) conducted a second study in which they took environmental concern as a mediator variable between the restorative experiences and ecological behaviour. Environmental concern was understood as “concern about personal harm stemming from environmental problems” (p. 292). The use of nature for psychological restoration was registered. A sample of 1413 middle-aged Norwegian participated in the study. The use of nature for psychological restoration was measured by three items (e.g., I need time in nature to be happy). Personal environmental concern was registered by four items (e.g., How much do you think environmental problems affected your health in the past, say 10 years ago?). Finally, ecological behaviour was measured by registering how often in the last year participants performed the 26 behaviours given (e.g., participated in cleaning up the local environment). Their results showed that personal environmental concern partially mediated the relation between using nature for psychological restoration and ecological behaviour, indicating that restoration has direct and indirect effects on pro-environmental behaviour.

The results are encouraging, but it is needed to keep in mind that the analyses carried out by Hartig et al. (2007) do not imply causality, which indicates that the possibility that ecological behaviour or personal concern are motivators for using the environment for restorative purposes cannot be ruled out. However, the theoretical model presented by Hartig et al. (2001) supports the direction of the results obtained by Hartig et al (2007). Nevertheless, the latter study shows that variables such as environmental concern mediate the relation of restoration on ecological behaviour. Therefore, future studies, with more accurate techniques such as structural equation models, should be carried out and mediator variables should be included.

It is also worth noticing that the measure used to register need for psychological restoration in Hartig et al.'s (2007) study is closely related to people's affective connection with the natural world. In fact, Hinds and Sparks (2008) used the same three items used by Hartig et al. (2007) plus one more ("it makes me sad to see natural environments destroyed") to measure individuals' affective connection with nature. Not surprisingly, the authors also found that affective connection predicts people's environmental behaviour, in this case, people's intentions to engage with nature. Hinds and Sparks (2008) realized the similarity of their items with the restorative ones and described their affective measure as affective well-being, which can be also understood as a personal motivator to protect the environment.

To the best of our knowledge, only these two studies have assessed the role of restorative experiences, in terms of perceived potential for restorative experience and use of nature for restoration, in promoting ecological actions. The question of whether restorative experiences motivate children to conduct ecological actions remains unstudied.

1.3.3.2. Connectedness with nature and environmental attitudes and behaviours.

Evidence with general population.

There is empirical evidence showing that positive feelings like love for nature (Kals et al., 1999) or affective connection to nature (Hinds & Sparks, 2008) motivate ecological behaviours. One of the first studies in which affective connection with nature was taken into consideration and that has inspired later research was conducted by Kals et al. (1999). The authors define Emotional Affinity toward Nature (EAN) as an emotional experience with four aspects: love of nature, feelings of freedom in nature, feelings of security in nature, and feelings of oneness with nature. EAN “describes the extent to which a person has an emotional connection to his or her natural environment” (Müller et al., 2009, p. 62). The researchers were interested in checking whether this emotional connection with the natural world might be promoted by past and current experiences in nature, alone or with others. They also aimed at evaluating the role that EAN, together with emotional indignation about insufficient nature

protection and cognitive interests in nature, has in predicting willingness of conducting nature-protective behaviours (e.g., I am willing to take steps in my own household for the protection of natural resources, e.g., installation of water flow regulators, solar panels, and so forth.) and personal behavioural decisions (e.g., I counteract the destruction of the landscape by my frequent use of public transportation instead of my own automobile). Their results show that direct experiences of nature during childhood and adulthood, especially with others, promote EAN. They also found that for active members of environmental organizations, as well as for the general public, EAN predicts nature protective behaviours, mainly in the private sphere, together with the negative feelings of indignation about insufficient protection and the cognitive interest in nature.

Following Kals et al' (1999) steps, various researchers have shown interest in studying the role that affective determinants of environmental attitudes has in the human-nature relationship, and some have also incorporated cognitive (knowledge and beliefs) and behavioural (actions and experiences) aspects. Several names have been given to this construct such as affective connection to nature (Hinds & Sparks, 2008), Nature Relatedness (Nisbet, et al., 2009), Environmental Identity (Clayton & Opatow, 2003), Inclusion of Nature in the self (Schultz, 2002) or Connectedness to nature (Mayer & Frantz, 2004).

Efforts have been made in designing a tool that measures emotional connection in adults (Mayer & Frantz, 2004; Kals et al., 1999) and children (Cheng & Monroe, 2012; Ernst & Theimer, 2011) as well as in understanding

how this affective connection is created. It is thought to be enhanced by positive experiences in nature and, therefore, seen as a way of explaining the process by which frequent contact with nature promotes ecological behaviours. Many of these studies are based on the biophilia hypothesis or the biological need to affiliate with nature (Wilson & Kellert, 1993). The proponents of the biophilia hypothesis as the basis of this affective link to nature claim that people have an innate sense of connection to the natural world. They suggest studying this feeling of connectedness because it seems to be related to people's ecological behaviours, such as future intentions to engage with the natural environment (Hinds & Sparks, 2008) or turning off the light when the room is vacant (Mayer & Frantz, 2004). Researchers agree that this innate affinity is not constant among people (Hinds & Sparks, 2008; Müller et al., 2009). In fact, as mentioned before, Kellert (2002) affirms that this biological tendency is weak, and it needs to be enhanced by culture, learning experiences and experiences in nature.

Evidence with young people.

The affective domain of environmental attitudes has also been taken into account with young people. Müller et al. (2009) studied the role of EAN in predicting willingness of pro-environmental behaviours in a sample of teenagers (from 15 to 19 years old). The EAN scale used by Kals et al. (1999) was adapted for its use with younger participants. The authors took into account the influence of context on EAN, arguing that living in a rural area and in a less industrialized

country would enhance more contact with nature which in turn would promote teenagers' EAN. Data were collected with students from people in rural and urban areas in Germany, a highly industrialized country, and Lithuania, which was industrialized much later than Germany. Teenagers' awareness of the risks for nature (e.g., contamination and pollution are increasingly becoming a problem) was also registered as well as their frequency of contact with nature and their willingness for pro-environmental commitment (e.g., I would be willing to take action for the protection of natural resources). After carrying out stepwise multiple regression analyses, the researchers found that willingness for pro-environmental behaviour was predicted by EAN and awareness of the risks for nature. By conducting analyses of variance, it was found that, in general, girls scored higher than boys on the pro-environmental variables. Differences were found in EAN shown by participants in Lithuania compared to the ones in Germany, those in Lithuania scoring higher. Also, participants living in rural areas had contact with nature more frequently than those living in urban ones. Their findings demonstrated that EAN is the stronger predictor of willingness for pro-environmental commitment, followed by a more cognitive variable (awareness of the risks for nature). Müller et al. (2009) call for insights about how EAN develops and the way in which it influences ecological actions. In their own words, *“there is a strong need to learn more about how nature affinity is formed in youth and adulthood on the one hand, and, on the other hand, find effective ways to promote contact with nature and positive experiences with nature in order to*

make sure that future generations will feel a connection to nature and a need to protect it.” (p. 66).

Efforts have also been made to design a tool that targets children’s affective domain. For example, Larson et al. (2011) created an instrument to measure children’s environmental perceptions. They acknowledged that the existing instruments to register children’s attitudes toward the environment are too complicated for younger children (e.g., Manoli, et al., 2007), take too long to use them if a large number of data is needed (e.g., Evans et al., 2007) or do not include the affective domain. The authors used items from previous instruments that seemed appropriate for younger children and simplified the language. A scale with 16 items was designed, including components of environmental attitudes, such as interest in nature, importance of nature, endangered ecosystems, and environmental stewardship. A big effort was made to include children from a range of socioeconomic characteristics, rural and urban environments and from different ethnicity. Apart from the scale, some participants were interviewed in order to complement the quantitative data. Their results show that scale has two dimensions: ecoaffinity, or “personal interest in nature and intentions to engage in pro-environmental behaviour” and ecoawareness or children’s “cognitive grasp of environmental issues related to the general importance and sustainability of natural ecosystems” (p. 83). They also found that those children who talked about nature with their parents scored higher on eco-awareness and environmental knowledge. Also, those children

who affirmed spending more time in direct contact with nature scored higher on ecoaffinity, ecoawareness and environmental knowledge.

Although the authors specifically mentioned including the affective domain on the scale, only one item, -“it makes me sad to see homes built where plants and animals used to be” - is explicitly affective. However, it is included in the ecoawareness (the cognitive) dimension of the scale, with items such as “people need plants to live” or “nature is easily harmed or hurt by people”.

Three groups of researchers have designed connection to nature indexes for children, all of them based on adults' indexes. First of all, Stern et al. (2008) developed a Connection with Nature index, in which the affective domain was included, together with cognitive and behavioural aspects. The authors studied the impact of a 3- and 5-day sleepover EE program focused on the same topic. In order to do this, they developed four indexes: 1) Connection with Nature index, 2) environmental stewardship, 3) participants' interest in learning and discovery, and 4) knowledge and awareness. The Connection with Nature Index, included four aspects: students feel comfortable outdoors, students feel that they are a part of nature rather than separate from it, students actively engage in observing their surroundings when in natural settings, and students show interest in outdoor activities. This index is similar to the ones used with adults in which feelings, cognition and nature experiences are taken into account (Nisbet et al., 2009). The students completed the surveys as soon as they arrived to the camp, just before leaving and three months after. The results show that participants

significantly improved their scores in the four indexes when the second measurement was taken (just after the camp). However, three months after the EE program, the impact remained significant only for stewardship and awareness. Stern et al. (2008) also studied the possible changes in each of the items of the Connection with Nature Index and found that after three months the impact of the camp was still significant for children's feelings of comfort in the outdoors and children thought that they were a part of nature, and not separate from it.

Cheng and Monroe (2012) designed a Connection to Nature Index for children from 8 to 10 years old. It includes aspects that seem to reflect attributes of the feelings of connection with nature described by adults: enjoyment of nature, empathy for other creatures, sense of oneness and sense of responsibility. The authors aimed at explaining children's interest in participating in nature-based activities as well as their interest in environmentally friendly practices through children's connection with nature and through other factors that have been proven to influence ecological behaviours, such as previous nature experiences, environmental knowledge, self-efficacy and environmental values. Perceived nature near home was also included. The information collected through interviews with 9 and 10 year old children helped the authors to develop the Connection to Nature Index. Once the tool was designed, a sample of 5.500 children participated in the study. Two paths analyses using LISREL showed that 27 % of the variance in children's interest in participating in nature-based activities is explained by the variables included in the model (family values,

previous experience in nature, nature near home, knowledge of environment and connection to nature). The strongest predictor of children's interest in participating in nature-based activities was connection to nature. Their previous experiences in nature and their perceived family values toward nature also had a direct influence on the interest of participating in nature-based activities. Perceived nature near home and environmental knowledge had an indirect effect, through their direct impact on connection to nature.

Children's interest in environmentally friendly practices was also equally predicted by family values toward nature and children's connection to nature. Previous experience in nature and children's sense of self-efficacy also had a direct effect. Children's environmental knowledge and nature near home had an indirect effect on children's interest in participating in nature-based activities. 54% of the variance was explained by the model.

Based on their findings, Cheng and Monroe (2012) suggest that learning about nature and experiencing nature should increase children's connection with the natural environment. With this idea in mind, Ernst and Theimer (2011) evaluated the impact of seven EE programs that had increasing participants' connection to nature among their objectives. All the programs were outdoors but none of them were sleepover camps. They varied greatly from, for example, two day-long events to week-long day-camp, six hours a day. In order to measure the impact of the camps, the authors used the Children's Connection to Nature Index (Cheng & Monroe, 2012) and the Nature Connectedness Inventory that they

developed specifically for the study. Data were collected at the beginning and at the end of each program. Their results show that only two of the programs seemed to increase children connection to nature, as measured with the Nature Connectedness Inventory but not with Cheng and Monroe' (2012) index. The researchers give several possible explanations to their results. First of all, the fact that no improvement was found with the Cheng and Monroe's (2012) index suggests that there could be a ceiling effect, as children in the pretest scored 3.90 in a five-point scale. According to Ernst and Theimer (2011), the response format of the two instruments could also have influenced the results. While the Connection to Nature Index had a five-point scale format, the Nature Connectedness Inventory used a type of response in which children had to indicate whether they were similar or not to the children described in the questionnaire. For example, they had to choose whether they are more like "kids who feel a part of nature or kids who feel separate from nature" (p. 588). Then, participants indicated how much they are like the group they have chosen (*a little, somewhat like them, or a lot*). The authors argue that this type of response might be better for avoiding social desirability and, therefore, children's responses vary more, and the scores on the pretest are further from the maximum than the ones registered with Cheng and Monroe's (2012) index. They also point out that a condensed time frame is important to increase children's emotional connection to nature. The two only programs that had an impact on children's connection to nature were those that were more condensed in time (a week-long day camp, and three field trips with preparatory and follow up activities in class

for a month). Age seems to be another important factor, with children from 8 to 10 being more easily influenced than older children.

1.4. Summary

From the literature review it can be concluded that nature experiences have deep positive effects on people's health and quality of life (e.g., Kaplan & Kaplan, 2011; Kuo, 2001). This statement is true for adults (e.g., Kaplan, 2001) and children (e.g., Wells & Evans, 2003). It has also been highlighted that gratifying experiences of nature seem to promote the formation of positive attitudes toward the environment that might, in turn, be transformed into pro-environmental actions (e.g., Kaiser et al., 2012). However, the society's trend is to live apart from nature, which may have negative consequences for individuals, families, communities and nature conservation, described by Louv (2008) as Nature Deficit Disorder.

It appears that researchers agree on the need of a behavioural change in the Western world in order to create a sustainable society. The fearful messages included in some EE programs could be transformed into more positive ones, emphasizing the importance of nature for people's wellbeing. More research about children's experiences of nature is needed, paying attention to the benefits that children obtain from direct contact with nature, to the effect that contact with nature may have on children's environmental attitudes and to the process that leads to environmental behaviour. This will help to improve children's

health as well as to find ways to promote environmental conservation. This may in the end lead to adults' improved attitudes, and more favourable environmental behaviour.

CHAPTER 2.- AIMS, RESESARCH QUESTIONS, OBJECTIVES AND HYPOTHESES

This dissertation aims at obtaining a deeper understanding of children's experiences of nature and the outcomes of these experiences. The Thesis has two main objectives or central points. The first one (1) is to study the (positive) effect that nearby nature might have on children's wellbeing. It is important to understand what physical elements of young people's everyday environments affect their health so that they can be taken into account when designing children's most frequently used places (Ozdemir & Yilmaz, 2008; Wells, 2000). Providing accessibility to nature could be a way of promoting children's wellbeing, specifically, through restorative experiences (Wells & Evans, 2003). The second general aim (2) focuses on studying the effect that contact with nature might have on children's environmental attitudes and behaviours. Understanding children's environmental attitudes and behaviours is important because they will be the ones facing the environmental problems in the future (Evans et al., 2007). The second aim is divided in two sub-objectives: (2.1) evaluating the effect of everyday, nearby nature in children's environmental attitudes and behaviours. The relation between children's restorative experiences, their environmental attitudes and pro-environmental behaviours will be assessed and (2.2) evaluating the impact of a onetime, long term experience in nature in children's ecological attitudes and the process by which spending time in nature might promote children's environmental behaviours.

These objectives and the research hypotheses can be seen in Table 1. The specific objectives, hypotheses, method and results are presented in each of the following chapters.

The research questions that guided the studies of this dissertation are the following: a) Does nearby nature in home and school areas have a positive effect on children's wellbeing?, b) are schools with more natural elements perceived as more restorative?, c) are the preferences that children show toward their schoolyard mediated by children's perceived restorativeness?, d) are there tools to measure children's environmental attitudes?, e) is there a difference in children's environmental attitudes according to children's place of residence, nature in the school playground and/or sociodemographic characteristics? f) is there a relation between children's experiences in nature and children's environmental attitudes? g) can a prolonged experience in nature be a way of promoting children's environmental behaviours? and, if so, how? A series of five studies have been conducted to answer the research questions.

The review of the literature in the previous chapter shows that there is a marked paucity in including children in the psychoenvironmental research. Researchers are calling for insights on ways of promoting children's play outdoors, especially in nature (e.g., Karsten, 2005), in the effects that contact with nearby nature may have on children's wellbeing (Wells, 2000) and in ways of promoting young people's environmental attitudes (Chawla, 1999; Cheng & Monroe, 2012; Ernst & Theimer, 2011; Larson et al., 2011). As stated by

previous researchers (Bagot, 2004; Larson et al., 2011), the large number of studies showing the benefits that adults obtain from contact with nature (e.g., Johanson et al., 2011) contrasts with the relatively little knowledge accumulated about children's relation with the natural environment and the benefits that this population group might obtain from their contact with nature. The process by which experiences of nature during childhood might promote environmental attitudes and behaviours in children is also quite unknown (Evans et al., 2007).

Table 1

Main objectives, studies and hypotheses of the dissertation

Objectives	Sub-objectives	Studies	Hypotheses
<p>Objective 1: Studying the effects of contact with nearby nature (home & school) in children’s wellbeing.</p>	<p>Study 1: Nature as a moderator of children’s stress.</p> <p>Chapter 3, section 3.1.</p>		<p>a) Nearby nature will have a positive influence on children’s stress level.</p> <p>b) Frequency of exposure to stressful events will negatively influence children’s stress level.</p> <p>c) Nearby nature will have a moderating effect over children’s stress level.</p> <p>d) The moderating effect of nature will be more notable in more vulnerable children (those exposed to adversity more frequently).</p>

Objectives	Sub-objectives	Studies	Hypotheses
<p>Objective 1 (Continues): Studying the effects of contact with nearby nature (home & school) in children’s wellbeing.</p>		<p>Study 2: Children’s perceived restorativeness: Influence of type of schoolyard on restorative experiences.</p> <p>Chapter 3, section 3.2.</p>	<p>a) The factorial structure of children’s perceived restorativeness (as measured with the PRCS-C II) will be similar to the one found in previous studies.</p> <p>b) Natural environments will be perceived as more restorative than non-natural ones.</p> <p>c) Boys will perceive their playground as more restorative than girls.</p> <p>d) Children’s preference toward their playground will be mediated by their perceived restorativeness.</p>

Objectives	Sub-objectives	Studies	Hypotheses
<p>Objective 2: Studying the effects of contact with nature on children's environmental attitudes and behaviours.</p>	<p>Objective 2.1: evaluating the impact of contact with nearby nature on children's environmental attitudes and behaviours.</p>	<p>Study 3: Differences on the ecological beliefs of a sample of children. Spanish version of the NEP Scale for children. Chapter 4, section 4.1.</p>	<p>a) Spanish children's ecological beliefs system, as measured by the NEP scale for children, (Manoli et al., 2007), can be described as unidimensional.</p> <p>b) Children from rural areas will be more ecocentric than those from urban areas.</p> <p>c) Older children will be more ecocentric than younger ones.</p> <p>d) No differences will be found in the ecological view of males and females.</p>

Objectives	Sub-objectives	Studies	Hypotheses
<p>Objective 2 (Continues): Studying the effects of contact with nature on children's environmental attitudes and behaviours.</p>	<p>Objective 2.1 (Continues): evaluating the impact of contact with nearby nature on children's environmental attitudes and behaviours.</p>	<p>Study 4: Relation between perceived restorativeness, orientation toward nature and pro-ecological behaviour. Chapter 4, section 4.2</p>	<p>a) The dimensionality of Spanish children's environmental orientation, as measured by CEPS (Larson et al., 2011), will be similar to the one obtained by the authors of the scale.</p> <p>b) No differences will be found between males and females.</p> <p>c) Older children will score higher than younger ones.</p> <p>d) Children living in rural areas will have more frequent contact with nature than those living in urban ones.</p> <p>e) Children living in rural areas will score higher on CEPS than those living in urban ones.</p> <p>f) Those children whose schoolyard includes more nature will score higher on the scale.</p> <p>g) Children's pro-environmental behaviour will be encouraged by restorative experiences in nature.</p>

Objectives	Sub-objectives	Studies	Hypotheses
<p>Objective 2 (Continues): Studying the effects of contact with nature on children’s environmental attitudes and behaviours.</p>	<p>Objective 2.2. Evaluating the impact of a onetime direct experience in nature on children’s environmental attitudes and the psychological paths that lead to behaviour.</p>	<p>Study 5: Developing a bond with nature: how a summer camp affects children’s emotional and cognitive experience of nature and leads to increased environmental behaviour. Chapter 5.</p>	<p>a) Children’s environmental attitudes will increase after spending time in a nature camp, compared to children spending time in an urban camp.</p> <p>b) There will be an additional increase in children’s environmental attitudes due to the combination of Environmental Education (EE) included in one of the camps as well as a longer duration, as compared to shorter programs without EE.</p> <p>c) Increases in children’s cognitive and affective dimensions of environmental attitudes will mediate the effect that type of camp (nature vs. urban) will have on children’s willingness to carry out three different pro-environmental behaviours.</p>

As specified in Table 1, our first objective consists of evaluating if and how nearby nature affects children's wellbeing. It is known that nearby nature in the home area buffers the negative effect (stress) produced by children's exposure to adversity (Wells & Evans, 2003). We aim at going a step further by evaluating the possible buffering effect of nearby nature present in the school area and by including children's perceived nature in the analyses. The physical characteristics of schoolyard, including the presence of nature, influence children's behaviours such as type of play (Lindholm, 1995) and children's physical health (e.g., obesity; Ozdemir & Yilmaz, 2008). It is also known that teenagers with more access to nature in the school area are more successful at school (e.g., better graduation rates) than those whose access to nature is more reduced (Masukota, 2010). Because of the importance that nature present in the school seems to have on students' psychological and physical health, we aim at studying the moderating effect of contact with nature within the school, as well as in the residential area.

From the results obtained in study 1, we realized that an instrument that could be used with children and that measures the restorative qualities of places frequently used by them was needed. With this kind of tool, the benefits that children might obtain from their contact with different environments could be foreseen. The Perceived Restorativeness Scale for Children II (PRCS-C II; Bagot et al., 2007) has been adapted to Spanish. Bagot (2004) and Bagot et al. (2007) did not evaluate the possible differences in perceived restorativeness of

natural versus non natural environments. This was one of the aims of the dissertation because it would be a proof of validity of the scale, as it is well known that natural environments are more restorative than non natural ones (Kaplan & Kaplan, 1989; Ulrich et al., 1991). This study also aimed at evaluating the possible influence of age and gender on perceived restorativeness, following the suggestions of Bagot (2004).

Our second main objective was to study if and how contact with nature influences children's environmental attitudes and behaviours. In order to do this, instruments that are designed to register children's environmental attitudes are needed. However, the number of tools available is limited (Cheng & Monroe, 2012; Evans et al., 2007; Larson et al., 2011; Manoli et al., 2007), especially in Spanish. Because of this, we had to adapt two new different instruments to measure children's environmental attitudes into Spanish. First of all, the New Environmental Paradigm (NEP) Scale for children (Manoli et al., 2007) has been adapted to Spanish and children's ecological worldviews were evaluated. Following, the *Children Components Perceptions Scale* (CEPS; Larson et al., 2011) was adapted to Spanish. Previous studies with adults and children have shown that people's environmental attitudes differ according to their gender, with females normally being more pro-environmental than men (Zelezny, Chua, & Aldrich, 2000). Age also seems to be an influencing factor, with younger children being more anthropocentric than older ones (Kahn, 1999). Finally, frequency of contact with nature also appears to have an impact, those with a more frequent contact with nature being more pro-environmental than those with

less or no contact (Cheng & Monroe, 2012; Hinds & Sparks, 2009). The possible influencing factors (gender, age, place of residence, and presence of nature in the school yard) on children's ecological worldviews and environmental perceptions were evaluated.

Aiming at studying the mechanisms that lead children to behave in an environmentally friendly way, the relation between children's environmental attitudes, behaviours and children's restoration was evaluated in study 4, using the CEPS adapted to Spanish as well as the PRCS-C II in Spanish (study 2). As stated by Kaiser et al. (2012) positive, gratifying experiences in nature seem to be a motivational source for people to behave in an environmentally friendly way. Restorative experiences are included among these positive, personal experiences, as people experience the restoration of their psychological, physical and social capabilities diminished while attending the different tasks of the day. As mentioned in Chapter 1, it has been demonstrated that for college students (Hartig et al., 2001) and adults (Hartig et al., 2007) restorative experiences are a positive motivator to protect the environment. This is seen as a selfish motivation, as people might protect the natural environment as a way of maintaining the positive experiences that they have in these kinds of environments. The relationship between children's restorative experiences and ecological behaviour has not been checked yet. This is one of the objectives included in the second main aim of the dissertation.

Although the NEP and CEPS seem to be valid tools to measure children's environmental attitudes, they appear to be measuring different aspects of children's attitudes. The NEP includes more cognitive, abstract items, such as "Nature is strong enough to handle the bad effects of our modern lifestyle." whereas the CEPS includes more personal items that have been specifically designed to be relevant to younger children (e.g., I like to spend time in places that have plants and animals). Probably this latter scale is more suitable to be used when studying if and how personal gratifying experiences in nature may affect children's environmental attitudes and behaviours and when working with younger children. The NEP scale seems more appropriate to measure more abstract environmental problems, and suitable to be used with older children.

Once the positive influence of children's contact with nearby nature on their environmental attitudes was established, the dissertation moves to the last sub-objective. It deals with studying the possible influence of a onetime prolonged experience in nature on children's environmental attitudes and the psychological paths that lead to behaviour. Summer camps are a common way of spending part of the summer holidays in Spain. Therefore, assessing the possible effects that the location of the camp and its characteristics may have on children's environmental attitudes and behaviours seemed as a good opportunity for research as well as for future lines of educational intervention. Four summer camps were chosen, three of them organized in a natural area and the fourth in an urban one. One of the nature camps included EE activities and the other two did not. This provided us with the possibility of exploring whether the outcomes of

the camps are due to being in contact with nature *per se* or to the combination of being in the camps and EE activities.

Both affective and cognitive dimensions of environmental attitudes have been pointed out as being important when predicting environmental behaviour (Pooley & O'Connor, 2000). Therefore, children's ecological beliefs about the human–nature relationship were studied (NEP scale for children) as well as their affective connection to nature, using the Emotional Affinity towards Nature scale (Kals et al., 1999). Finally, we aimed at studying whether the psychological paths underlying children's environmentally friendly behaviours were different according to the type of behaviour taken into consideration.

CAPÍTULO 3.- EFECTOS BENEFICIOSOS DEL CONTACTO CON LA NATURALEZA CERCANA

En este capítulo se evalúa la posible influencia que la naturaleza cercana - aquella a la que los niños tienen acceso todos o casi todos los días - tiene en el bienestar de la población infantil. Para ello, se han llevado a cabo dos estudios. En el primero de ellos se evalúa el efecto moderador que la naturaleza cercana a los niños puede tener sobre los eventos estresantes a los que la población infantil se enfrenta diariamente. El segundo estudio se centra en adaptar la *Perceived Restorativeness Components Scale for Children II* (PRCS-C II) al español y utilizarla para evaluar la restauración percibida por la población infantil en los patios de sus colegios. A su vez, se estudian las posibles diferencias en cuanto a la preferencia que los niños muestran hacia el patio de su colegio según la cantidad de naturaleza presente en éste así como las posibles variaciones debidas a la edad y al género de los participantes. Finalmente, se evalúa la relación entre restauración percibida y preferencia.

3.1. Estudio 1. La naturaleza cercana como moderadora del estrés infantil

Como ya se ha comentado en el capítulo introductorio, el contacto con la naturaleza tiene efectos beneficiosos tanto para la salud física (e.g., Grahn et al., 1997) como para la mental (e.g., Taylor y Kuo, 2011) de la población infantil. Entre estos beneficios se encuentra el efecto moderador de la naturaleza cercana a la casa descrito por Wells y Evans (2003). Estos autores demostraron que los niños que tienen más naturaleza cerca del hogar son capaces de sobrellevar mejor los eventos estresantes diarios que aquellos que no cuentan con este factor protector. Para llegar a esta conclusión, los autores siguieron el modelo de variable moderadora de Baron y Kenny (1986). Según estos investigadores, la variable moderadora se define como una tercera variable, cualitativa o cuantitativa, que afecta la dirección y/o fuerza de la relación entre dos variables independientes o entre una variable predictora y una dependiente. Los resultados de Wells y Evans (2003) indican que la presencia de naturaleza cercana modera la fuerza de la relación entre la exposición a eventos estresantes y el nivel de estrés de la población infantil.

A partir de los resultados de estos autores se abren nuevas líneas de investigación como, por ejemplo, el efecto moderador que podría tener la naturaleza incluida en el patio del colegio de los niños. El estudio de las características físicas de los patios de los colegios es importante, pues los niños pasan en ellos gran parte de su tiempo. Además, el colegio es un lugar que

demanda recursos sociales, psicológicos y físicos, y conviene estudiar todas aquellas cualidades (por ejemplo, las restauradoras) que puedan promover la salud de la población infantil.

3.1.1. Objetivos e hipótesis.

El presente trabajo¹ tiene principalmente tres objetivos: en primer lugar, evaluar los posibles efectos positivos que la naturaleza cercana tiene sobre la población infantil. En segundo lugar, profundizar en la reciente línea de investigación sobre la hipótesis moderadora de la naturaleza de los entornos cotidianos con respecto a eventos estresantes habituales y, finalmente, incluir por primera vez en el estudio de la hipótesis moderadora la naturalidad del entorno escolar, así como la naturaleza percibida por los niños.

Las hipótesis que guían la presente investigación son las siguientes: (Hipótesis 1) la naturaleza cercana influirá positivamente en el nivel de estrés infantil; (Hipótesis 2) la frecuencia de exposición a situaciones estresantes tendrá un efecto negativo sobre el nivel de estrés que muestran los niños; (Hipótesis 3) el impacto de los eventos estresantes será menor cuando la

¹ Este estudio ha sido parcialmente publicado en Corraliza, J.A. y Collado, S. (2011). La naturaleza cercana como moderadora del estrés infantil. *Psicothema*, 23, 221-226.

naturaleza cercana sea mayor; y (Hipótesis 4) habrá un efecto moderador de la naturaleza más notable en aquellos niños expuestos a más eventos estresantes (niños más vulnerables).

En el caso del presente estudio, la variable dependiente o producto es el estrés percibido por los niños, es decir, su nivel de estrés, y la variable independiente es la frecuencia de exposición a adversidades, medida de manera objetiva. En principio, es de esperar que a mayor cantidad de eventos estresantes, mayor nivel de estrés muestre el niño. Sin embargo, la hipótesis principal de este trabajo sostiene que la naturaleza cercana a los niños actuará como variable moderadora o protectora, haciendo que el efecto negativo (estrés percibido) de los eventos estresantes a los que son expuestos los participantes, sea menor de lo esperado. El planteamiento se basa en que aquellos niños que tengan un mayor acceso a la naturaleza serán capaces de sobrellevar mejor los eventos estresantes que les ocurren en su vida diaria, con lo que el efecto de esos eventos estresantes (en este caso el estrés percibido) será menor que si no contasen con ese factor protector que es la naturaleza cercana. El modelo de variable moderadora puede verse en la Figura 1.

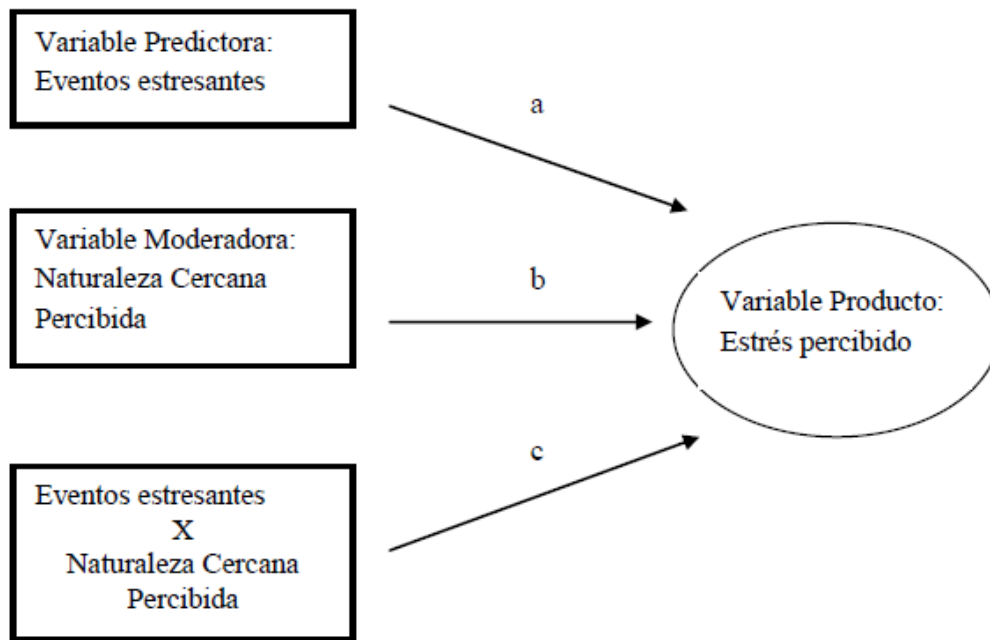


Figura 1. Modelo de variable moderadora. Adaptado de Baron y Kenny (1986, 1174)

Para que una variable sea moderadora, la relación de interacción o camino c debe ser significativa (Baron y Kenny, 1986). Puede haber también efectos directos significativos en los caminos a y b, pero éstos no indican ningún efecto moderador.

En el apartado de análisis y resultados, se estudia si existen efectos directos de la naturaleza (camino b) y de los eventos estresantes (camino a) sobre la variable producto (estrés percibido). Además, se evalúa si la naturaleza actúa como moderadora de los efectos de los eventos estresantes, es decir, si el camino c es significativo.

3.1.2. Método.

Participantes.

Para llevar a cabo el estudio se han utilizado datos de una muestra de 172 niños (53%) y niñas (47%) de la ciudad de Cuenca (España), durante los meses de abril, mayo y junio de 2009. El número total de cuestionarios recogidos fue de 181. Sin embargo, nueve cuestionarios fueron eliminados del estudio por estar incompletos o porque el participante había marcado la misma casilla en todas las preguntas.

Los estudiantes se encontraban cursando 5º o 6º de primaria (edad media = 11.3 años, $DE = 0.67$). De los 172 niños de la muestra, 140 vivían en pisos, 15 en chalets adosados, 12 en chalets individuales, 4 en casas de acogida y 1 en un internado.

Los ámbitos de estudio en este trabajo abarcan cuatro centros educativos y los 172 lugares de residencia de los alumnos.

a) Centros Educativos: el primer grupo de datos fue recogido de forma colectiva en las clases de cuatro colegios de Cuenca. La elección de los colegios vino determinada por la cantidad de naturaleza presente en el centro educativo y alrededores, diferenciando entre cantidad muy alta de naturaleza, alta, media y baja. Tres de los colegios eran públicos y el cuarto era un colegio privado concertado.

- Colegio muy natural. Situado a tres kilómetros a las afueras de Cuenca. Es un colegio que está en plena naturaleza. El patio está inmerso en un pinar. Desde todas las ventanas se ve gran cantidad de naturaleza. En todo momento se oyen sonidos naturales tales como pájaros, las hojas con el viento, ardillas, etc. Véase Figura 2.

- Colegio natural. El patio se caracteriza por tener elementos naturales tales como arena y pinos. Desde varias ventanas se ven elementos naturales del patio y de una zona natural cercana con un río. En el patio también hay pistas de cemento donde los niños juegan. Véase Figura 3.

- Colegio con grado medio de naturaleza (colegio mixto). Está situado al lado de un parque y desde algunas de las ventanas se ven elementos naturales. El patio es de cemento. Muchos de los niños, sobre todo los de los cursos superiores, juegan en el parque cercano al colegio antes y después de clase. Véase Figura 4.

- Colegio sin naturaleza. Es un colegio situado en el centro urbano de Cuenca. No se ven elementos naturales por las ventanas y el patio es de cemento. No tiene naturaleza cercana y el parque más próximo está situado a 15 minutos andando. Véase Figura 5.

b) Lugares de residencia: Cada una de las casas de los niños fue visitada. Éstas fueron clasificadas según la cantidad de naturaleza cercana a las mismas

en casas muy naturales, naturales, mixtas y urbanas, utilizando la Escala de Observación de Naturaleza Cercana.



Figura 2. Patio de colegio muy natural



Figura 3. Patio de colegio natural



Figura 4. Patio de colegio mixto



Figura 5. Patio de colegio no natural

Instrumentos.

a) Escala de Observación de Naturaleza Cercana.

Esta escala fue diseñada en un trabajo previo (Collado, 2009) para registrar la cantidad de naturaleza a la que tienen acceso los niños. Se divide en dos subescalas con las que se mide la naturalidad de los entornos escolar y residencial. En la primera subescala se incluyen variables tales como cantidad de elementos naturales en el centro educativo o la naturalidad de las vistas desde las aulas, entre otras. La subescala del entorno residencial tiene en cuenta variables tales como las vistas desde las ventanas de la casa o la distancia andando al parque más cercano. La puntuación final obtenida permite clasificar los entornos escolares y los residenciales en cuatro grupos: no natural, mixto, natural y muy natural. Esta escala se ha diseñado basándonos en la escala de naturalidad (*Naturalness Scale*) utilizada por Wells y Evans (2003). Una explicación más detallada de este instrumento puede verse en el Anexo 1.

b) Cuestionario de naturaleza percibida.

Mide la percepción que el niño tiene sobre la cantidad de naturaleza que le rodea. La naturaleza percibida por la población infantil ha sido utilizada como registro de la cantidad de naturaleza cercana en estudios previos (e.g., Cheng y Monroe, 2012). Se utilizaron las siguientes cuestiones: “Creo que mi casa está en un entorno natural”, “Creo que el patio de mi colegio es natural” y “En

general, en mi vida diaria la naturaleza está presente”. El niño puede contestar señalando una de las cuatro posibles respuestas: “No, para nada”, “Sí, hay un poco de naturaleza”, “Sí, hay bastante naturaleza” y “Sí, hay mucha naturaleza”.

c) Cuestionario de eventos estresantes.

Se ha aplicado el repertorio de eventos estresantes de Lewis (Lewis, Siegel y Lewis, 1984). De entre las 20 situaciones estresantes incluidas por los autores, se han seleccionado las que ellos consideran ser las principales fuentes de estrés psicológico: «no pasar suficiente tiempo con los padres», «los padres discuten delante del niño», «no tener suficiente tiempo para hacer los deberes», «no tener nada que hacer» y «no tener suficiente dinero para gastar en lo que quieren». Se solicitaba a los participantes que estimaran la frecuencia con que había ocurrido en el último año (de 1 = nunca a 5 = me pasa siempre).

d) Escala de estrés percibido.

El estrés percibido fue medido mediante la escala de 50 ítems de Martorell, Sánchez y Escrivá (1990). Este instrumento consiste en 25 preguntas que miden el estrés de los niños en casa y otras 25 que miden el estrés de los niños en el colegio. A los participantes se les pidió que indicasen si en las situaciones descritas sentían nerviosismo o tensión y en qué grado. Así por ejemplo frente a la situación “Antes de un examen” el niño puede contestar: 1 (nunca o casi nunca), 2 (algunas veces), 3 (muchas veces) o 4 (siempre o casi

siempre). Finalmente, se halla la media de las 25 cuestiones del estrés en el colegio y de las 25 preguntas del mismo en la casa, así como una media global de las dos subescalas que indica el estrés percibido medio de los niños.

Procedimiento.

Primeramente, se llevó a cabo el estudio piloto y se entregó una carta a cada niño para que los padres diesen su autorización. La doctoranda visitó una de las clases de 6º (niños de entre 11 y 12 años). Se explicó a los participantes que se trataba de un estudio de la Universidad Autónoma de Madrid acerca de lo que los niños piensan de sus casas y de sus colegios. Se les pidió que contestasen a las preguntas explicándoles que eran anónimas y que no había respuestas buenas o malas. Cada una de las preguntas fue leída en voz alta, dejándoles tiempo para contestar, de modo que todo el grupo las fue respondiendo a la vez. Una vez obtenidos los datos, se evaluó la cantidad de naturaleza en el entorno del centro educativo. Finalmente, con las direcciones de las casas de cada uno de los niños, se registró la naturaleza cercana existente en cada entorno residencial. Con el estudio piloto, se comprobó que las preguntas eran comprendidas por los participantes y que el tiempo de respuesta era adecuado. En total los niños tardaron una media de 35 minutos en contestar a todas las preguntas. Este mismo procedimiento fue seguido en otra clase de este colegio, así como en los otros tres.

3.1.3. Análisis de los datos.

En primer lugar, se evaluaron las diferencias significativas en cuanto al nivel de estrés presentado por los niños, a la frecuencia de exposición a adversidades y a la cantidad de naturaleza según cada uno de los cuatro colegios, mediante análisis de varianza y *t* - Student. Además, se estudió la relación entre la cantidad de naturaleza que rodea al niño y el nivel de estrés mediante correlaciones. Finalmente, con el objetivo de evaluar el posible efecto moderador de la naturaleza cercana, se llevaron a cabo regresiones jerárquicas.

3.1.4. Resultados.

Los resultados obtenidos se agrupan siguiendo la estructura de los objetivos e hipótesis mencionados anteriormente. Se presentan los resultados sobre las diferencias entre naturaleza percibida, estrés percibido y exposición a eventos estresantes. A continuación, se analiza el nivel de estrés en función de la naturaleza cercana y la frecuencia de exposición a eventos estresantes y, finalmente, el efecto moderador de la naturaleza.

Diferencias entre naturaleza percibida, estrés percibido y frecuencia de eventos estresantes.

La naturaleza percibida por los niños en los cuatro centros educativos varía de forma estadísticamente significativa ($F(3, 730) = 3.17, p < .001$). El colegio percibido como más natural fue el que había sido clasificado como muy natural según la Escala de Observación de Naturaleza Cercana ($M = 4, DE = 0.00$) y el percibido como menos natural el que se había clasificado como no natural ($M = 1.75, DE = 0.60$), siendo estas diferencias estadísticamente significativas, ($t(79) = 22.09, p < .001$; véase la Figura 6). Del mismo modo, existieron diferencias significativas en la cantidad de naturaleza percibida en el colegio mixto ($M = 2.88, DE = 0.73$) y el muy natural ($t(77) = -9.15, p < .001$), entre el mixto y el urbano ($t(86) = 7.88, p < .001$) y entre el mixto y el natural ($M = 3.22, DE = 0.66$) ($t(89) = -4.63, p < .001$). La naturaleza percibida en el colegio natural difiere significativamente del muy natural ($t(47) = 5.36, p < .001$). Finalmente, la diferencia en cuanto a este mismo aspecto en el colegio urbano y en el natural también fueron estadísticamente significativas ($t(91) = -14.56, p < .001$).

En relación al nivel de estrés percibido, éste difiere significativamente de un colegio a otro ($F(3, 171) = 4.19, p < .01$). Los niños que mostraron más estrés fueron los del colegio no natural, con una media de 2.66 ($DE = 0.54$) y los niños que menos estrés sufrieron los del colegio muy natural, con una media de 2.31 ($DE = 0.49$). Las diferencias en el nivel de estrés de los niños de estos dos

colegios fueron significativas ($t(86) = -2.84, p < .01$; véase la Figura 6). No sólo existieron diferencias en cuanto al nivel de estrés entre los colegios cuya presencia de elementos naturales difiere en mayor medida (colegio muy natural y colegio no natural) sino que también ($t(89) = -1.99, p < .05$) entre el nivel de estrés que muestran los niños del colegio mixto ($M = 2.34, DE = 0.52$), y los del natural ($M = 2.58, DE = 0.63$). Igualmente, el nivel de estrés de los niños del colegio muy natural difiere del de los niños del natural ($t(81) = -2.13, p < .05$).

El análisis del nivel de estrés objetivo está vinculado a la exposición del niño a alguno de los eventos estresantes cuyo registro se ha incluido en el estudio. Así, la cantidad de veces que los niños son expuestos al evento estresante *no pasar suficiente tiempo con los padres* varió significativamente entre los niños de los cuatro colegios, ($F(3, 170) = 6.12, p < .01$), de manera que los niños del colegio muy natural fueron los que más frecuentemente sufrieron el no pasar tiempo con sus padres, con una media de 2.94 ($DE = 1.32$) y los del colegio no natural los que más tiempo pasaban con sus padres, con una media de 1.91 ($DE = 1.16$). Véase Figura 7.

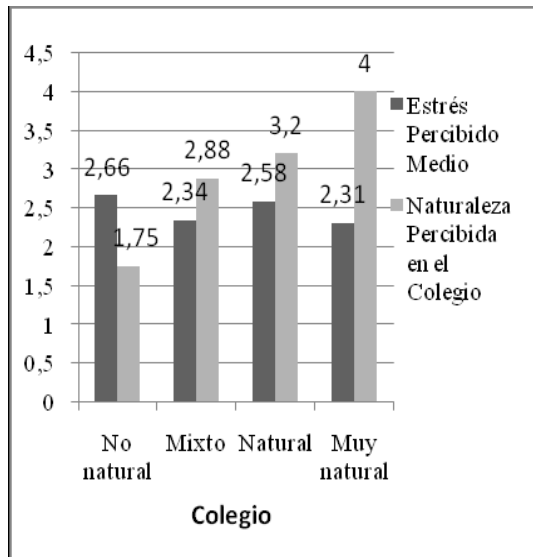


Figura 6. Estrés percibido medio y naturaleza percibida en los cuatro colegios.

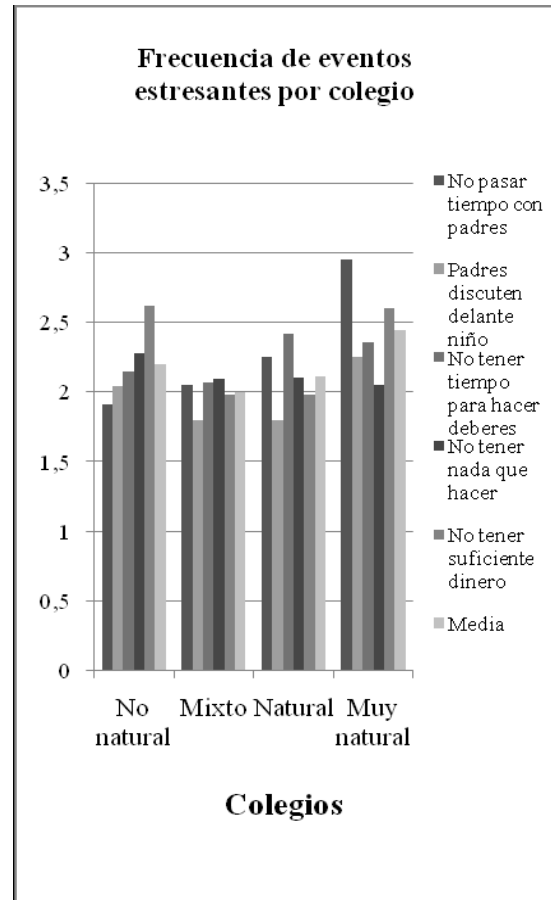


Figura 7. Frecuencia de exposición a eventos estresantes en cada colegio.

También existieron diferencias significativas entre los cuatro colegios en cuanto a la frecuencia del evento estresante *no tener suficiente dinero para gastar en lo que se quiere* ($F(3, 170) = 3.46, p < .05$). Sin embargo, no existieron diferencias significativas en la frecuencia de ocurrencia de ninguno de los otros tres eventos estresantes registrados: no tener tiempo para hacer los deberes, no tener nada que hacer y los padres discuten delante del niño.

Nivel de estrés según la naturaleza cercana y la frecuencia de eventos estresantes.

Para el estudio de la posible influencia de la frecuencia de los eventos estresantes y de la naturaleza cercana en el nivel de estrés percibido de los niños se han realizado, en primer lugar, análisis de varianza, en los que la variable dependiente es el nivel de estrés de los niños y el factor es la frecuencia de cada uno de los cinco eventos estresantes. Los resultados muestran diferencias significativas respecto al nivel de estrés sufrido por los niños según la cantidad de veces que sus padres discuten delante de ellos ($F(4, 170) = 7.35, p < .001$). Del mismo modo, también observamos diferencias significativas según la frecuencia del evento estresante *no tener tiempo para hacer los deberes*, ($F(4, 170) = 3.45, p < .05$) y relativo a la frecuencia del evento estresante *no tener dinero para gastar en lo que quieren*, ($F(4, 170) = 2.45, p < .05$). Estos resultados nos permitieron concluir que, en efecto, los eventos estresantes influyen en el estrés percibido de los niños, corroborando nuestra Hipótesis 2.

A su vez, la naturaleza percibida también influyó en el nivel de estrés de los niños. Las correlaciones de Pearson de la Tabla 2 señalan que existe una relación negativa significativa entre la cantidad de naturaleza percibida (en el colegio), la naturaleza medida objetivamente (en el entorno residencial y global) y el nivel de estrés, de manera que a mayor cantidad de naturaleza menor es el nivel de estrés. Estos resultados corroboran la Hipótesis 1, la naturaleza cercana se relaciona positivamente con el bienestar de los niños. Además, el análisis de

varianza mostró que el nivel de estrés de los niños difiere según la cantidad de naturaleza que perciban en el centro educativo ($F(3,170) = 4.07, p < .01$). Es decir, el que un colegio tenga más o menos elementos naturales y sea percibido por los niños como más o menos natural afecta al nivel de estrés de los alumnos.

Tabla 2

Correlaciones entre la naturaleza cercana y el estrés percibido (medio y en el colegio). N = 172

	Naturaleza percibida en el colegio	Naturaleza percibida en casa	Naturaleza percibida diariamente	Naturaleza objetiva cercana colegio	Naturaleza objetiva cercana casa	Naturaleza objetiva cercana diaria
Estrés medio	-.30***	.07	-.15***	-.08	-.08	-.14*
Estrés colegio	-.19***	-.09	-.009	-.02	-.19***	-.25

* $p < .05$. ** $p < .01$. *** $p < .001$

Por otra parte, la hipótesis moderadora de la naturaleza sostiene que la naturaleza cercana amortigua el efecto negativo (estrés percibido) de los eventos estresantes de tal manera que aquellos niños que tienen una mayor cantidad de naturaleza cercana sufrirán menos estrés que los niños que no cuenten con naturaleza a su alrededor, aún siendo expuestos con la misma frecuencia a situaciones estresantes. Con el objetivo de estudiar las posibles diferencias en el nivel de estrés de los niños según la naturaleza cercana a la que tienen acceso y la frecuencia de exposición a eventos estresantes, se han clasificado los participantes en cuatro grupos. Para ello se han combinado cada uno de los eventos estresantes y de tipo de naturaleza cercana que se ha comprobado que

afectan al nivel de estrés. De este modo se obtienen cuatro posibles combinaciones: 1) Alta frecuencia de evento estresante y naturaleza cercana alta; 2) alta frecuencia de evento estresante y naturaleza cercana baja; 3) baja frecuencia de evento estresante y naturaleza cercana alta y 4) baja frecuencia de evento estresante y naturaleza cercana baja.

Para este trabajo se han elegido como ejemplo las combinaciones que influyen más significativamente en el nivel de estrés de los niños: 1) naturaleza percibida en el colegio y no pasar suficiente tiempo con los padres y 2) naturaleza percibida diariamente y los padres discuten delante del niño. A continuación se describen los resultados referidos a cada una de ellas.

No pasar tiempo con los padres y la naturaleza percibida en el colegio.

El estrés medio percibido en los cuatro grupos de niños varía significativamente, $F(3,123) = 6.37, p < .001$. Además, también difiere el nivel de estrés entre aquellos grupos de niños que están expuestos con igual frecuencia a *no pasar tiempo con sus padres*. Es decir, existen diferencias significativas en los niveles de estrés de los grupos de niños 1 y 2 ($t = -3.16, p < .05$). Los niños del grupo 2 muestran un nivel de estrés más alto ($M = 2.85, DE = 0.49$) que los del grupo 1 ($M = 2.53, DE = 0.57$), aún siendo expuestos igual cantidad de veces a *no pasar tiempo con sus padres*. Además, existen diferencias entre ambos en la cantidad de naturaleza percibida en el colegio, que es mayor en el grupo 1 ($M =$

3.76, $DE = 0.50$) que en el 2 ($M = 1.83$, $DE = 0.38$), siendo esta diferencia estadísticamente significativa ($t = 14.00$, $p < .001$).

Del mismo modo se comprueba que existen diferencias en el estrés percibido entre el grupo de niños 3 ($M = 2.29$, $DE = 0.50$) y el 4 ($M = 2.55$, $DE = 0.60$), siendo $t = -2.46$, $p < .05$. Además la naturaleza percibida en el colegio entre estos dos grupos de niños también difiere ($t = 15.61$, $p < .001$), siendo mayor la naturaleza percibida por el grupo 3 ($M = 3.53$, $DE = 0.55$) que por el grupo 4 ($M = 1.70$, $DE = 0.46$). Véase la Figura 8.

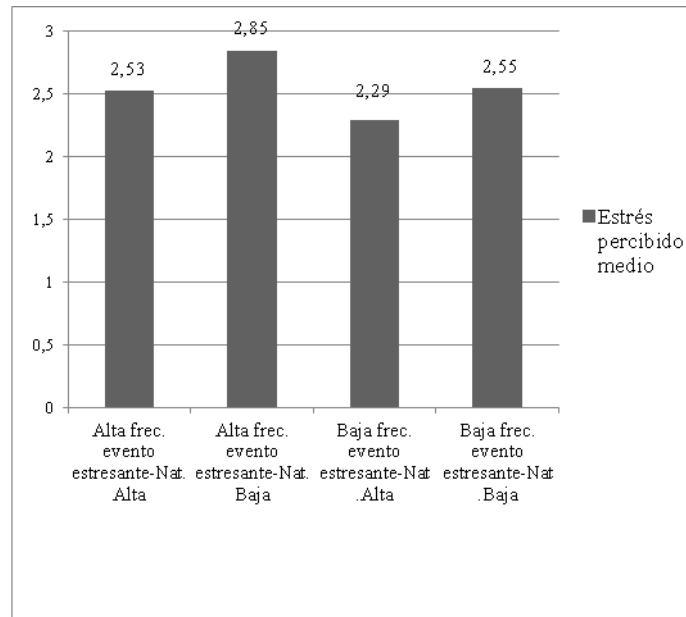


Figura 8. Nivel de estrés percibido según la naturaleza percibida en el colegio y el evento no pasar suficiente tiempo con los padres.

Los padres discuten delante del niño y naturaleza percibida diariamente.

Existen diferencias significativas en el nivel de estrés de los cuatro grupos de niños ($F(3,171) = 10.05, p < .001$). De entre los dos grupos que más veces sufren las discusiones de sus padres, grupos 1 y 2, aquellos que perciben más naturaleza en el colegio sufren menos estrés. Es decir, los niños del grupo 1 ($M = 2.66, DE = 0.52$) están menos estresados que los niños del grupo 2 ($M = 3.07, DE = 0.48, t = -3.26, p < .01$). La naturaleza percibida en el colegio por el grupo de niños 1 ($M = 3.40, DE = 0.49$) es mayor que la percibida por el grupo de niños 2 ($M = 1.80, DE = 0.41$), encontrándose diferencias significativas ($t = 10.70, p < .001$).

Del mismo modo, la naturaleza percibida por los niños del grupo 3 ($M = 3.39, DE = 0.49$) es mayor que la percibida por los niños del grupo 4 ($M = 1.92; DE = 0.27$), siendo esta diferencia significativa ($t = 14.42, p < .001$). Sin embargo, entre aquéllos que sufren menos veces las discusiones de sus padres (grupos 3 y 4), no existen diferencias significativas en cuanto a su nivel de estrés, a pesar de haber diferencias en la naturaleza percibida en el colegio. Así se corrobora la Hipótesis 4, ya que los niños más vulnerables, los que están expuestos a situaciones adversas más frecuentemente, son los más beneficiados del efecto moderador de la naturaleza cercana. Por ello, la diferencia en niveles de estrés es más apreciable entre los niños de los grupos 1 y 2 que entre los grupos 3 y 4. Véase Figura 9.

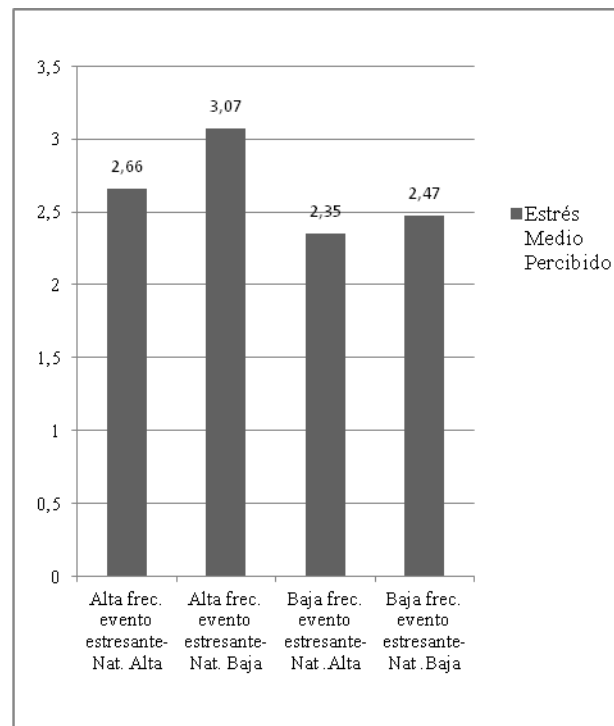


Figura 9. Nivel de estrés según la naturaleza percibida diariamente y el evento estresante los padres discuten delante del niño.

Se puede concluir que el nivel de estrés de los niños disminuye conforme aumenta la cantidad de naturaleza cercana.

Efecto moderador de la naturaleza cercana.

Para evaluar el efecto moderador de la naturaleza, se ha seguido el procedimiento indicado por Baron y Kenny (1986). Para ello, se ha calculado la variable interacción entre cada uno de los eventos estresantes y la naturaleza cercana y, posteriormente, se han llevado a cabo regresiones jerárquicas.

Se evaluó el posible efecto moderador de la naturaleza percibida por los niños. Dentro de todas las combinaciones realizadas para calcular la interacción entre naturaleza percibida por los participantes (en el entorno del colegio, en casa y en su día a día) y cada uno de los cinco eventos estresantes, tres interacciones han resultado significativas, indicando que existe efecto moderador de la naturaleza. A continuación, se presentan las regresiones jerárquicas de dichas interacciones así como los gráficos donde se observa el efecto de interacción.

La naturaleza cercana percibida en el entorno de la casa modera el efecto negativo del evento estresante *los padres discuten delante del niño* ($F(1,168) = 4.47, p < .001$) (véase Tabla 3). El efecto de las discusiones de los padres en el nivel de estrés percibido de los niños en casa varía en función de la cantidad de naturaleza presente en el entorno de la casa. Igualmente, la naturaleza percibida en el patio del colegio modera el efecto negativo del evento estresante *no tener nada que hacer*, cuando el estrés en el colegio es tenido en cuenta como variable dependiente, siendo $F(1,168) = 8.74, p < .001$, así como cuando se tiene en cuenta el estrés en casa, $F(1,168) = 4.48, p < .05$ (véase Tablas 4 y 5).

Tabla 3

Efecto moderador de la naturaleza percibida en casa sobre los efectos negativos de las discusiones de los padres delante del niño. Variable dependiente: estrés en casa. N = 172

Modelo	Predictora	R ² Total	ΔR ²	F (ΔR ²)	β
Efecto principal	Padres discuten	.44	.44	137.90***	.66***
Efecto principal	Nat. Perc. Casa	.50	.06	21.96***	-.25***
Interacción	Nat. Perc. Casa X Padres discuten	.51	.013	4.47***	.34*

*p < .05. **p < .01. *** < .001

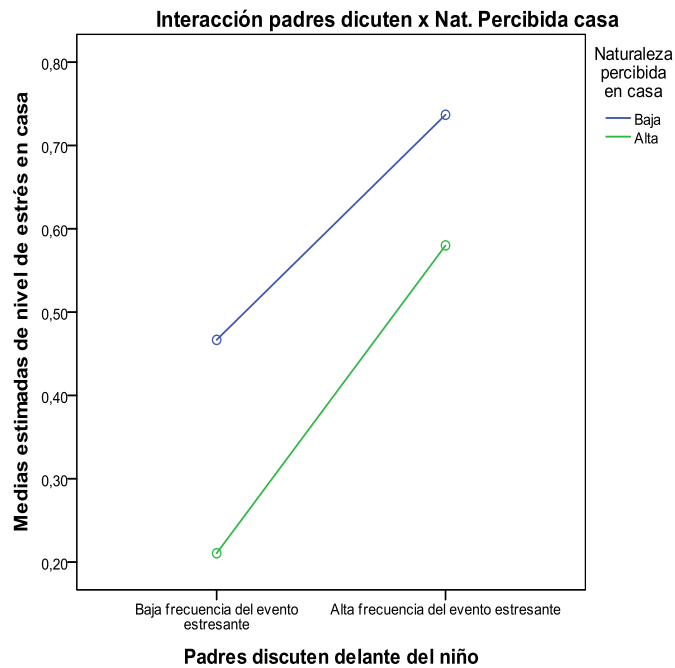


Figura 10. Efecto moderador de la naturaleza percibida sobre el evento estresante los padres discuten delante del niño. Variable dependiente: estrés en casa.

Tabla 4

Efecto moderador de la naturaleza percibida en el colegio sobre los efectos negativos del evento estresante no tener nada que hacer. Variable dependiente: estrés en el colegio. N = 172

Modelo	Predictora	R ² Total	ΔR^2	F (ΔR^2)	β
Efecto principal	Nada que hacer	.23	.23	49.51***	.47***
Efecto principal	Nat. Perc. Colegio	.27	.05	11.13***	-.22***
Interacción	Nat. Perc. Colegio X Nada que hacer	.31	.04	8.74***	.74***

*p < .05. **p < .01. *** < .001

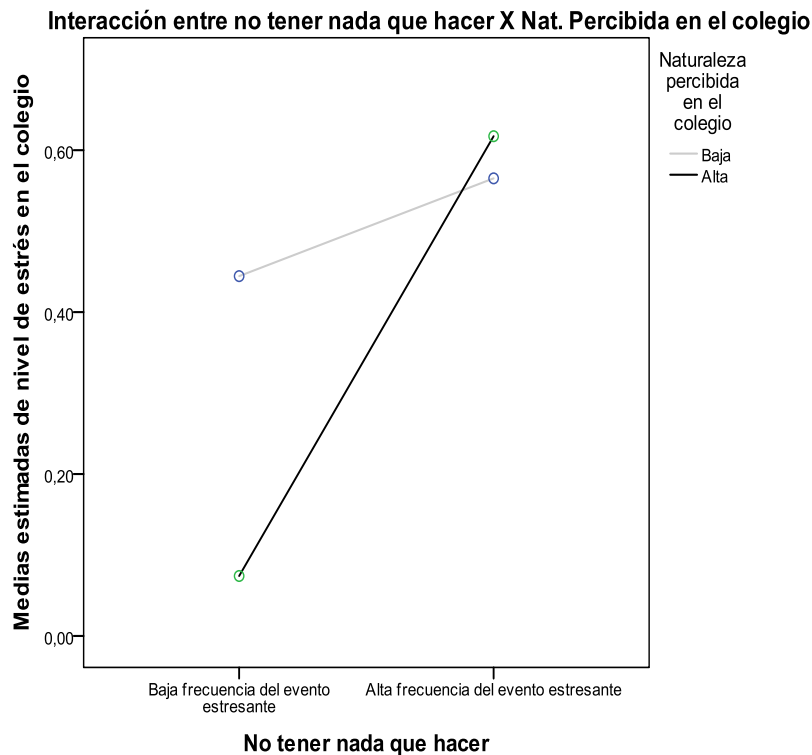


Figura 11. Efecto moderador de la naturaleza percibida en el colegio sobre el evento estresante no tener nada que hacer. Variable dependiente: estrés en el colegio.

En la Figura 11 se observa que el nivel de estrés de los niños es mayor cuando la naturaleza percibida por los mismos es baja. Cuando la frecuencia del evento estresante es alta, el nivel de estrés es alto. Sin embargo, los niveles de estrés disminuyen cuando la cantidad de naturaleza percibida es alta y la frecuencia del evento estresante es baja, acentuándose aún más esta disminución del estrés cuando la naturaleza percibida es alta.

Tabla 5

Efecto moderador de la naturaleza percibida en el colegio sobre los efectos negativos del evento estresante no tener nada que hacer. Variable dependiente: estrés en casa. N = 172

Modelo	Predictora	R ² Total	ΔR ²	F (ΔR ²)	β
Efecto principal	Nada que hacer	.15	.15	29.63***	.38***
Efecto principal	Nat. Perc. Colegio	.17	.02	3.69*	-.13*
Interacción	Nat. Perc. Colegio X Nada que hacer	.18	.02	4.48*	.57*

*p < .05. **p < .01. *** < .001

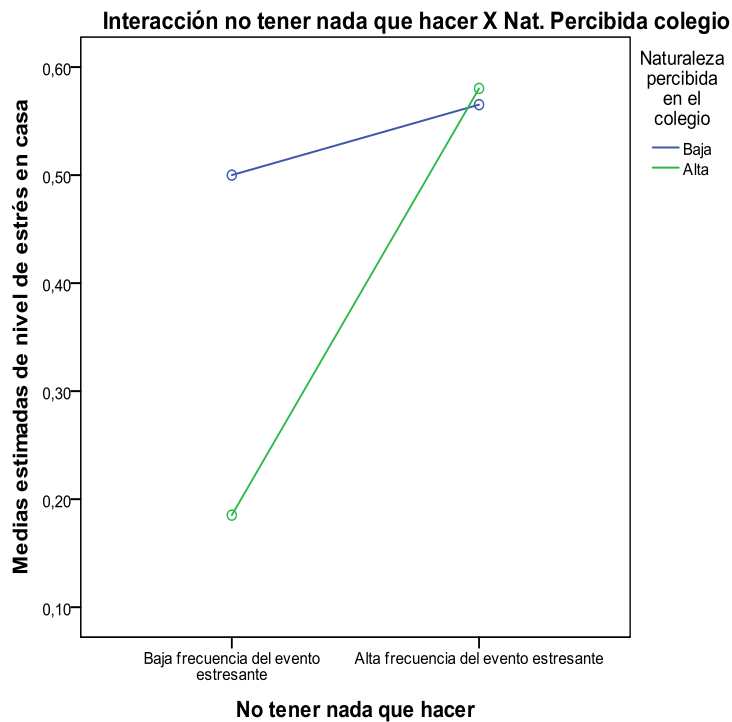


Figura 12. Efecto moderador de la naturaleza percibida en el colegio sobre el evento estresante no tener nada que hacer. Variable dependiente: estrés en casa.

La Figura12 muestra que los niveles de estrés de los niños son altos cuando la frecuencia de eventos estresantes es alta. Sin embargo, cuando baja la frecuencia de eventos estresantes baja también el nivel de estrés, disminuyendo aún más si hay presencia de naturaleza cercana.

Estos resultados corroboraron la Hipótesis 3.

3.1.5. Discusión.

La naturaleza cercana a la población infantil modera los efectos negativos de algunas de las situaciones estresantes. De este modo, aquellos niños que disfrutan de un mayor contacto con el medio natural son capaces de afrontar mejor algunas de las situaciones adversas a las que son expuestos habitualmente. Esto hace que sufran menos estrés del que cabría esperar si no contasen con este factor protector que es la naturaleza. El impacto de los eventos estresantes en los niños es menor cuando la cantidad de naturaleza cercana es mayor y este efecto positivo del contacto con el medio natural es más apreciable en aquellos niños más vulnerables, en consonancia con los resultados obtenidos por Wells (2000) y Wells y Evans (2003).

En este trabajo se ha tenido en cuenta el efecto moderador de la naturaleza percibida por los niños, algo que no se ha considerado en los trabajos de referencia precedentes (Wells y Evans, 2003). Los datos recogidos en este estudio muestran que la naturaleza percibida en los cuatro centros educativos es distinta y que el estrés medio de los niños de cada colegio también difiere. Se puede concluir que los niños de los centros más naturales son capaces de sobrellevar mejor algunos de los eventos estresantes que los de los no naturales. Esto refuerza el papel que juega la cantidad de naturaleza que la población infantil tiene a su alrededor en el colegio y el entorno de éste.

De las cinco situaciones estresantes estudiadas, en dos de ellas (la inducida por la existencia de frecuentes discusiones de los padres delante del niño y la inducida por no tener nada que hacer) se comprueba que los efectos negativos de las mismas en el niño son amortiguados de manera significativa por la naturaleza cercana.

En suma, la experiencia de vivir en un entorno natural puede amortiguar el efecto de algunos eventos estresantes. De aquí se deduce la importancia estratégica que tiene la inclusión de elementos naturales en los entornos residenciales y educativos. La salud y el bienestar también dependen de que estos entornos promuevan contactos frecuentes con elementos naturales.

Limitaciones del estudio

En primer lugar, se ha concluido que la naturaleza tiene efecto moderador sobre los eventos estresantes a los que son expuestos los niños, pero no se ha mencionado el motivo. La explicación más plausible, tal y como señalan Wells y Evans (2003), es que los niños se estén beneficiando del efecto restaurador del contacto con la naturaleza. Es decir, el contacto con la naturaleza ayudaría a restablecer el equilibrio psicológico de los niños, de tal manera que sean capaces de recuperar la capacidad de atención directa y de pensar de manera más clara (Kaplan, 1995), pudiendo así sobrellevar mejor los eventos estresantes a los que son expuestos. Futuros estudios podrían tener en cuenta la restauración percibida por los niños en los patios de los colegios y la relación de

esta variable con el nivel de estrés de los niños así como con la naturaleza presente en el colegio.

Por otro lado, durante la recogida de datos no se ha tenido en cuenta el uso que los niños dan a las zonas naturales. El que los niños tengan cerca un área verde no implica que tengan acceso a ella, con lo cual no podrían beneficiarse del contacto con la naturaleza. La frecuencia de uso de las zonas verdes, el tipo de actividades que se realizan en ellas y con quién, son variables que deberían incluirse en futuros trabajos.

A pesar de las limitaciones, los resultados aquí presentados son importantes, ya que pueden ser aplicados en el diseño de espacios que vayan a ser utilizados por la población infantil, de manera que se incluyan elementos naturales. Esto podría servir para mejorar la salud mental de los niños, previniendo el estrés que éstos sufren al ser expuestos a las adversidades diarias.

3.2. Estudio 2. Restauración percibida infantil: Influencia del tipo de patios escolares en la experiencia restauradora

El presente trabajo² se centra en estudiar la morfotipología de los patios escolares en la restauración percibida infantil. Para ello se ha adaptado la *Perceived Restorativeness Components Scale for Children II (PRCS-C II*; Bagot et al., 2007) para su uso con una muestra infantil española. Se estudiará la restauración percibida por los niños según variables sociodemográficas y su relación con la preferencia. Ya se ha comentado anteriormente que la mayoría de trabajos sobre restauración se han llevado a cabo con adultos y estudiantes universitarios (Berto, 2005; Hartig et al., 1997; Laumann et al., 2001; Pals et al., 2009). Sin embargo, la restauración percibida por la población infantil ha sido muy poco estudiada. En el presente trabajo se continúa con la evaluación del ambiente escolar, pretendiendo analizar la restauración que los niños perciben en los patios de los colegios. Tal y como han sugerido varios investigadores, el estudio de la restauración efectiva y percibida en los colegios es importante puesto que son lugares donde los niños pasan gran parte de su tiempo, son

² Este estudio será parcialmente publicado en Corraliza, J. A., Collado, S., & Bethelmy, L. (*en prensa*). Children's perceived restoration: Adaptation of the PRCS for Children to a Spanish sample. *Psycology*.

accesibles y los estudiantes emplean gran parte de sus recursos (físicos, psicológicos y sociales) en ellos (Bagot, 2004; Taylor et al., 2001; Wells, 2000; Wells y Evans, 2003). Para evaluar esta variable en la población infantil, es necesario contar con un instrumento fiable. Como se ha comentado en el capítulo 1, la PRCS-C II de Bagot et al. (2007) es el único instrumento diseñado hasta el momento con este fin y, a nuestro conocimiento, no ha sido utilizado más allá de los estudios llevados a cabo por los autores del mismo.

De acuerdo con Hartig et al. (1997), una escala para medir restauración percibida deber ser capaz de registrar los componentes de ART y, a la vez, distinguir entre ambientes que teóricamente difieren en cuanto a su nivel de propiedades restauradoras. Los lugares más naturales son, en general, más restauradores (véase Kaplan & Kaplan, 1989; Ulrich et al., 1991). Bagot (2004) no midió explícitamente la naturalidad de los dos ambientes que evaluó (patios de colegio y bibliotecas), sino que asumió que los patios de los colegios son más naturales que las bibliotecas. Aunque esto puede resultar razonable, sería conveniente utilizar un instrumento de medida que ayude a clasificar objetivamente ambientes con distinta cantidad de naturaleza.

Cabe recordar aquí que las propiedades restauradoras no son parte únicamente del ambiente ni de la persona, sino de la relación persona-ambiente (Kaplan, 2001). Esto indica que los ambientes restauradores pueden diferir según distintas personas y también con el tiempo. Siguiendo las indicaciones de Bagot (2004), en este estudio se evaluarán las posibles diferencias en cuanto al

potencial restaurador de los patios de los colegios según la edad y el sexo de los participantes. Estudios previos con población infantil no han encontrado diferencias según la edad aunque sí en función del sexo, percibiendo los niños el patio del colegio como más restaurador que las niñas (Bagot, 2004).

Relación entre restauración y preferencia.

Los ambientes naturales son preferidos, en general, sobre los ambientes no naturales (Kaplan & Kaplan, 1989; Hartig, 1993; Hartig & Staats, 2006). Kaplan y Kaplan (1989, p. 189) afirman que “un ambiente preferido es probable que sea restaurador”. En opinión de algunos autores, la razón de esta preferencia hacia los lugares naturales viene determinada por el efecto restaurador de este tipo de ambientes (Hartig & Staats, 2006; Staats & Hartig, 2004; Staats et al., 2003; Van den Berg et al., 2003). Así, de acuerdo con Van den Berg et al. (2003, p. 136), “en base a la funcionalidad que la preferencia tiene para nuestra especie, se puede esperar una relación positiva entre un ambiente particular y su capacidad de restauración del estrés o de la fatiga mental”. La restauración psicológica y física es entendida como un proceso adaptativo que ayuda a las personas a recuperar los recursos desgastados por su uso (Staats, *in press*). Esto vendría a indicar que la preferencia que las personas muestran sobre lugares naturales en contraposición a los urbanos se debe, al menos en parte, a las experiencias restauradoras que pueden darse en estos ambientes. De acuerdo con Van den Berg et al. (2003), esto significa que la preferencia de las personas

hacia lugares naturales o construidos estará mediada por las experiencias restauradoras que pueden darse en esos ambientes.

Los estudios sobre preferencia llevados a cabo con población infantil son escasos y los resultados son más variados que en el caso de muestras de población general. Tal y como señalan Castonguay y Juntras (2009), los trabajos sobre los lugares que prefieren los niños, realizados durante la época de los 90 muestran que la población infantil prefería lugares con presencia de elementos naturales. Sin embargo, esta tendencia ha disminuido y, aunque los lugares naturales siguen estando entre los preferidos por los niños, compiten con otros tipos de escenarios como por ejemplo lugares donde se juegan deportes organizados. Korpela, Kytta y Hartig (2002) llevaron a cabo un trabajo en el que evaluaron los lugares favoritos de 55 niños de entre 8 y 13 años. Los participantes rellenaron un cuestionario con preguntas abiertas y cerradas sobre sus lugares favoritos, las características de los mismos, las razones por las que van allí, sus sentimientos y emociones antes de ir al lugar favorito y sus actividades, pensamientos y estados de ánimo, entre otros. Los resultados de estos autores mostraron que, al contrario que los adultos, que suelen nombrar lugares naturales y residenciales como los más preferidos (Korpela, Hartig, Kaiser y Furher, 2001), los niños mencionaron con la misma frecuencia escenarios donde se puede practicar deporte, lugares residenciales, espacios naturales y lugares comerciales. Aunque los investigadores también consideraron importante estudiar la influencia del género o la edad en la elección de un lugar favorito por parte de los niños, no encontraron diferencias acordes

con estas variables sociodemográficas. Otro de los objetivos del estudio de Korpela et al. (2002) fue evaluar la relación entre los lugares favoritos de los niños y el uso de estos espacios con fines restauradores. Así, el 75% de los participantes que dieron respuestas consistentes indicaron que acudían a su lugar favorito para olvidarse de sus problemas, reflexionar, aclarar las ideas y sentirse libres y relajados. Además, un 27% de los niños dijo acudir a su lugar favorito después de sufrir eventos emocionales negativos o para obtener restauración cognitiva y relajación.

En otro trabajo, Malinowski y Thurber (1996) evaluaron los lugares preferidos de un grupo de niños (sólo varones) de entre 8 y 16 años que participaban en un campamento de dos semanas de duración. De entre los 10 lugares más frecuentemente nombrados como favoritos destacaron los lugares con agua, como el lago que obtuvo una frecuencia de 22.7%. La cabaña fue el segundo lugar más elegido, con un 12.4% de frecuencia. Es interesante resaltar que entre las razones mencionadas por los participantes para elegir un lugar como favorito están las estéticas y cognitivas, como que sea bonito o que te deje pensar. Además, los autores subrayan que las razones para elegir un sitio como preferido varían según la edad, desde los más pequeños que nombran sobre todo las actividades que se pueden llevar a cabo en dichos lugares, a los más mayores, que destacan la preferencia estética y el uso cognitivo.

En un estudio más reciente, Castonguay y Juntras (2009) evaluaron los lugares que les gustan a los niños de entre 7 y 12 años y, de entre estos

escenarios, los favoritos. Para ello un grupo de niños tomó fotografías de esos sitios y sus espacios favoritos en su barrio. Además, explicaron las razones por las que habían elegido esos lugares. De relevancia para el presente trabajo es el resultado de que el 75% de los niños mencionaron la presencia de elementos naturales como razón por las que les gustaba un determinado escenario.

En relación a los patios de los colegios, Ozdemir y Yilmaz (2008) mostraron que el 33% de los participantes en su estudio no estaban satisfechos con su patio y el 35% de los niños señalaron la falta de árboles y de elementos naturales como causa de su insatisfacción. Además, se les pidió que describieran su patio ideal y el 39% de los niños lo definieron como un lugar lleno de árboles, hierba y elementos naturales.

En cuanto a la relación entre la preferencia y la restauración, Van den Berg et al. (2003) llevaron a cabo un experimento con universitarios de Los Países Bajos. En primer lugar, los participantes rellenaron una escala sobre estados de ánimo tales como depresión, enfado, tensión, felicidad o estrés. Seguidamente, vieron un video cuyo objetivo era aumentar sus niveles de estrés. Al terminar, los sujetos rellenaron de nuevo el cuestionario sobre estados de ánimo y, a continuación, vieron un video de entre cuatro al azar, representando paseos por lugares naturales o contruidos. Los videos fueron evaluados en función de distintas características, entre ellas su preferencia y la cantidad de naturaleza. Una vez hecho esto, rellenaron de nuevo el cuestionario de estados de ánimo y, después, hicieron un test de concentración. Los resultados del

estudio mostraron que los participantes preferían los videos de paseos por lugares naturales sobre los videos de paseos por espacios urbanos. Además, la restauración afectiva y cognitiva promovida por los paseos naturales fue mayor que la evocada por los urbanos. Finalmente, se evaluó el papel mediador que la restauración afectiva puede tener sobre la preferencia expresada por los sujetos. Van den Berg et al. (2003) concluyeron que la relación entre el tipo de paseo (natural vs. no natural) y la preferencia expresada por los sujetos estaba parcialmente mediada por la restauración afectiva que los sujetos experimentan en este tipo de ambientes.

3.2.1. Objetivos e hipótesis.

Los objetivos del presente trabajo son, en primer lugar, adaptar la PRCS-C II a la población infantil española. En segundo lugar, evaluar la restauración percibida por los niños según la distinta cantidad de naturaleza incluida en los patios de los colegios. En tercer lugar, estudiar las posibles diferencias en cuanto a la restauración percibida según la edad y el género de los participantes y, finalmente, evaluar la preferencia de la población infantil hacia el patio de su colegio y si ésta está mediada por las posibilidades restauradoras percibidas en estos escenarios. Para ello, se han elegido patios con naturaleza y sin naturaleza, ya que, acorde con los aportes teóricos, estos dos tipos de ambientes diferirán en las cualidades restauradoras, siendo más restauradores los ambientes más naturales (Kaplan, 1995). Así podrá comprobarse la sensibilidad de la escala

para discernir las diferencias entre ambientes que teóricamente difieren en cuanto a sus cualidades restauradoras.

Se espera, tal y como sugieren Bagot (2004) y Bagot et al., (2007), encontrar una estructura factorial de 5 factores (Hipótesis 1). Además, coincidiendo con los resultados de estudios anteriores llevados a cabo con adultos (Hartig et al., 1997; Laumann et al., 2001), se cree que los ambientes más naturales serán evaluados como más restauradores (Hipótesis 2). Se prestará atención a las posibles variaciones según el género y la edad de los participantes. Acorde con los resultados de Bagot (2004), se espera que los niños perciban el patio como más restaurador que las niñas (Hipótesis 3). Además, se cree que habrá diferencias según la edad de los participantes. Bagot (2004) no encontró diferencias y, para nuestro conocimiento, no existen más estudios que hayan tenido en cuenta la edad como factor influyente en la restauración percibida. Por ello, no se propone ninguna hipótesis en este sentido. Finalmente, se espera que la preferencia que muestran los niños hacia los patios se deba, al menos en parte, a las características restauradoras que los participantes perciben en ellos (Hipótesis 4).

3.2.2. Método.

Participantes.

Se recogieron datos de un total de 846 niños y niñas de entre 6 y 13 años de la ciudad y provincia de Cuenca. De éstos, 832 fueron utilizados en el estudio. El resto se desecharon debido a que eran cuestionarios incompletos. La edad media fue de 10 años ($DE = 1.30$). El 48.8% de los participantes era niños y el 51.2% niñas. Se visitaron un total de 19 colegios y se analizaron 20 patios (un colegio tenía dos patios).

Instrumentos.

a) Perceived Restorative Components Scale for Children (PRCS-C II).

La PRCS-C II fue traducida y adaptada al castellano por tres personas distintas. La versión en castellano fue traducida de nuevo al inglés por un profesor nativo. En el estudio de Bagot et al. (2007) se decidió eliminar el siguiente ítem: “creo que el patio del colegio es aburrido”, aun con una carga factorial por encima de .30 en uno de los factores obtenidos. Los autores no explican el motivo de la eliminación, por ello se decidió mantenerlo para evaluar los resultados con la muestra española, contando así la PRCS-C II con 16 ítems. La PRCS-C II en español fue revisada por una maestra de primaria y pedagoga, y se realizaron los cambios oportunos a fin de facilitar a los niños la comprensión de los ítems.

b) Preferencia hacia el patio de su colegio.

Los estudiantes tuvieron que señalar su nivel de acuerdo con tres premisas: 1) “creo que el patio del colegio es el mejor lugar para pasarlo bien”, 2) “me gusta el patio de mi colegio tal y como está” y 3) “el patio del colegio es un buen lugar para estar a gusto”. La consistencia interna medida mediante el alfa de Cronbrach fue de .68. No fue alta pero es aceptable teniendo en cuenta el bajo número de ítems que componen la escala (Anastasi y Urbina, 1997).

c) Escala de Observación de Naturaleza Cercana.

Esta escala ha sido descrita en el estudio anterior y puede verse en el Anexo 1. Sirve como un registro observacional de la cantidad de naturaleza a la que tienen acceso los niños. En este trabajo sólo se usó la subescala que cuenta con 4 ítems y registra la cantidad de naturaleza en el entorno escolar.

d) Naturaleza percibida.

Percepción que el niño tiene de la cantidad de naturaleza presente en el patio de su colegio mediante el siguiente ítem: «Creo que el patio de mi colegio es natural», a lo que el niño podía contestar señalando una de las cuatro posibles respuestas: 1 (No, para nada), 2 (Sí, hay un poco de naturaleza), 3 (Sí, hay bastante naturaleza) y 4 (Sí, hay mucha naturaleza).

El cuestionario puede verse en el Anexo 4.

Procedimiento.

Los datos fueron recogidos durante las horas de clase en grupos de 25 niños aproximadamente. Se pidió a los participantes que indicasen hasta qué punto estaban de acuerdo con las frases que se les planteaban, en una escala tipo Likert del 1 (totalmente en desacuerdo) al 5 (totalmente de acuerdo). Para facilitar la comprensión lectora, se añadieron símbolos familiares al lado de cada posible respuesta (Dillman, 2007). Así, *totalmente de acuerdo* queda simbolizado con dos dedos hacia arriba, *de acuerdo* con un dedo hacia arriba, *no estoy seguro* con un símbolo de interrogación, *en desacuerdo* con un dedo hacia abajo y *totalmente en desacuerdo* con dos dedos hacia abajo. Se les indicó que el trabajo que estaban realizando era anónimo y que no había respuestas buenas ni malas. Cada ítem fue leído en voz alta dos veces. Una vez terminada la recolección de los datos, se les explicó el propósito del estudio, se les agradeció el tiempo empleado y se respondió a todas las preguntas que quisieron formular.

Los patios de los colegios se clasificaron atendiendo a la cantidad de naturaleza presente en ellos, con la Escala de Observación de Naturaleza Cercana, en patios naturales y no naturales. Además, se ha tenido en cuenta la naturaleza percibida por los niños en los patios de los colegios.

3.2.3. Análisis de los datos.

Los datos fueron analizados con el programa estadístico SPSS (v.18.0). En primer lugar, se llevó a cabo un análisis factorial exploratorio de ejes principales y rotación oblínica para determinar la estructura factorial del instrumento. Los factores obtenidos fueron analizados con el objetivo de determinar su consistencia interna hallando el alfa de Cronbach. Seguidamente, se calcularon las puntuaciones de los sujetos en cada uno de los factores y se llevaron a cabo análisis *t*-Student para comparar las puntuaciones obtenidas según la cantidad de naturaleza del ambiente evaluado, así como las posibles diferencias debidas a la edad y al género de los participantes. Finalmente, se analizó el posible efecto mediador de la restauración percibida en los patios de los colegios con respecto a la preferencia que los niños muestran hacia los mismos, siguiendo el modelo de mediación de Baron y Kenny (1986) y utilizando el test de Sobel.

3.2.4. Resultados.

Dimensionalidad de la escala.

En primer lugar, se comprobó que la muestra era adecuada para poder llevar a cabo un análisis factorial. Para ello, se calcularon las medidas de adecuación muestral: la de Kaiser-Meyer-Olkin resultando adecuado, con valores próximos a 0.9 (0.82), y el contraste de esfericidad de Bartlett, que

resultó ser significativo. Con ello se deduce que la aplicación del análisis factorial es pertinente al conjunto de las variables observadas en el presente estudio (Pérez, 2004).

Los resultados obtenidos del análisis factorial mostraron que había un total de 5 autovalores mayores que 1.0. El gráfico de sedimentación indicó que podrían extraerse cinco factores, con una separación inicial entre los tres primeros y los dos últimos. La presencia de 5 factores fue consistente con los resultados obtenidos por Bagot (2004) y Bagot et al. (2007), así como con los obtenidos por los autores de los instrumentos diseñados para adultos (Laumann et al., 2001).

Al examinar la matriz de componentes rotados, se observó que dos de los ítems, el 15 “creo que el patio del colegio es aburrido” y el 16 “creo que todas las zonas del patio del colegio son como pequeños patios unidos juntos”, no cargaban por encima de .30 en ninguno de los factores; por lo tanto, se decidió eliminarlos. El resultado final fue una escala formada por 5 factores y 14 ítems. Los factores se denominaron, teniendo en cuenta el contenido de los ítems que cargaban en cada uno de ellos y siguiendo la denominación utilizada por Bagot et al. (2007), como: *fascinación* (Fas.), *evasión física* (Ev. Fís.), *evasión psicológica* (Ev. Psic.), *compatibilidad* (Comp.) y *extensión* (Ext.). Los componentes de cada uno de los factores, su autovalor y su consistencia interna pueden verse en la Tabla 6. Los factores cumplen tanto los criterios teóricos como estadísticos.

Tabla 6

Análisis factorial de la escala de componentes restauradores para niños

Ítems	Fas.	Ev. Psic.	Ev. Fís.	Comp.	Ext
3. Hay muchas cosas que descubrir en el patio del colegio	.74				
7. Hay muchos lugares interesantes para mí en el patio del colegio	.87				
10. Hay muchas cosas en el patio del colegio que me gustan mucho.	.54				
13. Hay muchas cosas interesantes que ver en el patio del colegio.	.81				
2. Cuando estoy en el patio del colegio me siento libre de todas las cosas que los maestros quieren que haga.		.83			
6. Cuando estoy en el patio del colegio me siento libre de las horas de clase y de las tareas que hacemos en clase.		.89			
12. Cuando estoy en el patio del colegio no pienso en las cosas que tengo que hacer.		.76			
1. Cuando estoy en el patio del colegio hago cosas distintas a cuando estoy en la clase.			.67		
4. Cuando estoy en el patio del colegio siento que todo lo que me rodea es distinto al ambiente de la clase.			.83		
9. Cuando estoy en el patio del colegio siento como si estuviese en un lugar distinto a cuando estoy en la clase.			.65		
5. Las cosas que me gusta				.85	

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hacer puedo hacerlas en el patio del colegio.					
11. Las cosas que quiero hacer puedo hacerlas en el patio del colegio.				.80	
8. Puedo hacer muchas cosas diferentes en alguna de las zonas del patio del colegio.					.73
14. Hago cosas distintas en las distintas zonas del patio del colegio.					.85
Autovalor	4.87	2.51	1.52	1.20	1.06
Alfa de Cronbach	.85	.87	.76	.82	.78

Nota: el ítem que cargaba < .30 ha sido eliminado. (Fas = fascinación, Ev. Psic = evasión psicológica, Ev. Fís = evasión física y Div. Estimular = Diversidad estimular).

Siguiendo las recomendaciones de Bagot (2004) y Bagot et al. (2007), se ha calculado una medida de restauración percibida total, como la media de las puntuaciones en cada factor. El alfa de Cronbach de la restauración total, con 14 ítems es de .83, siendo ésta adecuada. El siguiente paso fue hallar correlaciones entre los factores. Los resultados mostraron que todas las correlaciones fueron positivas y significativas, pero ninguna con valores superiores a .70 (véase Tabla 7).

Tabla 7

Correlaciones de Pearson entre los cinco factores de la PRCS-C II

	Fascinación	Evasión Psicológica	Evasión Física	Compatibilidad
Evasión psicológica	.16***			
Evasión física	.16***	.35***		
Compatibilidad	.43***	.23***	.10***	
Extensión	.39***	.19***	.22***	.32***

*p < .05. **p < .01. *** < .001

Diferencias según la cantidad de naturaleza, la edad y el género.

Para comprobar si la PRCS-C II adaptada al castellano es capaz de distinguir entre distintos ambientes que teóricamente difieren en cuanto a las propiedades restauradoras, se han llevado a cabo análisis de *t*-Student, teniendo en cuenta la cantidad de naturaleza presente en el patio del colegio. Como se ha comentado, los patios de colegio se seleccionaron según la cantidad de naturaleza presente en los mismos para así tener patios con distinta naturalidad. Para hacer dicha selección, se utilizó la Escala de Observación de Naturaleza Cercana. Por otra parte, se tuvo en cuenta la naturaleza percibida por los niños en el patio del colegio. La naturaleza percibida por los usuarios de un lugar ha sido utilizada como medida de la naturalidad en estudios con adultos (Hur, Nasar y Chun, 2010) y con niños (Cheng y Monroe, 2012). En el caso del presente trabajo, existió una correlación positiva significativa (.62, $p < .001$) entre la naturalidad obtenida con la escala de Observación de Naturaleza Cercana y la Naturaleza Percibida por los niños.

En primer lugar, se comprobó que no existiesen diferencias en la naturaleza percibida según la edad de los niños. Para ello, los participantes se dividieron en grupos de edad de manera que el primer grupo estaba formado por los niños más pequeños, de 6 a 9 años, y el segundo grupo por los más mayores, de 10 a 13 años. Los grupos se establecieron de esta manera basándonos en el procedimiento seguido por Bagot (2004). Además, de acuerdo con Kahn (1999), los valores que los niños tienen hacia la naturaleza son distintos en estos dos

rangos de edad. Los niños de entre 6 y 9 años son conscientes de la importancia de los animales como seres vivos en sí mismos y entienden que los animales pueden sufrir dolor y estrés. Entre los 9 y los 12, años, Kahn (1999) afirma que aumenta el conocimiento que los niños tienen sobre los animales y la naturaleza. En nuestro caso, no se encontraron diferencias significativas en cuanto a la naturaleza que perciben cada uno de los grupos, pudiendo afirmarse que la manera de percibir la naturalidad de los patios de los colegios por parte de los niños no depende de su edad. Así, para llevar a cabo análisis de *t*-Student, los patios se clasificaron en dos grupos: patios no naturales y patios naturales.

A continuación, se calculó la puntuación media para cada uno de los cinco factores así como la puntuación media total de la escala. Como puede verse en la Tabla 8, la media de todos los factores así como la puntuación total en la PRCS-C II (calculando la media de las puntuaciones de cada factor), fueron significativamente mayores en los patios de los colegios naturales que en los no naturales. Además, se estudió la posible existencia de diferencias en las puntuaciones de los factores según la edad de los participantes. Los niños más pequeños evaluaron el patio de su colegio como más fascinante, más compatible y con mayor extensión que los más mayores. No se han encontrado diferencias significativas según el género de los participantes.

Tabla 8

Medias, desviaciones típicas y test de t-Student para los cinco factores y la puntuación total de restauración entre dos ambientes (patios naturales - patios no naturales) y según la edad

	Fascinación		Evasión Física		Evasión Psicológica		Compatibilidad		Extensión		Total	
	<i>M</i>	<i>DE</i>	<i>M</i>	<i>DE</i>	<i>M</i>	<i>DE</i>	<i>M</i>	<i>DE</i>	<i>M</i>	<i>DE</i>	<i>M</i>	<i>DE</i>
Muestra Total												
Patio Natural	3.71	0.82	4.77	0.41	4.50	0.71	3.90	3.45	3.95	0.89	4.17	0.45
Patio no natural	3.03	0.95	4.45	0.71	3.85	1.06	3.45	1.10	3.54	1.11	3.67	0.62
Valor de t	10.78***		8.21***		10.52***		-6.53***		-5.77***		-13.28***	
Edad												
Niños Pequeños	3.90	0.81	4.73	0.58	4.33	0.97	4.33	0.76	4.10	0.93	4.29	0.47
Niños Mayores	3.46	0.91	4.64	0.55	4.25	0.92	3.70	0.97	3.77	0.98	3.96	0.57
Valor de t	4.80***		1.48		0.93		6.67***		3.32***		5.64***	

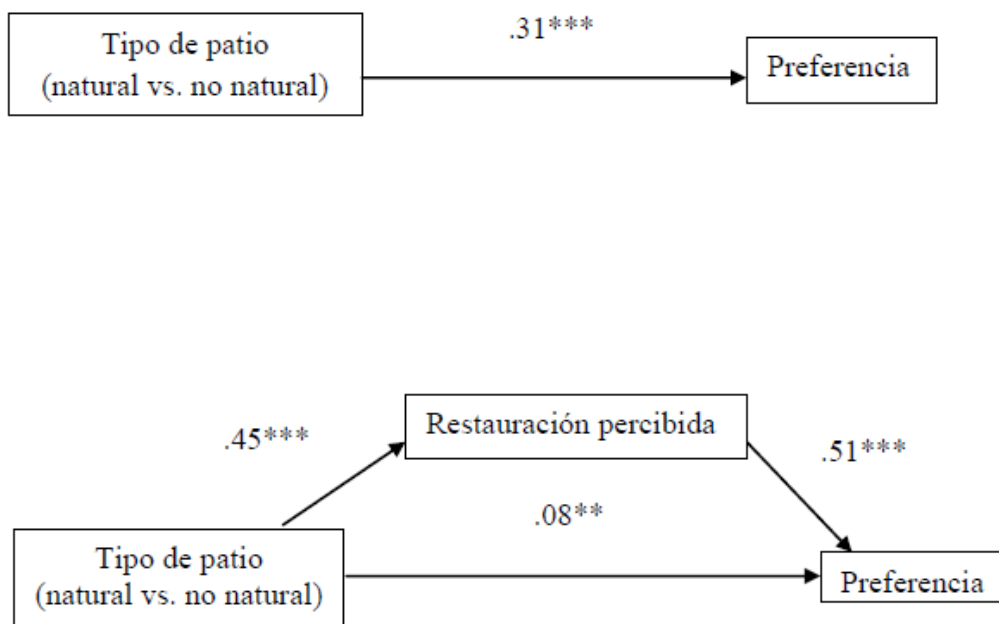
Nota: las diferencias significativas están señaladas en el texto. * $p < .05$. ** $p < .01$. *** $< .001$.

Relación entre preferencia y restauración.

La preferencia mostrada por los niños hacia su patio del colegio es relativamente alta ($M = 3.78$, $DE = 0.9$).

Una vez comprobado esto, se llevó a cabo un análisis de mediación siguiendo el procedimiento descrito por Baron y Kenny (1986) y utilizando como variable mediadora la puntuación total en la escala de restauración percibida. En primer lugar, se realizó una regresión en la que el tipo de patio (natural vs. no natural) fue la variable predictora y la preferencia la variable dependiente. Los resultados mostraron que el tipo de patio de colegio (natural o no natural) predecía significativamente la preferencia de los niños hacia el patio de su colegio, $\beta = .31$, $t = 9.48$, $p < .001$. En general, los patios más naturales fueron más preferidos ($M = 4.00$, $DE = 0.78$) que los no naturales ($M = 3.40$, $DE = 0.97$). Seguidamente, se llevó a cabo un análisis de regresión en el que la variable mediadora (la restauración percibida por los niños) actuaba de variable dependiente y el tipo de patio de colegio, de independiente. En este caso, se observó que el tipo de patio de colegio también predecía significativamente la restauración percibida por los niños, $\beta = .45$, $t = 14.30$, $p < .001$. Finalmente, se realizó un análisis de regresión con tipo de patio de colegio y restauración percibida como variables independientes y preferencia como variable dependiente. Así, se observó que la variable mediadora, en este caso restauración percibida, predecía la preferencia, $\beta = .51$, $t = 15.83$, $p < .001$ y que el efecto del patio del colegio sobre la preferencia, aunque seguía siendo

significativo, disminuyó considerablemente, siendo $\beta = .08$, $t = 2.64$, $p < .01$. Además, se llevó a cabo un test de Sobel para comprobar que esta reducción era significativa. Los resultados obtenidos fueron: $z = 10.54$, $p < .001$. Además, el tanto por ciento de varianza explicada en cuanto a la preferencia disminuye de $R^2 = 36\%$ a $R^2 = 20.8\%$ cuando la restauración percibida no se incluye en el modelo. Estos resultados son compatibles con la hipótesis de la mediación parcial entre el tipo de patio de colegio (natural vs. no natural) y la preferencia que los niños muestran. La preferencia de los niños hacia el patio de su colegio estuvo mediada por la probabilidad de restauración que los niños perciben. La ejemplificación de la mediación puede verse en la Figura 13.



* $p < .05$. ** $p < .01$. *** $p < .001$

Figura 13. Modelo sin mediación (parte superior) y modelo con mediación (parte inferior) del efecto del tipo de patio (natural, no natural) sobre la preferencia. Nota: $N = 832$. Los coeficientes son β 's estandarizados.

3.2.5. Discusión

Los resultados obtenidos aquí son importantes por varias razones. En primer lugar, la escala puede distinguir entre ambientes con distintas cualidades restauradoras según ART, naturales y no naturales, lo cual no se había medido de manera explícita en estudios previos (Bagot, 2004; Bagot et al., 2007). Segundo, porque el instrumento es capaz de detectar diferencias según grupos de población, en este caso según la edad de los niños. Ambos criterios son esenciales para determinar la validez de un instrumento para medir restauración percibida (Bagot, 2004). Además, los resultados concuerdan con los obtenidos en estudios anteriores (Bagot, 2004; Bagot et al., 2007; Laumann et al., 2001), indicando que la PRCS-C II traducida y adaptada al español tiene un comportamiento adecuado y puede ser usada como una medida válida de la restauración percibida por la población infantil. La solución final está formada por 14 ítems y 5 factores. Así mismo, al igual que en el caso de los adultos, se ha demostrado que los niños perciben los lugares más naturales como más restauradores (Berto, 2005; Laumann et al., 2001).

Al contrario que Bagot (2004), no se han encontrado diferencias según el género de los niños. Sin embargo, sí se han hallado variaciones teniendo en cuenta la edad de los participantes en tres de los cinco factores. Así, los niños más pequeños (de 6 a 9 años) perciben el patio de su colegio como más fascinante, más compatible y con mayor extensión. La hipótesis que se baraja para explicar estas diferencias según la edad es la familiaridad. Los niños más

mayores podrían estar más familiarizados con el patio de su colegio que los más pequeños y por ello podría parecerles menos interesante, menos compatible con lo que quieren hacer y con menor extensión. Aunque Bagot (2004) no encontró diferencias según la edad de sus participantes, sí sugiere que se evalúe cómo puede influir esta variable en la restauración percibida, ya que las percepciones de los niños pueden ser diferentes de acuerdo a las distintas etapas de desarrollo (Piaget, 1980).

Por otro lado, un aporte importante de esta investigación son los resultados sobre el papel mediador de la restauración percibida en la preferencia mostrada por la población infantil. Coincidiendo con trabajos previos, los patios más preferidos por los niños (en este caso los más naturales) tienen una relación positiva con el potencial restaurador de esos lugares (Korpela et al., 2002). Así, las posibilidades de restauración percibidas por los niños en los patios de sus colegios median la preferencia mostrada por ellos. Parece ser que la preferencia tiene una base adaptativa (Van den Berg et al., 2003), haciendo que se prefieran aquellos escenarios que son percibidos como promotores de salud física y mental.

El diseño de una escala de restauración percibida que puede ser utilizada por la población infantil es una aportación importante para el estudio de los ambientes restauradores. Para nuestro conocimiento, sólo existe la PRCS-C II como instrumento para medir la restauración percibida por los niños y es la primera vez que se produce una versión en castellano. Además, la muestra de

832 niños y niñas es amplia y los resultados obtenidos coinciden con los de los participantes utilizados en los estudios de Bagot (2004) y Bagot et al. (2007), indicando que es posible la generalización de la estructura de cinco factores de restauración percibida en una población infantil. El contar con un instrumento de este tipo abre las puertas a que los niños sean tenidos en cuenta a la hora del diseño de espacios que serán utilizados por ellos, pudiendo así evaluar su potencial restaurador. Además, permite a los investigadores estudiar el papel que los elementos físicos incluidos en los patios de los colegios tienen para el bienestar psicológico de los alumnos. Un lugar tan frecuentemente utilizado como es el patio de un colegio, donde un niño puede pasar hasta 10 años de su vida, podría ser diseñado de manera que incluya elementos beneficiosos para sus usuarios. Los patios de colegio más naturales aportan beneficios psicológicos a los niños (Lindholm, 1995) y, además, el presente estudio demuestra que los niños evalúan los patios de colegio más naturales como más beneficiosos.

Limitaciones del estudio

Cabe mencionar dos limitaciones de este trabajo. En primer lugar, se tiene en cuenta las cualidades restauradoras de los patios de los colegios según son percibidas por los sujetos, lo cual crea dudas sobre si un patio más natural es realmente más restaurador que uno menos natural. Futuros estudios deberían incluir medidas adicionales de restauración efectiva, tales como los estados de ánimo de los niños o su capacidad de atención, y estudiar la relación entre la

restauración percibida por los niños en un determinado tipo de patios y la restauración efectiva. Aún así, apoyándonos en estudios previos con población infantil (Taylor y Kuo, 2011; Wells, 2000, Wells y Evans, 2003) y con adultos (Masuokuta, 2010; Tenesse y Cimprich, 1995), parece razonable pensar que los patios de colegio más naturales serían realmente más restauradores, tal y como los niños de este estudio los perciben. Además, los resultados del estudio 1 aportan en este mismo sentido.

Un segundo aspecto a puntualizar es que el análisis de mediación llevado a cabo no deja de ser un análisis basado esencialmente en técnicas de correlación. De ahí que quepa la posibilidad de que sea la preferencia la que cause restauración. Es decir, podría ser que los niños prefieran cierto tipo de ambientes porque han tenido un mayor contacto con ellos (por ejemplo, ambientes naturales) y que esto conlleve efectos restauradores. Existe la necesidad de llevar a cabo más estudios con mecanismos explicativos que sean más precisos en cuanto a la relación causal existente entre restauración y preferencia.

Se sugiere seguir estudiando la escala, proponiendo análisis confirmatorios, comparándola con otras variables similares e incluyéndola en modelos explicativos, para observar así su posible capacidad predictiva y explicativa hacia otros fenómenos relacionados con la restauración, el bienestar, el rendimiento académico y la pro-ambientalidad.

3.3. Discusión general.

En estos dos primeros trabajos se ha comprobado como la naturaleza cercana a los niños influye positivamente en su bienestar. La población infantil se beneficia del contacto directo que tiene con la naturaleza cercana a la casa y al colegio. Se han corroborado los resultados de estudios previos (Wells y Evans, 2003) que mostraron que el contar con naturaleza cercana ayuda a los niños a sobrellevar los eventos estresantes a los que se enfrentan diariamente.

Los beneficios que las características físicas de los patios de los colegios ofrecen han sido relativamente poco estudiadas. Así, los resultados aportados en este primer capítulo empírico indican que la naturaleza presente en el entorno educativo de la población infantil actúa de factor protector frente a algunas de las adversidades a las que los niños se enfrentan diariamente. Estos resultados están en línea con ART (Kaplan & Kaplan, 1989). En el primer estudio puede entenderse la capacidad de hacer frente a eventos estresantes como un indicador de la capacidad de atención de la población infantil. Futuros trabajos deberían incluir, por ejemplo, modelos de mediación en los que la restauración percibida medie la relación encontrada entre el tipo de entorno cotidiano (natural vs. no natural) y el nivel de estrés de la población infantil. Por otro lado, desde la perspectiva de los niños, se ha demostrado que los patios más naturales son percibidos como más restauradores. Se ha adaptado y utilizado la PRCS-C II con población infantil hispanoparlante y los resultados obtenidos corroboran la fiabilidad y validez de la escala.

Con estos trabajos se ha avanzado en el estudio de la relación entre restauración y preferencia en niños, pudiendo sugerirse que ambas funciones adaptativas están relacionadas y que los patios más naturales son tanto más preferidos como más restauradores.

En un momento en el que el contacto de los niños con la naturaleza está disminuyendo considerablemente (Karsten, 2005), los patios de los colegios y zonas cercanas al lugar de residencia podrían ser lugares donde la población infantil se beneficie de experiencias en la naturaleza. De acuerdo con Ozdemir y Yilmaz (2008, p. 289), “los niños necesitan jugar en la naturaleza y con la naturaleza todos los días”, de ahí la necesidad de tener en cuenta la inclusión de elementos naturales a la hora de diseñar los escenarios frecuentados por la población infantil.

A partir de los resultados presentados pueden proponerse aspectos a tener en cuenta en el diseño de los patios de colegio y lugares de residencia. En primer lugar, sería conveniente incluir elementos naturales. Entre ellos, árboles y vegetación de poca altura (arbustos, hierba, flores, etc.), preferiblemente en zonas que puedan ser vistas desde las aulas del colegio y las ventanas de las casas. Además, sería conveniente dedicar algunas zonas a suelos blandos, como por ejemplo de arena o de otros materiales compatibles que naturalicen la experiencia de estar en el patio o en el barrio.

Entre estos elementos “naturalizadores”, destaca la situación misma del centro educativo. Así, podría ser considerado más positivo ubicar los centros educativos cerca de parques o entornos naturales, hecho éste que facilitaría el contacto de los niños con elementos naturales antes y después del horario escolar. Pellegrini y Bjorkland (1997) afirman que el recreo ayuda a los niños a recuperar la atención tras el uso prolongado de ésta en las clases y, según Arbogast, Kane, Kirwan y Hertel (2009), éste sirve para disminuir la ansiedad y estrés de los niños que surgen a raíz de las tareas del colegio y de la interacción con los compañeros. Las características restauradoras de los patios de los colegios podrían facilitar la obtención de beneficios académicos y sociales en los niños (Taylor et al., 2001). Esta hipótesis aún está por demostrar, pero los resultados de estos dos estudios implican un avance en esta dirección, ya que se ha demostrado que los niños también perciben los lugares más naturales como más restauradores y que, además, la restauración percibida media la relación entre el tipo de patio de colegio y la preferencia. De acuerdo con Arbogast et al. (2009, p. 456), “los niños pasan la mitad de sus años de formación en el colegio, por lo que los investigadores deberían reconocer la necesidad de estudiar la exposición a la naturaleza en el ambiente escolar”.

Por otro lado, las diferencias según la edad encontradas en el segundo estudio llevan a pensar que quizás sería conveniente diseñar los patios de los colegios teniendo en cuenta el rango de edad de los niños que jugarán en ellos y dedicando ciertas zonas a grupos de edad más específicos. Para los niños más mayores sería interesante incluir elementos que aporten una mayor diversidad de

estímulos al patio, así como zonas más compatibles con los que lo niños más mayores suelen hacer (jugar, descansar a la sombra, charlar, comer, etc.).

Bagot (2004) utilizó la escala para medir la restauración percibida de bibliotecas, y, además de patios de colegios, la PRCS-C II adaptada al español podría usarse para tener en cuenta las posibilidades de experiencias restauradoras en el diseño de hospitales, guarderías, parques, etc. Cabe mencionar que cada vez son más los niños que muestran dificultades de atención (Taylor y Kuo, 2009), por lo que el diseño de patios de colegios donde la restauración de la capacidad de atención sea tomada en cuenta puede ser un avance para aliviar los síntomas de niños que han sido diagnosticados con estos problemas. La inclusión de elementos naturales en los patios de los colegios y zonas residenciales son una oportunidad para el aprovechamiento de las bondades atencionales, físicas, emocionales y ecológicas que trae el contacto directo de los niños con la naturaleza.

CAPÍTULO 4.- EFECTOS DEL CONTACTO DIARIO CON LA NATURALEZA EN LAS ACTITUDES Y EL COMPORTAMIENTO AMBIENTAL DE LA POBLACIÓN INFANTIL

El estudio de las actitudes y los comportamientos ambientales de la población infantil es esencial teniendo en cuenta que la protección del medio ambiente depende de las decisiones que tomen las generaciones futuras (Larson, et al., 2011; Van Petegem y Blicek, 2006). Sin embargo, se sabe poco sobre las actitudes ambientales de los niños, de su desarrollo y de las variables que influyen sobre ellas. Algunos autores coinciden en que la escasez de instrumentos fiables que midan las actitudes ambientales infantiles es responsable, en parte, de este avance tan paulatino (Evans et al., 2007; Manoli et al., 2007). Esto contrasta con la gran cantidad de estudios sobre las actitudes ambientales de personas adultas (para una revisión véase Milfont y Hawcroft, 2010). En este capítulo se evalúa la influencia que variables sociodemográficas, tales como la edad o el lugar de residencia, pueden tener en las actitudes ambientales de la población infantil. Para ello se han adaptado al español dos instrumentos para medir las actitudes ambientales de la población infantil: 1) la *New Environmental Paradigm* (NEP; Manoli et al., 2007) *scale for children* y 2) la *Children Environmental Perceptions Scale* (CEPS; Larson et al., 2011) Finalmente, se propone un modelo explicativo de la conducta pro-ecológica de los niños a partir de experiencias restauradoras.

4.1. Estudio 3. Diferencias en las creencias ecológicas de una muestra infantil. Versión española de la *NEP Scale for Children*.

El presente trabajo³ se centra en la evaluación de las actitudes ambientales de los niños. Uno de los instrumentos que mayor uso ha tenido para medir las creencias ecológicas de los adultos es la *New Environmental Paradigm (NEP) Scale* de Dunlap y Van Liere (1978). Estos investigadores afirmaron que los seres humanos compartimos una misma forma de ver la relación ser humano-naturaleza y que este sistema de creencias compartidas está detrás de la crisis ecológica. Así, hasta los años 70, al menos en la sociedad occidental, reinaba el Paradigma Social Dominante (PSD), una visión antropocéntrica del mundo, según los autores mencionados. De acuerdo con el PSD, los seres humanos se consideran superiores al resto de la naturaleza, hay suficientes recursos naturales y no hay necesidad de conservación. Por medio de la tecnología, son capaces de adaptar la naturaleza para sus propios fines y están fuera sus leyes. Sin embargo, a partir de los años 70 se planteó la idea de que esta visión del mundo está cambiando hacia una visión más ecocéntrica, en la que se incrementa la preocupación por el medio ambiente y, progresivamente, la población va

³ Los resultados de este trabajo están siendo evaluados para su publicación en Corraliza, J.A., Collado, S., y Bethelmy, L. (*enviado a evaluación*). Versión española de la *NEP Scale for Children*. Diferencias en las creencias ecológicas de una muestra infantil *Spanish Journal of Psychology*.

adoptando principios propios del Nuevo Paradigma Ambiental (*New Environmental Paradigm: NEP*). Según este paradigma, se valora la naturaleza, se considera el impacto que el ser humano tiene sobre el medio natural y se asumen límites al crecimiento. Para medir la afinidad de las personas a este paradigma surge la escala NEP formada por 12 ítems. Posteriormente, el instrumento fue revisado para contar con un número similar de ítems a favor y en contra de NEP, incluir problemas ambientales más actuales y revisar la terminología de los ítems (Dunlap, Van Liere, Mertig, & Jones, 2000), dando lugar a la Nueva Escala de Paradigma Ecológico (*New Ecological Paradigm: NEP revised*). Este instrumento consta de 15 ítems e incluye cinco contenidos que describen la relación ser humano-naturaleza: 1) límites al crecimiento, 2) anti-anthropocentrismo, 3) fragilidad del equilibrio natural, 4) rechazo al excepcionalismo humano y 5) creencia en la crisis ecológica. Evidencias empíricas demostraron que el sistema de creencias ecológicas puede interpretarse como unidimensional (Dunlap y Van Liere, 1978; Dunlap et al., 2000), bidimensional (Vozmediano y San Juan, 2005), o incluso con más dimensiones (seis, por ejemplo, en el caso de Amérigo y González, 2000), entre otras soluciones. De acuerdo con Dunlap (2008), la visión ecológica del mundo se estructura de forma unidimensional cuando las personas tienen un sistema de creencias ecológicas organizado de manera coherente. Sin embargo, el sistema de creencias puede ser también multidimensional en el caso de personas con creencias ecológicas menos estructuradas. Es decir, no todos los grupos de población tienen un sistema de creencias sobre la relación ser humano-medio

ambiente organizado de la misma manera, sino que la coherencia y estructura del mismo puede variar de unas personas a otras. Por ello, Dunlap et al. (2000) recomiendan evaluar la dimensionalidad del sistema, y de la escala, con cada muestra de estudio, en lugar de tomar una decisión de antemano.

La escala NEP ha sido utilizada, entre otros fines, para relacionar las creencias ecológicas con el comportamiento pro-ambiental. Se ha comprobado que este instrumento se relaciona positivamente con el comportamiento ecológico de las personas. Por ejemplo, Vozmediano y San Juan (2005) observaron que la dimensión *ecocentrismo* de la escala NEP correlacionaba positivamente con la frecuencia de llevar a cabo conductas ecológicas ($r = .12, p < .01$), con las consecuencias positivas de dichas conductas ($r = .28, p < .01$) y negativamente con el esfuerzo que conlleva realizar dichas conductas ($r = -.20, p < .01$). Del mismo modo, Olli, Grendstad y Wollebaek (2001) mostraron, mediante un análisis de regresión múltiple, que la NEP, junto con otras variables tales como los ingresos familiares o el conocimiento ambiental, es capaz de predecir distintos tipos de comportamiento ecológicos, como consumo responsable ($b = 0.58, \beta = .09, p < .01$) o conservación de recursos ($b = 0.64, \beta = .10, p < .01$).

Hawcroft y Milfont (2010) llevaron a cabo un meta-análisis sobre el uso de la NEP con más de 300 trabajos desde 1970. Los autores recomiendan su uso como una medida estandarizada de las actitudes ambientales y señalan un único

estudio en el que la NEP ha sido adaptada para su uso con la población infantil (véase Manoli et al., 2007).

Escala NEP para niños.

Dos grupos de investigadores han adaptado la NEP a la población infantil. En primer lugar, Evans et al. (2007) diseñaron tres juegos basados en la escala NEP a fin de medir las actitudes ambientales de los niños (N = 100) de entre 6 y 8 años e incluyendo cuatro dimensiones de la escala original: antropocentrismo, equilibrio de la naturaleza, preocupación por una catástrofe medioambiental y límites al crecimiento. Estos autores también midieron, mediante otro juego, la conducta pro-ambiental de los participantes. El comportamiento ecológico de las madres fue registrado mediante la *General Environmental Behavior* (GEB; Kaiser, 1998) *scale* y se registraron otras variables sociodemográficas, como las ideas políticas de los padres o su nivel educativo. La escala NEP, representada por los tres juegos, está formada por 11 ítems, con una consistencia interna adecuada ($\alpha = .69$). Los autores demostraron que las creencias ecológicas de los niños aumentaron significativamente después de pasar 5 días en un programa de educación ambiental al aire libre (sin ser campamento). Sin embargo, no se encontró ninguna relación entre las actitudes ambientales medidas mediante la NEP y el género de los niños o la educación, los ingresos o ideas políticas de los padres. Tampoco se relacionaron con las actitudes ambientales de los padres. A pesar de la fiabilidad y validez de

este sistema, el tiempo necesario para recoger datos es prolongado puesto que requiere interacciones uno a uno entre el niño y el investigador.

En segundo lugar, Manoli et al. (2007) adaptaron la escala NEP para su uso con la población infantil de entre 10 y 12 años, esta vez siguiendo el formato de la escala para adultos (escala con respuesta tipo Likert con 5 posibilidades). En primer lugar, adaptaron los 15 ítems de la NEP revisada para que fuesen más fáciles de comprender por los niños. Durante su segundo año de trabajo, Manoli et al. (2007) recogieron datos de 678 niños que habían asistido en un programa de educación ambiental. Éstos fueron tomados una semana antes de empezar el programa y un mes después de acabarlo. Seguidamente, los autores llevaron a cabo un análisis factorial mediante el cual se decidió que la mejor solución consistía en una escala con 11 de los 15 ítems originales, divididos en tres factores y explicando un 48.6% de la varianza. Se denominaron: *derechos de la naturaleza*, *crisis ecológica* y *excepcionalismo humano*, siguiendo los nombres propuestos por Dunlap et al. (2000). La estructura de tres factores fue corroborada mediante un análisis factorial confirmatorio.

En un tercer y último año de análisis, se modificó una vez más la escala, eliminando un ítem a fin de hacerla más comprensible para los niños y se recogieron datos de participantes que asistieron a un programa de educación ambiental. A continuación, se llevó a cabo un segundo análisis factorial confirmatorio para evaluar si el modelo se ajustaba a los datos del año anterior.

En este caso, tanto la solución con tres factores como la solución unidimensional fueron adecuadas. La escala NEP para niños, formada por 10 ítems, resultó ser un instrumento válido para medir las actitudes ambientales de la población infantil americana y para percibir cambios en las actitudes ambientales, en este caso promovidos por un programa de educación ambiental. Estos resultados indicaron que la visión ecológica de los niños varía en cuanto al grado de coherencia y estructura, teniendo algunos niños un sistema de creencias más organizado y coherente que otros (véase Dunlap, 2008).

Factores relacionados con las actitudes ambientales de los niños.

Como se ha comentado en el capítulo introductorio, uno de los factores que parece influir positivamente en las actitudes ambientales de los niños son las experiencias directas de contacto con la naturaleza (Kellert, 2002). Así, en el trabajo llevado a cabo por Larson et al. (2011) se puso de manifiesto que aquellos niños que pasaban más tiempo en contacto con la naturaleza mostraban una orientación pro-ambiental más alta. De igual modo, Cheng y Monroe (2012) señalaron que el tener naturaleza cerca de casa promueve en los niños una actitud afectiva positiva hacia la naturaleza, lo cual conlleva que tengan un mayor interés por llevar a cabo actividades en la naturaleza y conductas más pro-ambientales. Diversos autores han sugerido que la visión ecológica de los niños dependerá, entre otras cosas, del contacto que éstos tengan con la

naturaleza (Evans et al., 2007; Van Petegem y Blicke, 2006); sin embargo, esta hipótesis requiere comprobaciones empíricas específicas.

Otro factor que parece influir en las actitudes ambientales es la edad. Kahn (1999) afirmó que la preocupación ambiental de los niños aumenta cuando alcanzan los 10 u 11 años de edad. Según Kellert (2002), los niños pequeños suelen tener una visión de la naturaleza más utilitaria, antropocéntrica, que cambia hacia una visión más ecocéntrica conforme se van haciendo mayores y alcanzan el periodo de infancia media. Aunque existen estudios que indican que los adultos más jóvenes puntúan más alto en la escala NEP (Dunlap et al., 2000), no existen evidencias empíricas sobre las posibles diferencias en las creencias ecológicas de la población infantil según esta variable.

Un tercer factor que podría influir en las creencias ecológicas es el género, mostrándose las mujeres adultas más pro-ecológicas que los hombres (Dunlap et al., 2000; Müller et al., 2009). Por ello, en los estudios llevados a cabo con niños se ha tenido en cuenta la relación entre el género y la visión ecológica de la población infantil (Evans et al., 2007; Manoli et al., 2007), aunque no se han encontrado diferencias entre niños y niñas.

Van Petegem y Blicke (2006) demostraron que la cultura de los niños también influye en su visión ecológica. Utilizando una versión previa de la *NEP Scale for Children* (Manoli, Johnson y Dunlap, 2005), observaron que los niños de Bélgica y de Zimbabue compartían una visión ecológica del mundo, siendo

conscientes del impacto que las actividades humanas tienen sobre el medio ambiente. Sin embargo, ambos países se diferenciaron en que los niños de Zimbabue también mostraron creencias acerca de la dominación del ser humano sobre el resto de la naturaleza y el derecho a usar la naturaleza cuando se necesita. Es decir, los niños de Zimbabue mostraron un sistema de creencias más dualista, teniendo una visión tanto ecológica como utilitaria del medio ambiente.

Finalmente, como se ha mencionado arriba, participar en un programa de educación ambiental que tenga lugar en la naturaleza influyó positivamente en las creencias ecológicas de los niños (Evans et al., 2007; Manoli et al., 2007).

4.1.1. Objetivos e hipótesis.

Ante la necesidad de contar con instrumentos fiables que midan las actitudes ambientales de la población infantil hispanoparlante, así como de profundizar en la investigación sobre el desarrollo de las actitudes ambientales de los niños, el presente trabajo trata de: adaptar la *NEP Scale for Children* (de aquí en adelante *NEP_Ñ*) a la población infantil española, estudiando sus propiedades psicométricas. Se espera que el sistema de creencias ecológicas de la población infantil española pueda describirse como unidimensional, coincidiendo con trabajos previos donde se ha utilizado (Manoli et al., 2007; Van Petegem y Blicek, 2006) (Hipótesis 1). Además, se pretende comparar las creencias ecológicas de niños según distintas variables sociodemográficas. En este caso, el lugar de residencia se tiene en cuenta como medida del acceso que

los niños tienen a la naturaleza, siguiendo el procedimiento de estudios previos (Hinds y Sparks, 2008; Müller et al., 2009). Se espera que los niños que viven en áreas rurales, dado que tienen un mayor acceso al medio natural, muestren creencias más pro-ecológicas que los niños de áreas urbanas (Hipótesis 2). Se pretende también evaluar si el género y la edad de los participantes influyen en las creencias ecológicas. Se espera que los niños más mayores muestren conductas más pro-ecológicas (Hipótesis 3). Acorde con estudios previos llevados a cabo con la población infantil, no se espera encontrar diferencias entre niños y niñas (Hipótesis 4). Finalmente, se cree que existirá una relación positiva entre la puntuación en la escala NEP_Ñ y una conducta ecológica realizada por los niños, en este caso de ahorro energético en la casa (Hipótesis 5).

4.1.2. Método.

Participantes.

En el estudio han participado 574 niños (47.2%) y niñas (52.1%) de entre 8 y 13 años, siendo la media 11.32 ($DE = 1.39$), de distintas localidades, 8 de ellas rurales (el 58.7% de los participantes) y 6 de áreas urbanas (41.3%). Estos datos son de aquellos niños que rellenaron todos los ítems del cuestionario (el número total de intentos fue de 592). Si alguna respuesta se dejó sin contestar, ese cuestionario no se utilizó para este trabajo. Los datos fueron recogidos aprovechando una visita a un centro cultural de Castilla - La Mancha en la que participaron niños de toda la comunidad. Este procedimiento ofrece la

oportunidad de disponer de una gran variabilidad de participantes en cuanto a su género, edad y lugar de residencia, variables que resultan pertinentes en el presente estudio.

Instrumentos.

a) NEP Scale for Children (NEP_Ñ) de Manoli et al. (2007).

La escala fue traducida y adaptada al castellano por el método de retro-traducción. El instrumento se tradujo primero al castellano y después de nuevo al inglés por un profesor nativo, comprobando la similitud con la escala original. La versión definitiva aplicada está formada por 11 ítems, incluyendo el ítem 11 de la versión original de Manoli et al. (2007) (“la crisis ecológica no es tan grave, tan mala, como nos quieren hacer creer”), a pesar de que estos autores sugirieron eliminarlo por las dificultades de comprensión que, en su caso, este ítem planteaba. El formato de respuesta es una escala Likert de 5 puntos. Siguiendo las recomendaciones de Dillman (2007), se incluyeron símbolos que son familiares para los niños al lado de cada puntuación a fin de que las respuestas fueran más visuales, incrementando así la precisión de respuesta de los participantes. De este modo, las respuestas varían desde 1 = *totalmente en desacuerdo* (dos dedos hacia abajo) a 5 = *totalmente de acuerdo* (dos dedos hacia arriba), siendo la puntuación intermedia 3 = *no estoy seguro* (símbolo de interrogación). La puntuación global de la escala se calcula como promedio de las puntuaciones en cada ítem. Tras analizar los datos, se concluyó que la

NEP_Ñ estaba compuesta por 9 de los 11 ítems iniciales (véase el apartado de resultados). Esta versión es la que se utiliza para evaluar la posible relación de las actitudes ecológicas con el resto de variables.

b) Conducta pro-ambiental.

La conducta pro-ambiental de los niños se midió mediante un ítem de auto informe en el cual los participantes tuvieron que señalar hasta qué punto estaban de acuerdo con la siguiente afirmación: “en casa ahorro energía eléctrica para proteger el medio ambiente: apago la luz cuando salgo de la habitación, apago la televisión, la videoconsola o el ordenador, etc., cuando no los estoy usando.” Se optó por esta conducta ya que el ahorro energético en el hogar ha sido usado como conducta pro-ecológica en niños en estudios previos (Evans et al., 2007; Leeming, Dwyer, Porter, y Bracker, 1995). La respuesta en este caso sigue el mismo formato que para la NEP_Ñ (escala Likert de 5 puntos acompañada por símbolos visuales). Además, se pidió a los participantes que indicasen su lugar de residencia, edad y género.

Este cuestionario puede verse en el Anexo 3.

Procedimiento.

Primeramente, se llevó a cabo un estudio piloto con 20 niños para comprobar que los ítems eran entendidos. Seguidamente, se procedió a recoger los datos finales para este trabajo. La doctoranda leyó cada uno de los ítems en voz alta dos veces, a fin de facilitar a los niños la comprensión de éstos. Los participantes tuvieron suficiente tiempo para contestar y se les resolvieron las dudas que se presentaron.

4.1.3. Análisis de datos.

En primer lugar, se ha llevado a cabo un análisis factorial exploratorio con la mitad de los datos. Siguiendo las recomendaciones de Abad, Olea, Ponsoda y García (2011), se utilizó el método de mínimos cuadrados generalizados con rotación oblimin. A continuación, se estudió la consistencia interna del instrumento mediante el coeficiente alfa de Cronbach. Seguidamente, se estimó un modelo de análisis factorial confirmatorio definiendo una estructura factorial de segundo orden consistente en tres factores de primer orden, con tres indicadores cada uno, y un factor de segundo orden, capaz de explicar las correlaciones existentes entre los factores de primer orden. Se utilizó el método de estimación de máxima verosimilitud. Se valoraron los siguientes estadísticos de bondad de ajuste (junto con su criterio): chi-cuadrado/gl (<4), GFI (≥ 0.95), AGFI (≥ 0.90), CFI (≥ 0.90) y RMSEA (≤ 0.08). El modelo confirmatorio se evaluó con el 50% de la muestra (distinto del 50% con el que se estimó el

modelo exploratorio) para obtener así una estimación de la validez cruzada del modelo. A continuación, se estudió la relación de la NEP con la conducta pro-ecológica y con la edad mediante un análisis de correlación. Finalmente, se realizó un análisis de varianza para estudiar las posibles diferencias entre grupos de niños que difieren en su sexo y lugar de residencia.

4.1.4. Resultados.

La medida de adecuación muestral de Kaiser-Meyer-Olkin resultó ser .88, y el test de esfericidad de Bartlett fue significativo, con lo que se dedujo que los datos eran adecuados para llevar a cabo un análisis factorial exploratorio. Se obtuvo una solución factorial unidimensional formada por 9 ítems. Los ítems 1 y 2 no saturaron lo suficiente en el factor (carga factorial menor a .30). Este factor explicó el 39.57% de la varianza y tuvo un autovalor de 4.15. La matriz de componentes puede verse en la Tabla 10.

El índice de consistencia interna de la escala resultó ser adecuado ($\alpha = .84$). Además, se calculó la consistencia interna con los ítems 1 y 2 y se comprobó que esta era menor ($\alpha = .80$) cuando estos ítems eran incluidos, con lo que se propuso eliminarlos.

El modelo factorial confirmatorio mostró que todas las saturaciones en los factores fueron significativas ($p < .001$) y por ello debían considerarse distintas de 0. La Figura 14 muestra el modelo especificado y las saturaciones

estandarizadas. Todas las saturaciones en los factores de primer orden fueron altas (>0.5) y el signo refleja la dirección de la pregunta. Las saturaciones de los factores de primer orden sobre el factor común de segundo orden fueron muy elevadas, superando el valor 0.8 (en valor absoluto) en todos los casos. El ajuste del modelo fue bueno en todos sus indicadores, menos el RMSEA que se obtuvo un valor próximo al criterio de corte: $\chi^2 / gl=2.93$; GFI=0.95; AGFI=0.91; CFI=0.94; RMSEA=0.083. De este modo, el sistema de creencias ecológicas de la población infantil puede describirse como unidimensional, con una dimensión latente que se ha denominado ecocentrismo general y que agrupa tres dimensiones de primer orden. Analizando el contenido de los ítems de cada factor de primer orden, éstos se definieron como (1) respeto a la naturaleza, (2) eco-responsabilidad y (3) eco-deterioro.

Las correlaciones entre las dimensiones de primer orden pueden verse en la Tabla 9.

Tabla 9

Correlaciones entre las dimensiones de primer orden de la escala NEP_Ñ.

	Eco-responsabilidad	Eco-deterioro
Respeto a la naturaleza	.57**	.59**
Eco-responsabilidad	1	.60**

*p < .05. **p < .01. *** p < .001

Tabla 10

Matriz de componentes de la escala NEP_Ñ

Ítem	Carga factorial
1. Las plantas y los animales tienen el mismo derecho a vivir que las personas.	.27
2. Hay demasiada gente en la Tierra para los recursos (comida, agua, etc.) que la Tierra tiene.	-.04
3. Las personas podemos parar la destrucción de la Tierra.	.50
4. Todavía hoy, las personas debemos obedecer (cumplir) las leyes de la naturaleza.	.59
5. Cuando las personas hacemos cosas sin tener en cuenta la importancia de la naturaleza obtenemos malos resultados.	.61
6. La naturaleza puede soportar los efectos negativos de nuestros estilos de vida modernos.	.73
7. Las personas tenemos derecho a controlar el resto de la naturaleza.	.58
8. Las personas estamos tratando mal a la naturaleza.	.67
9. En el futuro, las personas sabremos tanto sobre la naturaleza que seremos capaces de dominarla.	.71
10. Si las cosas no cambian, tendremos un desastre medioambiental pronto.	.64
11. La “crisis ecológica” no es tan grave, tan mala como nos quieren hacer creer.	.57

Nota: Los ítems 1 y 2 no cargan lo suficiente en el factor y no se incluyen en la escala.

Tabla 11

Estadísticos descriptivos y frecuencia de distribución de las respuestas en la escala NEP para niños españoles. N = 574

Ítems	Descriptivos				Frecuencias de respuesta (% de participantes)				
	<i>M</i>	<i>SE</i>	<i>As</i>	<i>K</i>	Totalmente en desacuerdo	En desacuerdo	No lo sé	De acuerdo	Totalmente de acuerdo
3	3.74	.05	-0.8	-0.4	6.8	40.2	5.4	15.7	6.8
4	4.49	.03	-2.05	4.66	1.0	30.7	1.9	4.0	1.0
5	4.20	.03	-1.42	2.32	1.4	47.7	4.7	5.6	1.4
6	3.73	.04	-1.03	0.14	24.0	12.2	4.7	51.7	24.0
7	3.59	.05	-0.75	-0.74	28.6	14.5	4.4	40.6	28.6
8	4.19	.03	-1.51	2.20	2.3	44.6	3.5	6.6	2.3
9	3.82	.04	-1.10	0.70	24.4	9.9	8.5	52.6	24.4
10	4.27	.03	-1.70	3.06	2.8	39.7	4.7	4.0	2.8
11	3.00	10.3	9.2	50.9	26.7	10.3	9.2	50.9	26.7

Nota:. SE = error típico de la media; As = asimetría y K = curtosis.

La distribución de la frecuencia de respuesta en cada ítem de la escala puede verse en la Tabla 11. Los participantes en este estudio mostraron creencias principalmente ecocéntricas, ya que puntuaron en la mitad superior del instrumento ($M = 3.82$, $DE = 0.57$). Los niños se mostraron pro-ecológicos en todos los ítems de la escala, cuyo valor mínimo es 1 y máximo es 5 (véase la Tabla 11).

Posteriormente, se calculó la correlación entre la puntuación de los niños en la escala NEP y el indicador de conducta pro-ecológica. Esta correlación resultó ser de $r = .14$, $p < .01$.

Se ha analizado también la relación de las puntuaciones obtenidas en la escala NEP con algunas variables sociodemográficas y contextuales. Los resultados mostraron una correlación entre las puntuaciones en la escala NEP y la edad de $r = .22$, $p < .001$, indicando que conforme aumenta la edad, los niños se mostraron más pro-ecológicos.

A continuación, se llevó a cabo un ANOVA 2x2 para estudiar el posible efecto del género y el lugar de residencia de los participantes. Los resultados mostraron que no hay diferencias en cuanto a las puntuaciones en NEP según el género de los participantes ni tampoco existió efecto de interacción. El efecto de lugar de residencia sí fue significativo, $F(1,570) = 4.85$, $p = .03$, $\eta_p^2 = .08$. En este caso, los niños del medio rural puntuaron más alto en la escala NEP ($M = 4.07$, $DE = 0.76$) que los niños del urbano ($M = 3.93$, $DE = 0.76$).

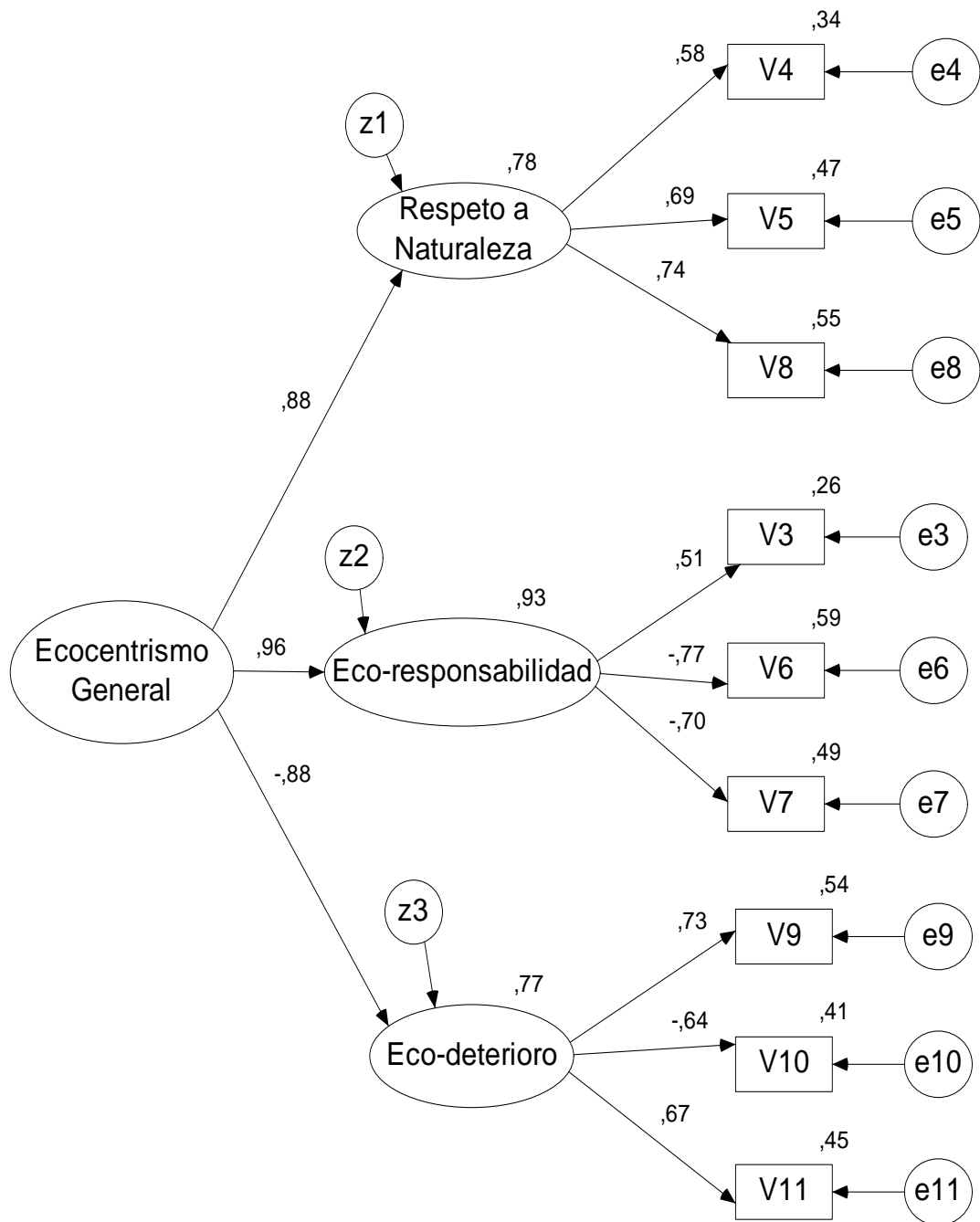


Figura 14. Modelo de análisis factorial confirmatorio para la escala NEP_Ñ unidimensional.

4.1.5. Discusión.

Conocer y entender la estructura de las creencias ecológicas de la población infantil y los factores que influyen en su desarrollo, es esencial para combatir los problemas ambientales actuales así como para profundizar en un área de investigación que ha sido poco estudiada. Para ello, es necesario contar con instrumentos eficaces que midan las actitudes ambientales de los niños y trabajos empíricos que profundicen en el estudio de la estructura de las creencias que los niños tienen sobre la relación ser humano-naturaleza. Este trabajo presenta la adaptación de la *NEP Scale for Children* a la población infantil española y se evalúa la visión ecológica de los niños españoles según variables sociodemográficas. Para nuestro conocimiento, es la primera vez que dicha escala se presenta en una muestra infantil española.

Como se ha indicado previamente, los participantes muestran creencias principalmente ecocéntricas. Los niños de la muestra siguen la tendencia encontrada en estudios anteriores donde se observa el predominio de las creencias pro-ecológicas. Por ejemplo, en el estudio de Manoli et al. (2007), los niños obtuvieron una puntuación media en la *NEP_Ñ* de 3.58 ($DE = 0.47$) antes de participar en un programa de educación ambiental y una puntuación media de 3.74 ($DE = 0.74$) tras la participación en el programa. Prestando atención a la distribución de respuestas a lo largo de las distintas categorías, se observa una tendencia a la acumulación de respuestas en las categorías centrales de acuerdo-desacuerdo, con porcentajes de respuesta en torno al 40-50% en la mayoría de

los casos. Es interesante comentar que en los ítems 3, 4, 5, 8 y 10 se concentra un alto porcentaje de respuestas en la mitad inferior de la escala, lo que pudiera señalar un posible efecto suelo. Sin embargo, el mayor porcentaje no se concentra en la categoría de respuesta más inferior, distribuyéndose también, aunque en menor medida, en las otras categorías de respuesta, indicando que los ítems tienen capacidad discriminativa.

Los resultados obtenidos muestran que el sistema de creencias ecológicas de la población infantil española puede describirse como unidimensional, corroborándose la Hipótesis 1. La escala propuesta está formada por 9 ítems. Estos resultados coinciden con estudios previos con adultos (Dunlap et al., 2000) y con niños (Manoli et al., 2007) indicando que la población infantil española posee una visión estructurada y coherente sobre la relación ser humano-naturaleza y mostrándose, además, más ecocéntricos que antropocéntricos. El porcentaje de varianza explicado por la escala es de 39.57% que, aun no siendo alto, es similar al de estudios previos llevados a cabo con niños (Manoli et al., 2007; Van Petegem y Blicck, 2006) y con adultos (Dunlap et al., 2000). Por ejemplo, en el trabajo de Dunlap et al. (2000), la NEP unidimensional explica un 31.3% de la varianza. Además, la consistencia interna de la escala es adecuada.

Por otro lado, el modelo confirmatorio de segundo orden se ajustó razonablemente bien. Debe tenerse en cuenta que el interés fundamental de este modelo es confirmar la existencia de una dimensión latente que agrupa las dimensiones de primer orden. Siendo esto así, el modelo confirmatorio respalda

la idea de que existe una única dimensión común a todas las respuestas emitidas por los sujetos, la cual puede ser detallada en tres dimensiones de primer orden con mayor capacidad descriptiva.

Como ya se comentó al comienzo de este trabajo, es difícil predecir el comportamiento pro-ambiental a partir de las escalas de medición de las actitudes ambientales. Aun así, en este estudio se ha comprobado que existe una relación positiva entre la conducta de ahorro energético en el hogar y la escala NEP, indicando que los niños más ecocéntricos tienden a tener con más frecuencia esta conducta de ahorro energético. Es una correlación baja pero significativa, similar a las encontradas por Vozmediano y San Juan (2005) en una muestra de adultos. Futuros trabajos deberían llevar a cabo un estudio más exhaustivo sobre el poder descriptivo y predictivo de la escala NEP_Ñ, utilizando una escala que permita recoger información sobre varios aspectos del comportamiento ambiental de las personas (reciclaje, ahorro energético, etc.) y evaluando el poder predictivo de la NEP_Ñ, junto con otras variables que se ha comprobado que afectan al comportamiento pro-ambiental de los niños, como por ejemplo la conectividad con la naturaleza (Cheng y Monroe, 2012).

Por otra parte, la visión de la relación ser humano-naturaleza puede cambiar a lo largo de la vida de una persona (Kahn, 1999). Manoli et al. (2007) y Evans et al. (2007) no evaluaron si la edad influye en las creencias ecológicas de los niños, pues los rangos de edad de su muestra eran estrechos (entre 6 y 8 ó entre 10 y 12). En este sentido, otra aportación de este trabajo es que la escala se

ha utilizado con niños de entre 8 y 13 años, un rango de edad lo suficientemente amplio como para estudiar la influencia de esta variable en las creencias ecológicas de la población infantil. Los resultados obtenidos muestran que los niños más mayores tienden a mostrar una visión más ecocéntrica del mundo que los más pequeños, corroborándose la Hipótesis 3. Esto coincide con la idea de Evans et al. (2007) que afirman que hay un paso paulatino de entre los 6-8 hasta los 11 años donde los niños cambian de una visión más antropocéntrica del mundo a considerar el impacto que el ser humano tiene sobre el medio ambiente. Aún así, esta tendencia debe estudiarse en futuros trabajos, pues el análisis de correlación llevado a cabo no permite establecer causalidad.

El contacto con la naturaleza, registrado en este caso mediante el lugar de residencia, influye en las creencias ecológicas de la población infantil, corroborando nuestra Hipótesis 2. Así, los niños de áreas rurales son más pro-ecológicos que los de áreas urbanas. Estos resultados deben interpretarse con precaución, pues el tamaño del efecto es relativamente pequeño. Se cree que esto es debido a que en general, independientemente del lugar de residencia, los participantes se muestran pro-ecológicos y las diferencias existentes entre grupos de niños son pequeñas. Los resultados de este trabajo coinciden con los de estudios realizados con adultos (Hinds y Sparks, 2008), adolescentes (Müller et al. 2009) y niños (Cheng y Monroe, 2012) sobre las actitudes de las personas hacia el medio natural, pero es la primera vez que se evalúa como influye el lugar de residencia en la visión ecológica del mundo de los niños.

El crecimiento de la urbanización ha producido, entre otras cosas, el distanciamiento de los entornos naturales. La tendencia de la población infantil actual es la de alejarse cada vez más del contacto directo con la naturaleza, especialmente en las ciudades, siendo las principales razones el tráfico, la falta de tiempo, la inseguridad y el mayor uso de la tecnología (Clements, 2004). Estos problemas, predominantes en los núcleos urbanos, no se dan en las zonas rurales, donde el contacto con el medio natural es mayor y las actitudes ambientales de las personas que viven en áreas rurales también son más altas. Esto tiene implicaciones a la hora de diseñar programas educativos dirigidos al fomento de las actitudes ambientales. Acorde con estos resultados, sería preferible que dichos programas tengan lugar al aire libre, donde se proporcione el contacto directo de los niños con el medio natural. Así mismo, el contacto con la naturaleza puede fomentarse en las ciudades mediante la inclusión de elementos naturales en lugares frecuentados por los niños, tales como patios de colegios, calles o vecindarios.

Futuras líneas de trabajo deberían incluir medidas directas del contacto con la naturaleza que tiene la población infantil, así como tener en cuenta la naturaleza cercana (parques, jardines, patios de colegio, etc.) en el caso de los niños que viven en las ciudades.

En suma, se ha profundizado en el conocimiento del desarrollo de la visión ecológica de los niños, indicando la influencia del contacto con la naturaleza y de la edad en la pro-ambientalidad de la población infantil. Ante el

creciente deterioro del medio natural y la necesidad incipiente de buscar soluciones, el contar con instrumentos que ayuden a entender la percepción que los seres humanos tienen de su relación con la naturaleza es esencial. En este trabajo se presenta una escala para medir las creencias ecológicas de la población infantil hispanoparlante a partir de 8 años. Contar con un instrumento de este tipo es importante, ya que permite estudiar la visión del mundo de la población infantil y compararla con la de los adultos. Además, podría usarse para llevar a cabo estudios longitudinales. Es probable que las actitudes ambientales de los niños conformen posteriormente la forma de pensar de los adolescentes y adultos (Leeming, Dwyer, Porter, & Bracker, 1995), por lo que es recomendable evaluar las creencias y comportamientos ambientales en edades tempranas. La NEP_Ñ es un instrumento muy reciente que, como bien apuntan sus autores, necesita de más estudios, con distintas culturas y con niños con diferentes variables sociodemográficas para poder generalizar los resultados.

4.2. Estudio 4. Relación entre restauración percibida, orientación naturalista y conducta pro-ecológica

Este cuarto estudio⁴ se centra también en la influencia que el contacto directo diario con la naturaleza tiene en las actitudes y el comportamiento ambiental de la población infantil española. Para ello se utiliza la *Children's Environmental Perceptions Scale* (CEPS; Larson et al., 2011) descrita en el capítulo introductorio. Larson et al. (2011) subrayan la falta de instrumentos que midan las actitudes ambientales de la población infantil; sobre todo las de niños menores a 10 años. Además, entienden que los instrumentos con los que se cuenta hasta el momento, por ejemplo la escala NEP para niños de Manoli et al. (2007), no reflejan la dimensión afectiva de las actitudes ambientales, la cual ha sido señalada como importante a la hora de predecir el comportamiento pro-ambiental de adultos (Pooley & O'Connor, 2000) y niños (Cheng & Monroe, 2012). Como se ha comentado en el capítulo 1, los autores han diseñado una escala de 16 ítems formada por dos factores: ecoafinidad (*eco-affinity*) y conciencia ecológica (*eco-awareness*). Eco-afinidad se refiere a ítems que “reflejan interés personal por la naturaleza e intenciones de llevar a cabo

⁴ Los resultados de este trabajo han sido parcialmente publicados en Collado, S., & Corraliza, J. A. (2011). Children's perceived restoration and pro-environmental beliefs. *Journal of Asian Behavioural Studies*, 1, 1-12.

comportamientos pro-ecológicos” y eco-conciencia refleja el “conocimiento que los niños tienen sobre problemas ambientales relacionados con la importancia y sostenibilidad de los ecosistemas naturales.” (p. 83). Larson et al. (2011) han intentado incluir la dimensión afectiva de las actitudes ambientales en su escala así como simplificar el lenguaje de manera que los ítems sean comprendidos por niños menores de 10 años.

Evidencias empíricas demuestran que el contacto con la naturaleza influye en las actitudes ambientales de las personas. De este modo, Hinds y Sparks (2009) demostraron, mediante un estudio retrospectivo, que los participantes que pasaron su niñez en zonas rurales tuvieron más contacto con la naturaleza que los de zonas urbanas y suburbanas. Además, aquellos que pasaron su infancia en zonas rurales mostraron mayor identidad medioambiental. Igualmente, Larson et al. (2011) concluyeron que niños que tienen un mayor contacto con la naturaleza puntúan más alto en *ecoaffinity* y *ecoawareness*, coincidiendo con estudios con población infantil en los que se ha demostrado que el contacto con la naturaleza influye positivamente en las actitudes ambientales de los niños (Cheng & Monroe, 2012).

Como se ha mencionado en el estudio anterior, otra de las variables que parece influir en las actitudes ambientales de la población infantil es la edad. Kellert (2002) afirma que los niños de menor edad tienen una visión de la naturaleza más utilitaria y antropocéntrica que pasa a ser más ecocéntrica conforme crecen. Evans et al. (2007) coinciden con Kellert (2002) en que los

niños de entre 6 y 8 años son más antropocéntricos, pasando a entender el efecto negativo que el ser humano puede tener en la naturaleza hacia los once años de edad. Es por ello que Larson et al. (2011) diseñaron la escala CEPS esforzándose en incluir ítems que sean relevantes para los niños de menor edad, cuya visión de la naturaleza es más egoísta y simple (p. 83). De ahí que los ítems incluidos en esta escala reflejen cuestiones personales de la relación de los niños con la naturaleza (e.g., mi vida cambiaría si no hubiese árboles) en comparación con otras escalas para niños (e.g., NEP scale for children), cuyos ítems son más abstractos (e.g., la crisis ecológica no es tan grave, tan mala, como nos quieren hacer creen).

La escala CEPS es un instrumento reciente que, para nuestro conocimiento, no ha sido utilizado en estudios posteriores a su publicación. Sus autores señalan la necesidad de continuar estudiando el comportamiento del instrumento y destacan la importancia de comprobar el posible poder predictivo de la escala sobre el comportamiento pro-ambiental de la población infantil.

Experiencias restauradoras como motivadoras del comportamiento pro-ambiental.

Los motivos y procesos psicológicos que llevan a la población infantil a comportarse de manera pro-ambiental han sido poco estudiados (Cheng y Monroe, 2012; Evans et al., 2007; Manoli et al., 2007). En adultos, Kaiser et al. (2012) han señalado la necesidad de distinguir entre dos tipos de motivos para

comportarse de manera pro-ecológica. Aquellos que son más altruistas y no egoístas (por ejemplo sentimientos de obligación moral) y aquellos que derivan de experiencias gratificantes en la naturaleza. Estos últimos serían motivos basados en el uso que el ser humano hace del medio natural y, por lo tanto, más egoístas, pues se centran en el interés de la persona. Es decir, la persona lleva a cabo acciones pro-ambientales con el fin de proteger el tipo de ambientes que le aportan beneficios (en este caso los ambientes naturales). Esta última clase de motivación es lo que se tiene en cuenta en el presente trabajo. Bagot (2004) señaló la necesidad de estudiar la relación entre la restauración percibida por los niños y otras variables, como por ejemplo, sus actitudes hacia el medio ambiente. En este estudio se pretende evaluar la posible relación entre las experiencias restauradoras de los niños y las actitudes y comportamientos pro-ambientales. Para ello, se utiliza la adaptación de la escala PRCS-C II descrita en el estudio 2 de esta tesis así como la escala CEPS de Larson et al. (2011).

Como se comentó en el capítulo introductorio, uno de estos beneficios que la población infantil obtiene del contacto con la naturaleza es la restauración de los recursos adaptativos (cognitivos, físicos y sociales) aminorados por su uso diario. Se sabe que los niños obtienen beneficios restauradores cuando están en contacto con la naturaleza (véase estudio 1) y que, además, perciben los lugares naturales como más restauradores que los no naturales (véase estudio 2). Por otro lado, con muestras de adultos y adolescentes se ha comprobado que las experiencias restauradoras predicen el comportamiento pro-ecológico (Hartig et al., 2001) y que la relación entre el uso de la naturaleza con fines restauradores y

el comportamiento pro-ambiental está parcialmente mediado por la preocupación ambiental (Hartig et al., 2007). Sin embargo, la relación entre experiencia restauradora y comportamiento pro-ambiental no ha sido estudiada con la población infantil. Podría ser que los niños se comporten de manera más pro-ecológica porque psicológicamente obtienen beneficios del contacto con la naturaleza.

Tal y como explican Hartig et al. (2001), la evaluación que los sujetos hacen de un lugar como restaurador - la restauración percibida por los sujetos- se basa tanto en el lugar en concreto que se está evaluando como en las experiencias pasadas en ese tipo de lugares. Así, cuando a lo largo de este estudio se habla de restauración percibida del patio del colegio se está teniendo en cuenta la experiencia pasada de los niños en lugares restauradores.

Hartig et al. (2001) y Hartig et al. (2007) destacan la necesidad de tener en cuenta variables mediadoras en el estudio de la relación entre experiencias restauradoras y comportamiento pro-ambiental. Es por ello que en este trabajo se evalúa la posible mediación de las actitudes ambientales en la relación entre las experiencias restauradoras y el comportamiento pro-ambiental. Hartig et al. (2007) demostraron que la preocupación ambiental medida como una preocupación sobre los efectos negativos que la degradación del medio ambiente tiene sobre las personas, media parcialmente la relación entre restauración y comportamiento proambiental. Las actitudes predicen significativamente el comportamiento (Kraus, 1995). Por ello, en el este trabajo se incluye un modelo

explicativo de la conducta pro-ambiental infantil en el que se espera que las actitudes ambientales medien la relación entre las experiencias restauradoras y el comportamiento pro-ecológico. Además, el tipo de ítems utilizados en la escala CEPS son ítems personalmente relevantes para los niños, lo cual coincide con el tipo de variable mediadora usada por Hartig et al. (2007).

4.2.1. Objetivos e hipótesis.

El objetivo principal consiste en adaptar la escala CEPS a la población infantil española, a fin de poder evaluar la percepción ambiental de los niños españoles. Se espera encontrar una estructura factorial similar a la propuesta por Larson et al. (2011) (Hipótesis 1). Seguidamente, se estudiará la percepción ambiental de la población infantil española según distintas variables sociodemográficas tales como el género, la edad, el lugar de residencia o la frecuencia de contacto con la naturaleza. La influencia de estas variables no ha sido estudiada por los autores del instrumento con lo que nuestras hipótesis se basan en trabajos precedentes con niños utilizando instrumentos para el registro de actitudes ambientales distintos a CEPS. Se espera que, al igual que los resultados encontrados por Evans et al. (2007), y Manoli et al. (2007), no existan diferencias según el género de los participantes (Hipótesis 2). Por otro lado, se cree que los niños más mayores puntuarán más alto en la escala (Hipótesis 3). Además, se espera que aquellos niños que vivan en zonas rurales tengan un mayor contacto con la naturaleza que aquellos que vivan en zonas urbanas

(Hipótesis 4) y que los participantes de zonas urbanas muestren una menor orientación ambiental que los de zonas rurales (Hipótesis 5). Finalmente, se cree que los niños que más naturaleza tengan en el patio del colegio puntuarán más alto en la escala (Hipótesis 6).

Por otra parte, se propone un modelo teórico de explicación de la conducta pro-ecológica de la población infantil a partir de experiencias restauradoras, utilizando la escala de restauración percibida para niños descrita en el estudio 2. Se espera que, al igual que los resultados encontrados en estudios precedentes con personas adultas (Hartig et al., 2001), la restauración percibida por la población infantil motive el comportamiento ecológico de los niños. Se cree que esta relación estará mediada por las actitudes ambientales de los mismos (Hipótesis 7).

Finalmente, se propone un perfil ecológico de la población infantil española, a fin de describir una tipología de niños en función de sus actitudes ambientales y como medida de validez de la escala propuesta.

4.2.2. Método.

Participantes.

Los participantes de este estudio fueron los mismos que participaron en el estudio 2 descrito en el capítulo 3. La muestra estuvo compuesta por 832 niños y niñas de entre 6 y 13 años de la Cuenca ciudad y provincia. La edad

media fue de 10 años ($DE = 1.30$). El 48.8% de los participantes era niños. Se recogieron datos de un total de 19 colegios (20 patios de colegio).

Instrumentos.

a) Children's Environmental Perceptions Scale (CEPS).

La CEPS fue traducida y adaptada al castellano por tres personas distintas. La versión en castellano fue traducida de nuevo al inglés por un profesor nativo. El formato de respuesta fue una escala Likert de 5 puntos. Siguiendo las recomendaciones de Dillman (2007), se añadieron símbolos familiares para los niños al lado de cada puntuación a fin de que las respuestas fueran más visuales, incrementando así la precisión de respuesta. De este modo, las respuestas varían desde 1 = *totalmente en desacuerdo* (dos dedos hacia abajo) a 5 = *totalmente de acuerdo* (dos dedos hacia arriba), siendo la puntuación intermedia 3 = *no estoy seguro* (símbolo de interrogación). Tras analizar los datos, se concluye que la CEPS está compuesta por 13 de los 16 ítems iniciales (véase apartado de resultados) y esta versión es la que se utiliza para el estudio de la posible relación de las actitudes ecológicas de la población infantil y el resto de variables.

b) Conducta pro-ambiental.

La conducta pro-ambiental de los niños se midió mediante una escala con cinco variables que reflejan conductas pro-ambientales usadas en estudios previos con población infantil (Evans et al., 2007; Leeming et al., 1995). El formato de respuesta fue tipo Likert de 5 puntos. Los ítems usados fueron los siguientes: 1) *llevo a cabo actividades para proteger el medio ambiente*, 2) *para ahorrar agua, uso menos agua cuando me ducho o me baño*, 3) *en el colegio, hablo tanto con profesores como con alumnos de lo importante que es hacer cosas para proteger el medio ambiente (como por ejemplo, reciclar)*, 4) *ayudo en casa a separar y reciclar la basura* y 5) *para ahorrar energía, apago los aparatos eléctricos (la TV, la luz, el ordenador, la consola, etc.) cuando no los estoy usando*. La fiabilidad de esta escala, medida mediante el alfa de Cronbach fue de .74.

c) Frecuencia de contacto con la naturaleza.

La frecuencia de contacto con la naturaleza se ha medido con 5 ítems similares a los utilizados en estudios anteriores con población infantil (e.g., Gotch y Hall, 2004; Larson et al., 2011). Estos ítems reflejan tanto contacto directo con la naturaleza como contacto indirecto o vicario (Kellert, 2002). Éstos son: “Indica cuantas veces has realizado alguna de las siguientes actividades en los últimos 12 meses (la respuesta es del 1 al 5 siendo 1 = nunca y 5 = más de

10 veces): 1) *pasar tiempo en algún lugar natural (por ejemplo en el bosque, en el campo, en el río, en la montaña, etc.)*, 2) *ir a ver animales al aire libre (al bosque, al campo, etc.) o a un zoo, un acurium.*, 3) *leer sobre naturaleza en internet, un libro, revista o ver algún documental o programa sobre naturaleza en la tele.*, 4) *hablar con tus padres, familiares o amigos sobre la naturaleza, animales o problema del medio ambiente.*

El formato de respuesta del resto de ítems fue también del 1 al 5, siendo 1 = *nunca* y 5 = *siempre*. Estos son: 5) *durante la semana, después del colegio, ¿juegas al aire libre (barrio, en tu calle o en el parque)?* y 6) *durante el fin de semana, ¿juegas al aire libre (en el barrio, en tu calle, en el parque, en el pueblo de papá, de mamá, de los abuelos, etc.)?*

La consistencia interna de la frecuencia de contacto con la naturaleza, medida mediante el alfa de Cronbach, fue de .70. Mediante un análisis factorial exploratorio, se estudió la posibilidad de que los ítems de frecuencia de contacto con la naturaleza indirecto o vicario formasen una sub-escala distinta al contacto directo con la naturaleza. Sin embargo, todos los ítems saturaron en un mismo factor y la eliminación de los ítems 3 y 4 disminuía la consistencia interna de la escala. De este modo se consideró la frecuencia de contacto con la naturaleza en su conjunto, aunque se entiende que los ítems de la escala hacen referencia a dos contenidos (contacto directo y contacto indirecto con la naturaleza).

Los datos recogidos en el estudio 2 sobre la *d) Naturaleza percibida en el patio del colegio* así como la clasificación de los patios usando la *e) Escala de Observación de Naturaleza Cercana* han sido también usados en este trabajo. Además, Los participantes también tuvieron que responder algunas preguntas sobre *f) variables sociodemográficas* tales como la edad, el sexo o el lugar de residencia. El cuestionario utilizado para este trabajo puede verse en el Anexo 4.

Procedimiento.

Los datos fueron recogidos al mismo tiempo que los utilizados en el estudio dos de esta tesis y el procedimiento seguido es similar al descrito en el apartado de procedimiento de ese estudio.

4.2.3. Análisis de datos.

En primer lugar, se llevó a cabo un análisis factorial de ejes principales con rotación oblimin para permitir que, en caso de que haya más de un factor, éstos puedan correlacionar. Una vez obtenidas las dimensiones del constructo, se evaluó su consistencia interna calculando el alfa de Cronbach. La relación entre las puntuaciones de la escala, el género, la edad, la naturalidad del patio del colegio y el lugar de residencia de la población infantil fue evaluada mediante análisis de varianza 2x2, a fin de poder analizar las posibles interacciones. Finalmente, se estudió la influencia de las experiencias positivas en la naturaleza (en este caso la experiencia restauradora) sobre la conducta pro-ambiental de la

población infantil mediante un análisis de ruta (*path analysis*) usando el programa AMOS v.17.0. Siguiendo las recomendaciones de Abad et al. (2011), se valoraron los siguientes estadísticos de bondad de ajuste (junto con su criterio): chi-cuadrado con $p > .05$; chi-cuadrado/gl (<3), TLI (≥ 0.95), CFI (≥ 0.95) y RMSEA (≤ 0.08). El método de estimación utilizado fue el de máxima verosimilitud.

Para establecer un perfil ecológico de la población infantil española, los niños fueron clasificados en cuatro grupos de acuerdo a su orientación naturalista y su frecuencia de contacto con la naturaleza. Las posibles diferencias en cuanto a la frecuencia de llevar a cabo conductas pro-ambientales en cada grupo fueron evaluadas mediante análisis de varianza.

4.2.4. Resultados.

La medida de adecuación muestral de Kaiser-Meyer-Olkin resultó ser .84 y el test de esfericidad de Bartlett fue significativo, con lo que se deduce que los datos fueron adecuados para llevar a cabo un análisis factorial exploratorio. Se obtuvo una solución unidimensional, formada por 13 de los 16 ítems originales de la escala. Los ítems 4, 7 y 16 fueron eliminados por no saturar lo suficiente ($> .30$) en el factor (véase Tabla 12). Debido a que la solución ofrecida por Larson et al. (2011) es bidimensional, se forzó la extracción de dos factores para evaluar si nuestros datos también podían interpretarse como bidimensionales. Sin embargo, la solución bidimensional obtenida no coincidió con la de los

autores de la escala, tuvo menor sentido teórico que la solución unidimensional y, además, los dos factores obtenidos tenían una correlación de .74 ($p < .001$). Por ello se optó por la unidimensionalidad del constructo. Seguidamente, se evaluó la consistencia interna del instrumento, resultando ser adecuada ($\alpha = .85$).

Mediante un análisis inductivo del contenido de la escala, se comprobó que el factor incluye ítems relacionados con la vida natural y el deseo de aprender (e.g., me gusta aprender cosas sobre plantas y animales) y de mantener los valores naturales (e.g., las personas debemos cuidar mejor a las plantas y los animales). El nombre que se ha dado a este constructo es el de orientación naturalista (*Orientation toward nature*). La orientación naturalista es interpretada como unidimensional aunque, en términos de contenido, pueden identificarse dos componentes entre los que hay una alta correlación: necesidad de aprender y estar en contacto con la naturaleza, y disposición favorable a la defensa de la naturaleza. Parece ser que en el caso de los niños españoles es más difícil diferenciar entre lo que se quiere hacer o les gusta hacer en/con la naturaleza (*eco-affinity*) y lo que se piensa sobre la naturaleza (*eco-awareness*), saturando ítems de ambas sub-escalas en nuestro constructo denominado orientación naturalista.

Tabla 12

Matriz de componentes de la escala CEPS

Ítems	Orientación Naturalista
1. Me gusta aprender cosas sobre plantas y animales.	.72
2. Las plantas y los animales son importantes para la gente.	.39
3. Me gusta leer cosas sobre plantas y animales.	.70
4. Las plantas y los animales pueden ser dañados o heridos fácilmente por la gente.	.27
5. Estoy interesado en aprender cosas nuevas para ayudar a proteger a las plantas y los animales.	.73
6. Las personas necesitamos a las plantas para vivir.	.31
7. Mi vida cambiaría si no hubiese árboles.	.16
8. Yo estaría dispuesto a usar parte de mi tiempo libre (después del cole) para ayudar a salvar o proteger las plantas y los animales silvestres.	.64
9. Yo estaría dispuesto a utilizar parte de mi tiempo para ayudar a resolver los problemas que hay en la naturaleza.	.69
10. Las personas debemos cuidar mejor las plantas y los animales.	.51
11. Me gusta pasar tiempo en los lugares en los que hay plantas y animales.	.63
12. Me pongo triste cuando veo casas construidas en lugares donde las plantas y los animales solían vivir.	.58
13. Me gusta aprender cosas sobre la naturaleza.	.75
14. Estaría dispuesto a ayudar a limpiar las áreas verdes de mi barrio (áreas naturales) o cercanas a éste.	.67
15. La naturaleza puede ser fácilmente dañada o herida por las personas.	.40
16. Mi vida cambiaría si no hubiese plantas ni animales.	.20

Nota: los ítems 4, 7 y 16 no se han incluido en la escala por no saturar lo suficiente (cargas menores a .30).

La puntuación media de los participantes del estudio en orientación naturalista fue de 4.36 ($DE = 0.80$), pudiéndose afirmar que los niños de la provincia de Cuenca mostraron actitudes favorables o muy favorables hacia la naturaleza.

A continuación, se evaluó la posible influencia de variables socio-demográficas y contextuales en la orientación naturalista de la población infantil. En primer lugar, los participantes se dividieron en tres grupos distintos según su lugar de residencia: ciudad, serranía o mancha. Con ello se estudió si la frecuencia de contacto con la naturaleza era distinta según el lugar de residencia. Se comprobó que, tal y como se esperaba, hay diferencias entre los tres lugares de residencia registrados en este trabajo, siendo $F(2,825) = 42.26$, $p < .001$. Mediante un análisis post hoc de Bonferroni, se observó que las diferencias entre cada grupo de niños fueron significativas ($p < .001$), indicando que los niños de la sierra tienen significativamente más contacto con la naturaleza ($M = 4.32$, $DE = 0.72$) que los niños de la zona rural agrícola -la mancha-, que tienen una media de 4.08 ($DE = 0.57$), y que los de ciudad ($M = 3.78$, $DE = 0.72$).

También debe destacarse que hay diferencias significativas ($p < .001$) en cuanto a la frecuencia de contacto con la naturaleza entre los niños del área rural en la sierra y los del área rural en la mancha, teniendo los niños de la sierra una mayor frecuencia de contacto con la naturaleza que los niños de la mancha.

Para estudiar la influencia de la edad en la orientación naturalista, los niños fueron clasificados en dos grupos: niños más pequeños (de 6 a 9 años) y niños mayores (de 10 a 13 años).

Por otro lado, los patios de los colegios fueron divididos en patios no naturales y patios naturales, de manera similar al estudio 2, (véase Figura 15 y Figura 16).

Mediante análisis de varianza 2x2, se estudió la influencia en la orientación naturalista de los niños de la frecuencia de contacto con la naturaleza, la edad, la naturalidad del patio del colegio y el género. No se encontró efecto de interacción entre ninguna de las variables; sin embargo, si se encontraron efectos directos significativos. La edad influyó en la orientación naturalista de manera que niños más pequeños obtuvieron mayor puntuación en orientación naturalista ($M = 4.53$, $DE = 0.41$) que los niños más mayores ($M = 4.31$, $DE = 0.50$), $F(1, 724) = 19.82$, $p < .001$.

Igualmente, las niñas mostraron una mayor puntuación ($M = 4.36$, $DE = 0.48$) que los niños ($M = 4.29$, $DE = 0.51$), $F(1, 831) = 4.68$, $p < .05$.

Finalmente, la orientación naturalista de los niños fue distinta según su lugar de residencia, $F(2, 831) = 3.21$, $p < .05$. Los niños que viven en la serranía conquense puntuaron más alto en orientación naturalista ($M = 4.41$, $DE = 0.45$) que los niños de la ciudad de Cuenca ($M = 4.32$, $DE = 0.52$) y que los de la mancha, que mostraron la puntuación más baja, ($M = 4.27$, $DE = 0.50$). Un

análisis post hoc de Bonferroni mostró que las diferencias son significativas entre los participantes de la sierra y los de la mancha ($p < .01$). No hay diferencias entre el resto de grupos de niños.

Finalmente, se evaluó si la naturaleza percibida en el patio del colegio influye en la orientación naturalista de los niños. Los resultados mostraron que no hay diferencias entre la orientación naturalista de los niños que más naturaleza perciben en el patio del colegio y los que menos.



Figura 15. Niños saliendo a jugar a un parque colindante con el colegio



Figura 16. Patio de colegio sin naturaleza

Relación entre restauración percibida y conducta pro-ambiental.

Siguiendo los pasos del trabajo realizado por Hartig et al. (2001) con adultos, se evaluó la relación entre los cinco componentes de la escala de restauración percibida y las actitudes y comportamiento pro-ambiental infantil. Se observó que el factor evasión física no tiene ningún efecto sobre el resto de variables, así que se decidió extraerlo del modelo. El modelo final aparece en la Figura 17. Los resultados obtenidos con AMOS mostraron que el modelo se ajustó a los datos. El ajuste del modelo fue bueno en todos sus indicadores: $\chi^2 (7, N = 416) = 11.70$; $p = .11$; $\chi^2/df=1.67$; TLI = 0.98; CFI=0.99; RMSEA=0.028, explicando un 46.5% de la varianza.

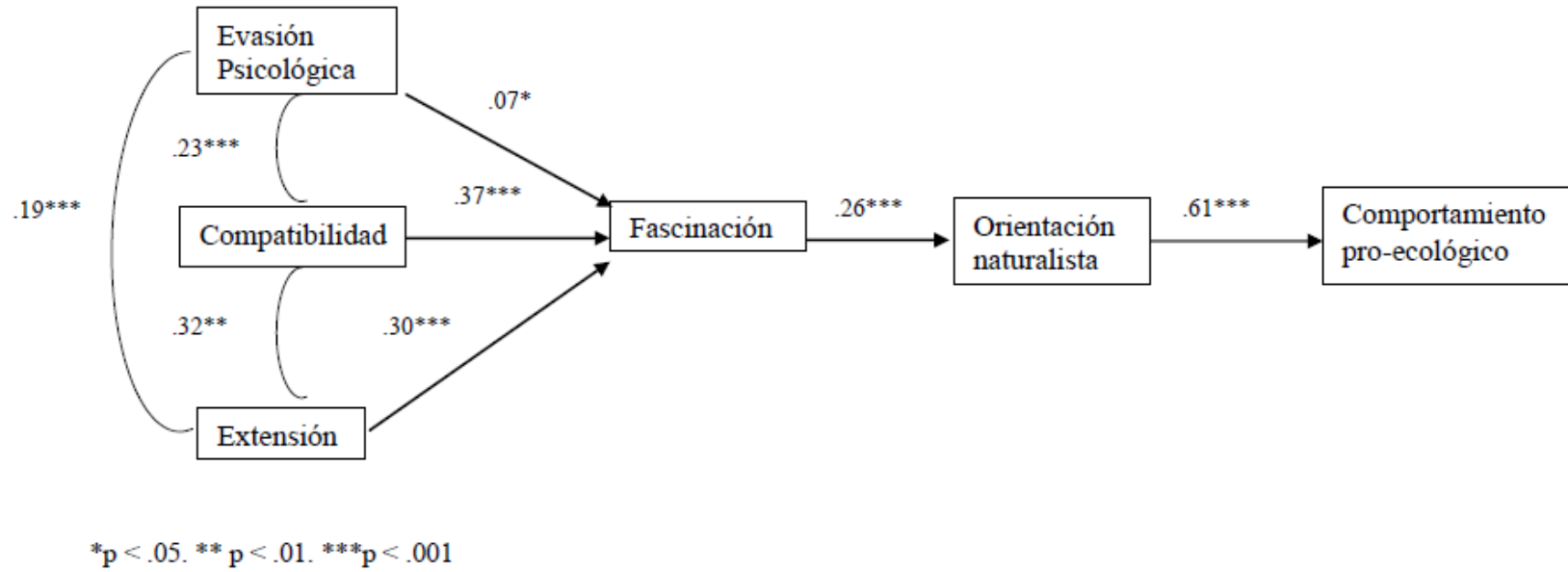


Figura 17. Análisis de ruta del comportamiento pro-ecológico infantil.

Perfil ecológico de la población infantil conquense.

El que un niño tenga un mayor contacto con la naturaleza no quiere decir que inexorablemente lleve a cabo más conductas pro-ecológicas. Igualmente, mostrar actitudes más positivas hacia el medio ambiente no indica la existencia de una relación directa con el comportamiento pro-ecológico, puesto que puede haber varios factores que obstaculicen el llevar a cabo dichas conductas, como por ejemplo la falta de tiempo o de control personal (Guagnano, Stern, y Dietz, 1995). En este sentido, se ha decidido estudiar el perfil ecológico de los niños de esta muestra, ya que se contó con una muestra amplia que podía entenderse como representativa de la provincia de Cuenca. Además, esto se usará como una medida de validez de la escala, esperando que los niños que muestren una mayor orientación naturalista puntúen más alto en la conducta pro-ambiental (véase Abad et al., 2011).

Para establecer los perfiles de niños, se ha clasificado la muestra en cuatro grupos de acuerdo a la frecuencia de contacto con la naturaleza fuera del colegio (alta o baja) y la orientación naturalista (alta o baja). A cada grupo se le ha dado un nombre acorde con las dos variables tenidas en cuenta para la clasificación. La distribución de la muestra y la denominación de cada grupo ha quedado como aparece en la Tabla 13.

Tabla 13

Perfiles de niños de acuerdo a su orientación naturalista y a la frecuencia de contacto con la naturaleza

		Orientación naturalista	
		Baja	Alta
Frecuencia de contacto con la naturaleza	Baja	Grupo 1: Tecno-orientados	Grupo 2 = Naturalistas de salón
		N = 351	N = 230
	Alta	Grupo 3 = Utilitaristas	Grupo 4 = Eco-orientados
		N = 61	N = 186

La correlación entre la orientación naturalista y la frecuencia de contacto con la naturaleza fue de .33, $p < .01$. La correlación entre el constructo orientación naturalista y la conducta pro-ecológica fue de .45, $p < .001$.

Un dato que llama la atención es que la mayor parte de los niños de la muestra se situó en el grupo de los niños tecno-orientados; es decir, fueron niños cuya orientación naturalista era baja y que, además, tenían poco contacto con el medio natural.

Por el otro lado, nos encontramos con un grupo formado por 186 niños que mostraron una alta orientación naturalista y, además, el contacto que mantuvieron con el medio natural fue alto. Este grupo se ha denominado eco-orientados.

Los grupos 2 y 3 de niños mostraron cierta disonancia entre su orientación naturalista y el contacto que mantuvieron con la naturaleza. Los llamados naturalistas de salón puntuaron alto orientación naturalista aunque su contacto con la naturaleza fue bajo. El grupo de utilitaristas estuvo constituido por el menor número de niños. En este caso fueron niños que sí acudían frecuentemente a la naturaleza pero cuya orientación naturalista era baja.

Mediante un análisis de varianza, se comprobó que la conducta pro-ambiental de la población infantil era distinta según el grupo al que pertenecían los participantes, $F(3,825) = 125.55, p < .001, \eta^2_p = .31$.

A continuación, se llevó a cabo un análisis ANOVA 2 x 2 en el que se comprobó que no existía interacción entre la frecuencia de contacto con la naturaleza y la orientación naturalista, siendo $F(1,825) = 2.61, p = .10$. La orientación naturalista influyó significativamente en la conducta ambiental de los niños, $F(1, 825) = 221.08, p = .00, \eta^2_p = .21$. Igualmente, la frecuencia de contacto con la naturaleza influyó en la conducta ecológica de la población infantil, $F(1, 825) = 16.53, \eta^2_p = .16$.

En cuanto a la conducta pro-ambiental que llevó a cabo cada grupo de niños, se comprobó, mediante un análisis post hoc de Bonferroni, que las medias de las conductas ecológicas de todos los grupos de niños se diferenciaron significativamente ($p < .001$), excepto los grupos 3 (utilitaristas) y 1 (tecnorientados), cuyas medias no fueron significativamente distintas. El grupo que

más veces llevó a cabo conductas pro-ambientales fue el de los eco-orientados, $M = 4.76$, $DE = 0.32$, seguido de los naturalistas de salón, $M = 4.53$, $DE = 0.43$; de los utilitaristas; $M = 4.12$, $DE = 0.50$ y, finalmente, de los tecno-orientados, $M = 4.01$, $DE = 0.53$. (Véase Figura 18).

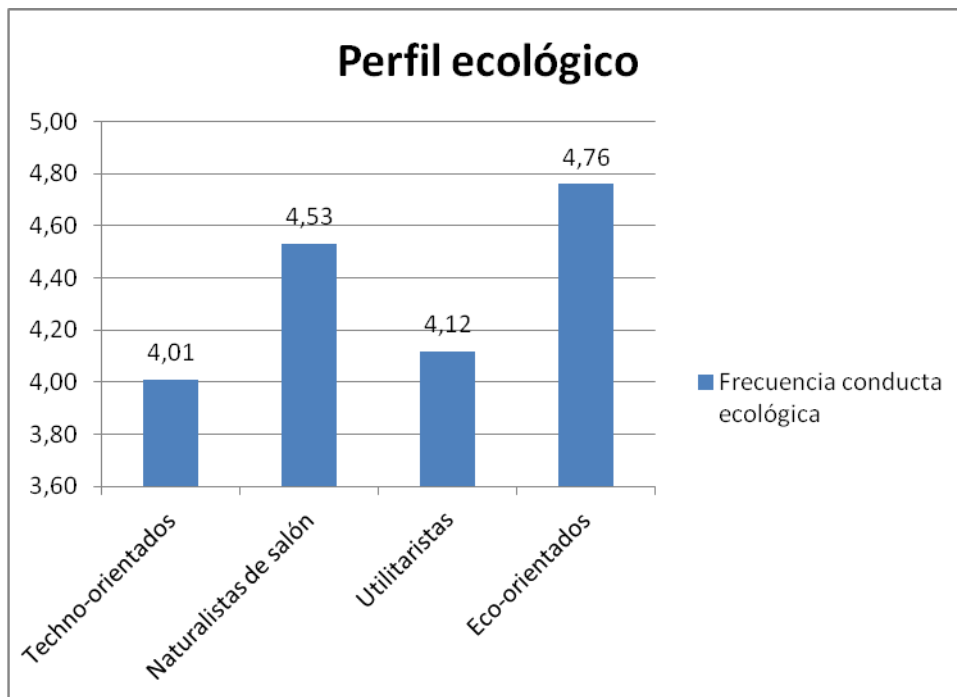


Figura 18. Frecuencia de llevar a cabo conductas pro-ecológicas según los grupos de población infantil establecidos.

4.2.5. Discusión.

La escala CEPS parece ser un instrumento útil y fiable para medir la percepción ambiental de la población infantil; sobre todo, la de los niños de menor edad. Hay que señalar que su estructura factorial parece no estar clara. Los autores del instrumento obtienen una estructura bidimensional. Sin embargo este constructo parece ser unidimensional en el caso de la población infantil española, por lo que no se corrobora la Hipótesis 1. Quizás esto se deba a diferencias culturales entre las dos muestras de niños (americanos y españoles). Para nuestro conocimiento, no se han publicado más estudios en los que se utilice este instrumento. Parece ser que los niños españoles no discernen tan claramente como los americanos entre lo que piensan de la relación ser humano-medio ambiente (*ecoawareness*) y su afinidad hacia la naturaleza (*ecoaffinity*), saturando todos los ítems de la escala en una dimensión.

Por otro lado, el tanto por ciento de varianza explicado por la escala (38.12%) es similar al encontrado en trabajos anteriores en los que se han medido las actitudes ambientales de niños (e.g., Larson et al., 2011; Manoli et al., 2007) y de adultos (e.g., Dunlap et al., 2000).

En cuanto a las variables sociodemográficas, coincidiendo con estudios anteriores llevados a cabo con adultos (Müller et al., 2009) y con adolescentes de la provincia de Cuenca (Amérigo y González, 1996) las niñas puntúan más alto

en orientación naturalista que los niños, con lo que no se corrobora la Hipótesis 2.

Además, los niños de menor edad puntúan más alto en orientación naturalista que los más mayores, no corroborándose la hipótesis 3. Esto podría deberse, principalmente, al objetivo de la escala de incluir ítems que son relevantes para la población infantil de menor edad de manera que, intencionadamente, se incluyeron ítems que son personalmente más relevantes para los niños más pequeños (e.g., me gusta aprender cosas sobre plantas y animales). A medida que los niños crecen, su visión de la naturaleza pasa de ser principalmente antropocéntrica (entre los 6 y los 8 años) a una visión en la que se aprecian los efectos negativos que el impacto del ser humano puede tener sobre el medio ambiente, hacia los 11 años de edad (Evans et al., 2007). De ahí que los niños de menor edad de nuestra muestra puntúen más alto en una escala que intenta medir la relación de la población infantil con la naturaleza desde una visión principalmente antropocéntrica. Estos resultados son novedosos y, además, pueden entenderse como una medida de validez de la escala que no se había aportado hasta el momento.

Al igual que Hinds y Sparks (2009), se ha demostrado que la frecuencia de contacto con la naturaleza es mayor en las áreas rurales que en la urbana, corroborando la Hipótesis 4. Sin embargo, contrariamente a los resultados de Larson et al. (2011), el tener un mayor contacto con la naturaleza no implica que los niños muestren una mayor orientación naturalista, con lo cual no se

corroborar la Hipótesis 5. No se han encontrado diferencias entre los niños de áreas rurales y los niños del área urbana, pero sí entre los niños de las dos áreas rurales. Esto parece indicar que no sólo el contacto con la naturaleza es importante, sino también el tipo de contacto o el tipo de naturaleza presente en las áreas frecuentadas por los niños. La razón podría ser que los niños de la mancha, el área agrícola, y los de la sierra tienen un tipo de contacto con la naturaleza distinto. Las familias de los niños que viven en la mancha son principalmente agricultores y dependen de la naturaleza para vivir. El tipo de contacto que normalmente tienen con el medio natural es un contacto directo, ayudando a sus padres en las labores del campo, o indirecto, hablando con sus padres y familiares sobre el trabajo agrícola. Éste es, de hecho, un tipo de contacto con la naturaleza distinto al descrito como más influyente en las actitudes y comportamientos pro-ambientales de las personas. Este último es un contacto más libre, normalmente con áreas cercanas a casa o al colegio (Chawla, 1999; Kellert, 2002; Sivek, 2002), y podría ser que se dé con mayor frecuencia en zonas de la serranía. Igualmente, podría ser que el tipo de naturaleza presente en la sierra sea distinto al de la mancha y que esto influya en la orientación naturalista de los niños. Estas hipótesis deberán ser comprobadas con futuros trabajos.

La naturaleza presente en el patio del colegio no parece influir en la orientación naturalista de los niños. Por ello nuestra Hipótesis 6 no se corrobora. Se cree que el papel de la variable naturalidad del patio del colegio en la orientación naturalista se refiere a una experiencia concreta (la del colegio) que,

en sí, es más importante para aspectos particulares. Es decir, en el proceso de formación de la orientación naturalista jugarían un papel más relevante otras variables del contexto espacial, social y cultural, tales como lugar de residencia, edad y frecuencia de contacto con la naturaleza fuera del colegio. La naturalidad del patio del colegio sería importante para definir la experiencia en el colegio, pero son otras las variables que pueden explicar las diferencias en orientación naturalista; por ejemplo, la probabilidad de restauración que el propio niño atribuye al patio.

Finalmente, coincidiendo con estudios previos (Kaiser et al., 2012; Hartig et al., 2001; Hartig et al., 2007), se muestran evidencias empíricas de que el comportamiento ecológico está asociado con las posibilidades de restauración ofrecidas en ambientes naturales, corroborándose la Hipótesis 4. Es decir, aquellos niños de la muestra que consideran el patio del colegio como más restaurador también llevan a cabo más conductas ecológicas. El modelo explicativo propuesto indica que las experiencias restauradoras de los niños promueven el comportamiento ecológico de los mismos. En este caso, la relación entre restauración y pro-ambientabilidad está mediada por la orientación naturalista de la población infantil. Coincidiendo con resultados de trabajos precedentes (Hartig et al., 2001), el factor fascinación es el que tiene un efecto directo sobre la orientación naturalista de la población infantil y media el efecto del resto de las cualidades restauradoras. Es decir, fascinación es el único predictor de la orientación naturalista y es el mediador a través del cual la evasión psicológica, extensión y compatibilidad influyen en la orientación

naturalista. La evasión física no tiene ningún efecto sobre la fascinación. Igualmente, la evasión psicológica es la que tiene un menor peso en el modelo. Parece ser que los factores que más influyen en la fascinación de la población infantil se relacionan con sus posibilidades de acción, diversidad de estímulos y compatibilidad entre lo que quieren hacer y lo que el ambiente les permite hacer. Es decir, parece ser que las cualidades restauradoras que hacen referencia al valor de la naturaleza en sí misma, tales como la fascinación, la extensión y la compatibilidad, influyen más en la orientación naturalista de la población infantil que el que el niño necesite evasión física o psicológica. Estas dos últimas parecen medir un valor más utilitarista del medio natural.

Por otro lado, en el meta-análisis llevado a cabo por Kraus (1995), se concluye que las actitudes predicen significativamente el comportamiento. Este autor afirma que las actitudes no son sinónimos de comportamiento y que tampoco serán los únicos determinantes de éste. Es quizás por ello que la varianza explicada en el modelo propuesto es mayor que la explicada en trabajos anteriores (pues se ha añadido la variable mediadora *actitudes ambientales*) pero aún queda más del 50% de la varianza por explicar. Por ejemplo, Hartig et al. (2001) encontraron que fascinación media la relación del resto de cualidades restauradoras con el comportamiento pro-ecológico y que su modelo explica un 23% de la varianza. Por otro lado, el que el modelo propuesto explique un tanto por ciento de varianza mayor que el encontrado en estudios precedentes podría deberse a que la consistencia en la relación entre actitudes y comportamiento es probablemente más fuerte en la población infantil (Larson et al., 2011).

Coincidiendo con Hartig et al. (2007, p. 291), “debido a que la destrucción de los ambientes naturales puede eliminar posibilidades de experiencias restauradoras, la apreciación de estas experiencias podría ser una primera fuente de motivación de distintos comportamiento ecológicos”. Es necesario destacar que los ítems incluidos en la escala CEPS parecen reflejar lo que Kaiser et al. (2012) han denominado “actitudes hacia la naturaleza”, refiriéndose a la apreciación y cuidado del medio natural debido a sentimientos de utilización y de interés para la persona. Esto es, los individuos aprecian el medio natural porque obtienen algún beneficio de ello (e.g., recreacional, restaurador, espiritual, etc.). Quizás por ello el relacionar la CEPS con la restauración de los niños permita explicar un tanto por ciento mayor de varianza que en estudios precedentes.

Nuestros resultados permiten afirmar que es importante promover el contacto directo de los niños con la naturaleza, no sólo porque éste sea beneficioso para su salud, sino porque, además, puede que esto les proporcione experiencias restauradoras que parecen promover la orientación naturalista de la población infantil así como su comportamiento pro-ecológico. Según el perfil ecológico de los niños de esta muestra, aquellos que tienen una mayor orientación naturalista (naturalistas de salón y eco-orientados) son los que llevan a cabo más comportamientos ecológicos. Además, existen diferencias significativas entre el grupo 2 (con menor contacto) y el grupo 4 (con mayor contacto), indicando que el grupo de niños que se muestran más pro-ambientales son aquéllos cuyo contacto con la naturaleza es frecuente y que, además,

muestran una orientación naturalista más elevada. Aquellos niños cuya orientación naturalista es baja, llevan a cabo menos comportamientos ambientales, independientemente de su frecuencia de contacto con la naturaleza. Parece ser que el contacto con la naturaleza ayuda a aumentar la orientación naturalista y la frecuencia de comportamiento ecológico en aquellos niños que ya muestran cierto grado de interés hacia la naturaleza, los valores naturales y su protección. Sin embargo, coincidiendo con estudios previos (Ernst y Theimer, 2011), en ausencia de esta orientación, el contacto con la naturaleza parece no influir lo suficiente en la conducta ecológica de la población infantil. Aquellos niños cuya orientación naturalista es baja (grupos 1 y 3) muestran una menor frecuencia de realización de conductas ecológicas, independientemente de su frecuencia de contacto con la naturaleza.

Cabe destacar que se observa un cierto efecto techo (puntuaciones en la parte superior de la escala) que se cree debido principalmente a dos razones. En primer lugar, podría haber problemas de deseabilidad social, con los niños marcando puntuaciones en la parte superior de la escala entendiendo que ese es el tipo de respuesta que se espera de ellos. Por otro lado, puede deberse a la generalización de patrones de conductas pro-ambientales, es decir, a la norma social. Aún con todo, y asumiendo que la deseabilidad social suele estar presente en los estudios medioambientales que utilizan autoinforme, los niños eco-orientados puntúan significativamente más alto en la realización de conductas pro-ambientales que el resto de grupos, sugiriendo que la orientación naturalista es una buena predictora de la conducta pro-ambiental infantil. Además, las

conductas pro-ambientales registradas son conductas que han sido elegidas para que puedan ser realizadas por los niños, tales como ayudar a reciclar en casa o apagar las luces, y que conllevan relativamente poco esfuerzo. Por ello, es probable que muchos niños las lleven a cabo habitualmente incluso si no muestran una actitud muy favorable hacia el medio ambiente. Resulta difícil encontrar comportamientos pro-ambientales que requieran más esfuerzo y que puedan ser realizados por la población infantil, especialmente por los de menor edad (Evans et al., 2007).

Futuros trabajos deberían incluir modelos explicativos en los que otras posibles variables mediadoras, como la conectividad de los niños a la naturaleza (Cheng y Monroe, 2012), sean tenidas en cuenta. Además, sería interesante contar con medidas de comportamiento observado que eliminasen los posibles problemas de deseabilidad social que surgen al usar ítems de autoinforme.

En definitiva, la escala CEPS es un instrumento útil y fiable para medir la orientación naturalista de niños pequeños. Aún así, requiere de más estudios para poder entender la dimensionalidad de este constructo y también la relación de las percepciones ambientales de la población infantil con otras variables, como la preferencia estética. Debería revisarse la redacción de los ítems, especialmente de aquéllos que han sido eliminados del presente trabajo, y llevar a cabo investigaciones cross-culturales, en las que se evalúe la dimensionalidad de la orientación naturalista en la infancia y las posibles diferencias culturales en la misma.

4.3. Discusión general.

Conocer las razones por las que la población infantil lleva a cabo comportamientos ecológicos y el contar con instrumentos que ayuden a entender la relación que los niños tienen con el medio natural, es esencial para poder promover estrategias de conservación (Cheng y Monroe, 2012; Evans et al., 2007; Larson et al., 2011; Manoli et al., 2007). Este capítulo se ha centrado principalmente en el estudio del impacto que el contacto con la naturaleza cercana tiene en las actitudes y el comportamiento ambiental de la población infantil española. Para ello, ha sido necesario adaptar la escala NEP para niños y la escala CEPS al español. Ambos instrumentos son nuevos, por lo que su estudio y adaptación nos permite avanzar en el conocimiento sobre las actitudes y el comportamiento ambiental de la población infantil española, y los factores que influyen en ellos.

En el estudio 3, se ha adaptado la escala NEP para niños a la población infantil española y se ha comprobado que el sistema de creencias ecológico de los niños adopta una estructura unidimensional de segundo orden (ecocentrismo general), con tres factores relacionados de primer orden: 1) respeto por la naturaleza, 2) eco-responsabilidad y 3) eco-deterioro. Esta estructura coincide con trabajos llevados a cabo con adultos (Dunlap et al., 2000) y con niños (Manoli et al., 2007) en los que se concluye que la escala NEP puede ser utilizada para medir una visión ecológica del mundo unidimensional. Es necesario destacar que los factores de primer orden encontrados en el presente

trabajo nos son similares a los encontrados por Manoli et al. (2007). Se cree que esto podría deberse a las diferencias culturales entre la población infantil americana y la española. Coincidiendo con Dunlap (2008), parece razonable estudiar la dimensionalidad del sistema de creencias ecológicas con cada muestra de estudio, pues la estructura y coherencia de éste puede variar de un grupo de población a otro. Es por ello que los resultados señalados en este trabajo no pueden generalizarse, puesto que los participantes incluidos son niños de la Comunidad de Castilla - La Mancha, cuya visión ecológica del mundo no tiene por qué seguir la misma estructura que la de niños de otros lugares geográficos.

En relación a la escala CEPS adaptada en el estudio 4, ésta no adopta la misma estructura que la descrita por sus autores. La solución encontrada es unidimensional, midiendo la orientación naturalista general de la población infantil.

Uno de los factores que influye en el sistema de creencias ecológicas de la población infantil española es la edad, mostrándose los niños más mayores más ecocéntricos que los niños de menor edad. Por otro lado, la edad influye en la orientación naturalista, de manera que los niños de menor edad puntúan más alto. Esto es interesante puesto que los autores del instrumento pretendían diseñar la escala de manera que ésta incluyese principalmente ítems relevantes para los niños de menor edad. Es decir, según el objeto de estudio será mejor el uso de una escala u otra. Sería recomendable el uso de la NEP_Ñ con niños

mayores, cuyo pensamiento abstracto está más desarrollado y a los que les es más fácil entender los ítems incluidos en este instrumento que a los niños de menor edad.

Se ha estudiado la influencia de la naturaleza cercana al lugar de residencia en la visión ecológica de los niños, y los resultados coinciden con estudios previos con adultos (Hinds & Sparks, 2008), adolescentes (Müller et al., 2009) y niños (Cheng & Monroe, 2012), en los que se ha comprobado que el contacto con la naturaleza influye en las actitudes ambientales de las personas. Se ha demostrado que los niños de áreas rurales son más ecocéntricos que los de áreas urbanas. Yendo un paso más allá, en el estudio 4 se ha observado que, efectivamente, los niños que viven en áreas rurales tienen una mayor frecuencia de contacto con la naturaleza que los que viven en áreas urbanas. Sin embargo, no existen diferencias en cuanto a la orientación naturalista entre el medio rural y el medio urbano, pero sí entre los dos rurales. Esto parece indicar que no sólo el contacto con la naturaleza es importante sino también el tipo de contacto y/o el tipo de naturaleza presente en cierta área. Futuros estudios podrán dilucidar si, efectivamente, esta es la razón de las diferencias encontradas, así como barajar otras posibles explicaciones, tales como el nivel educativo de los padres, el nivel socioeconómico, los valores que los padres tienen hacia la naturaleza, el tipo de casa y vecindario donde viven los niños o la distancia andando (o en bici) al lugar natural más cercano, entre otras.

Un dato a destacar es que los elementos naturales incluidos en el ámbito educativo parecen no influir en la orientación naturalista de los niños. Quizás los patios de colegio que han sido elegidos como naturales no sean lo suficientemente naturales como para influir en la orientación naturalista de los estudiantes. Esto es, ninguno de los colegios elegidos es similar al *outdoor in all weather* descrito por Grahn et al. (1997). En futuros trabajos sería conveniente estudiar si los resultados son los mismos cuando la cantidad de naturaleza en el colegio es mayor. Por otro lado, el contacto que los niños tienen con la naturaleza en el colegio no ha sido medido. Parece razonable pensar que el que haya más naturaleza en el patio hará que los niños tengan un mayor contacto con los elementos naturales, pero también podría ser que tengan restringido el acceso a las zonas naturales por diversas razones, como que se ensucien o miedo al deterioro de las mismas.

En relación al comportamiento pro-ambiental de la población infantil, los resultados coinciden con estudios llevados a cabo con adultos. La experiencia restauradora de la naturaleza parece ser una fuente de motivación para la protección del medio ambiente también en los niños. La población infantil, al igual que los adultos, se beneficia del efecto restaurador que promueve la naturaleza (Taylor y Kuo, 2011; Wells, 2000). Esto parece estar motivando la orientación naturalista de la población infantil, que se traduce en acciones pro-ambientales.

Por otro lado, el perfil ecológico de la población infantil descrito en el estudio 4 ayuda a establecer grupos de intervención. El contacto con la naturaleza influye positivamente en la frecuencia de llevar a cabo conductas pro-ecológicas cuando los niños muestran una orientación naturalista alta. Sin embargo, cuándo ésta es baja, la frecuencia de contacto con la naturaleza no influye en la conducta pro-ambiental. Es decir, sería conveniente crear en los niños interés por la naturaleza y por la protección medio ambiental y, posteriormente, reforzarlo con el contacto con el medio natural.

En conclusión, tanto la escala NEP_Ñ como la CEPS deberían seguir estudiándose, así como otros posibles factores que estén influyendo en las actitudes y el comportamiento ambiental de los niños. Aún así, estos dos instrumentos abren nuevas líneas de investigación para entender las actitudes ambientales de la población infantil hispanoparlante, así como los procesos psicológicos que influyen en su comportamiento pro-ambiental. También pueden ser utilizados para evaluar los efectos de programas de educación ambiental cuyo objetivo sea aumentar las actitudes ambientales de la población infantil.

CHAPTER 5.- DEVELOPING A BOND WITH NATURE: HOW A SUMMER CAMP AFFECTS CHILDREN’S EMOTIONAL AND COGNITIVE EXPERIENCE OF NATURE AND INCREASES WILLINGNESS TO DISPLAY ENVIRONMENTAL BEHAVIOUR

The studies described until now have focused on the effects that children’s daily contact with nature has for children’s wellbeing as well as for their pro-environmental attitudes and behaviours. The present chapter aims at studying a different kind of contact with nature: a onetime prolonged experience in nature and its impact on children’s environmental behaviour. The chapter includes study 5⁵.

As described in Chapter 1, research suggests that the basis for adults’ pro-environmental attitudes and behaviours is created during childhood, mainly due to experiences of nature (Chawla & Cushing, 2007; Hinds & Sparks, 2008). This relation is proposed in several studies. For instance, when environmentalists were asked about their reasons to commit to protect the

⁵ This study is being reviewed as: Collado, S., Staats, H., and Corraliza, J. A. (*Under review*). *Journal of Environmental Psychology*.

environment they frequently mentioned two reasons: positive experiences of nature during childhood and the influence of role models (Chawla, 1999; Palmer et al., 1999). The same pattern is found for the general public (Thompson et al., 2008; Wells & Lekies, 2006). Studies conducted with children support the underlying premise that children are sensitive to nature experiences and that these experiences tend to increase their environmental attitudes (Cheng & Monroe, 2012; Evans et al., 2007). Extending these effects of the experience of nature to issues of environmental conservation there is research with adults that indicates that gratifying experiences in nature may motivate environmental protection (Kaiser et al., 2012; Teisl & O'Brien, 2003). People who experience benefits from being in nature may want to preserve the places where they obtain these benefits and be more willing to carry out ecological behaviours. As previously mentioned, Hartig et al. (2001) found that psychological restoration, one consequence of experience of nature, predicts ecological behaviours. Similarly, Teisl and O'Brien (2003) showed that participating in outdoor recreation activities, such as hiking or camping, encourages people to take care of the environment.

Most of the studies about children's experiences of nature have been conducted as part of research on the evaluation of Environmental Education (EE) programs. There is empirical evidence showing that EE programs promote positive changes in children's ecological worldviews (Evans et al., 2007), environmental attitudes (Ernst & Theimer, 2011) and environmental knowledge (Powers, 2004). There has been some debate whether the duration and context

(normally outdoors vs. indoors) of the EE program influence the outcomes. It appears that longer programs have a greater impact on environmental behaviour than shorter ones (Bogner, 1998; Stern et al., 2008). Outdoor EE programs have a positive impact on children's environmental behaviours (Dresner & Gill, 1994; Stern et al., 2008) but this finding may not be general: a meta-analysis by Zelezny (1999) showed that participating in a classroom EE program was more effective in encouraging environmental behaviours than participating in an EE programs outdoors (workshops, nature camp or field trips). More recently, Duerden and Witt (2010) evaluated the effects of an intervention that included both indoor preparatory activities and outdoor activities in a sleepover camp. By registering participants' environmental behaviours before the program, in between the two phases of the program and afterwards, the authors concluded that both phases of the program separately increased participants' environmental behaviours. The EE programs evaluated greatly differ from one another, implying that success or failure of the EE program may both depend on its content and on the location where the program is run. The equivocal outcomes strengthen the need for more research that assesses the psychological backgrounds of potential change in pro-environmental behaviour through children's nature experience, both without and with support of EE programs. Finding out *how* behaviour changes may give a better understanding of the factors that are responsible for the effects.

In this study, we look at the impact that a prolonged experience of nature through a summer camp with or without an EE program has on children's

environmental attitudes and behaviours. In our approach we follow Pooley and O'Connor (2000) who demonstrated that emotions and beliefs should both be considered when trying to explain people's environmental behaviour. More specifically, we investigate how one or two weeks of direct exposure to nature in a summer camp affects children's emotional and cognitive components of environmental attitudes and whether and how these lead to improved ecological behaviours. We selected nature camps with and without EE programs, and had an urban camp without EE program as a control group. The following sections review relevant literature about the influence of direct experiences of nature on the affective and cognitive dimensions of environmental attitudes, as well as their relations with environmental behaviour.

Affective components of environmental attitudes.

Various researchers have shown an interest in the role that affective determinants of environmental attitudes have in the human-nature relationship. Several concepts have been used such as affective connection to nature (Hinds & Sparks, 2008), Nature Relatedness (Nisbet et al., 2009), Environmental Identity (Clayton & Opatow, 2003), Inclusion of Nature in the self (Schultz, 2002), Connectedness to nature (Mayer & Frantz, 2004), and Emotional Affinity toward Nature (EAN). The last concept is defined as an emotional experience with four aspects: love of nature, feelings of freedom in nature, feelings of security in nature, and feeling of oneness with nature (Kals et al., 1999).

We chose to use EAN for our study for several reasons. Firstly, it has proven to be sensitive to environmental context and predictive of behaviour. Müller et al. (2009) assessed the role that EAN had in predicting teenagers' (aged 15 to 19) willingness to behave pro-environmentally in different contexts (two different countries- Germany and Lithuania- and rural vs. urban areas). EAN was the main predictor of pro-environmental commitment and context played an important role in the level of EAN, with teenagers from rural areas in Lithuania more frequently being in contact with nature, showing higher levels of EAN than the other three groups. Second, in contrast with some of the other measures, it includes only affective items. For example, Ernst and Theimer's (2011) Connection to Nature Index has proven to be sensitive to EE programs that were kept outdoors, and predictive of pro-environmental behaviour, but their scale also contains cognitive items (Cheng & Monroe, 2012; Ernst & Theimer, 2011).

Ecological beliefs.

Many EE programs focus on increasing participants' environmental knowledge and beliefs (Rickinson, 2001). Often used for this purpose is the New Environmental Paradigm (Dunlap & Van Liere, 1978) and its successor the New Ecological Paradigm (Dunlap et al., 2000). The New Ecological Paradigm scale (2000) aims at measuring adults' "primitive beliefs" about their relationship with the natural environment. It measures "cognitive beliefs rather than affective experience" (Mayer & Frantz, 2004, p. 504). The NEP scale is widely used to

measure adults' environmental attitudes and predicts environmental behaviours such as avoiding buying products with unnecessary packaging or sorting household waste for recycling (Olli et al., 2001; Schultz, Zelezny & Dalrymple, 2000). Using the NEP scale for children (Manoli et al., 2007), it was demonstrated that attending a 5-day outdoor EE program has a positive effect on children's ecological worldviews (Manoli et al., 2007). Similarly, Evans et al. (2007) found that children showed a stronger ecological worldview after attending a one week, outdoor EE day program. We chose to use the NEP scale for Children in our study. We had no evidence in advance that the experience of nature alone, in a summer camp, without an EE program, affects the score on the NEP for children and we expected, by extrapolation from adults' experiences, that the NEP scale for children predicts children's environmental behaviour.

5.1. Objectives and hypotheses

Exposure to nature during a prolonged period can offer many benefits such as increased sensitivity to the natural environment, enjoyment of nature, and increased psychological wellbeing (Talbot & Kaplan, 1986). Many of the factors that seem to have an impact on children's environmental attitudes are present in nature sleepover camps: long term direct exposure to nature, usually combined with play and educational interaction with nature. This is approved of, if not explicitly stimulated by parents who sign up and pay to send their children to a camp, which suggests a home environment that supports a positive attitude toward nature and the environment, in line with earlier findings (see e.g., Cheng

& Monroe, 2012). Therefore, nature sleepover camps might be more effective in promoting children's emotional affinity to nature, ecological beliefs and environmental behaviours than day outdoors or in-class EE programs. The studies carried out in camps until now have paid attention to the outcomes that a specific EE program conducted in the camp has on children's environmental attitudes and behaviour and compared these to programs organized in urban, indoor settings. Such a design does not allow distinguishing whether the positive effects reported are due to spending time in nature *per se* or to the educational program that is being assessed. In this study we included two types of camps in nature, one with EE and one without it. We collected data in four sleepover summer camps with different characteristics: two 1-week religious camps in nature (one for boys and one for girls) without EE activities, one 2-week camp in nature with EE activities in its program and a 2-week urban camp without EE activities.

Our main expectations were that nature as experienced during a one- or two-week sleepover camp would increase children's affective and cognitive components of environmental attitudes, as measured with EAN and NEP, and their willingness to carry out several environmentally friendly behaviours, as compared to children participating in an urban sleepover camp (Hypothesis 1); that there is an additional increment in environmental attitudes and willingness to carry out pro-environmental behaviour for those children attending the two weeks nature camp with EE activities, as compared to the children in the one-week nature camps (Hypothesis 2); that increases in EAN and in ecological

beliefs mediate increments in willingness to carry out environmental behaviours (Hypothesis 3).

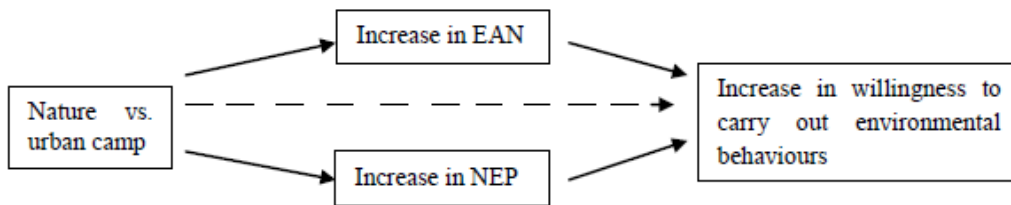


Figure 19. Illustration of the hypotheses.

5.2. Method

Participants and programs' description.

The sample was formed by children who attended four different sleepover summer camps in Spain. Data were collected on the first and last day of the summer camps. The number of children who fully completed the questionnaire at time 1 (T1) and at time 2 (T2) was 397; their mean age was 10.88 ($SD = 2.17$), 53.9% were boys. Due to family holiday's arrangements, illness or homesickness, 26 participants left the camp early; their T1 data were not included in this report. The three nature camps (C1 to C3) were located in a regionally protected natural area in the mountains. The fourth camp (C4) was organized in an urban area.

C1 and C2 had a Catholic religious denomination, one for boys and the other one for girls, in the same place but at different times. These two camps were run for one week and the staff was composed of nuns and laypersons with strong religious beliefs. Children's schedule included spending about 4 hours per day on religious activities such as going to mass, praying or playing games with religious topics. The staff were strict with the campers' chores, allocating time to have children wash their clothes, organize and clean their tents, help to clean the dining room, etc. Children had one hour of free time after lunch and between two to three hours in the early evening when they could wander around the surroundings freely. They also made a two days hiking tour in the area which included a night camping outside the camps. Participants also once went swimming in a river nearby during the week of the camp. The fee for C1 and C2 was 250 Euros. See Figure 20.

C3 was a boys' and girls' camp; it lasted 2 weeks. The main activities in the camp included outdoors sports such as hiking, climbing, kayaking, bike riding, swimming in the river and horse riding. Environmental education activities were also included in the program. Once every two days, for about an hour, children were taught about different environmental topics such as the importance of the local flora and fauna, the importance of recycling at home and school, what children can do for energy and water conservation and how to build a house for birds, among others. All these activities were hands-on activities developed to let children actively participate. In operating the camp, the staff taught the children how to behave in an environmentally friendly way and to

treat the environment with respect, as part of the camp's guidelines. The fee for this camp was 350 Euros. See Figure 21.

The urban camp (C4) was situated in a city of 55.000 inhabitants and lasted 2 weeks. Most of the activities were carried out in a school where children also had their bedrooms, or in the streets nearby the school. The activities included theatre, learning English, craft activities, visiting museums, playing games around the city (e.g., playing hide and seek) and sports such as football or basketball. They also spent an hour per day in one of the public swimming pools. The fee for this camp was 300 Euros. See Figure 22.

The fees and the information provided by the organizers of the camps suggest that children came from middle-class families.



Figure 20. C1 & C2. Nature summer camps without EE



Figure 21. C3. Nature summer camp with EE



Figure 22. C4. Campers playing in the street nearby the urban summer camp

Measures.

All variables were assessed using Likert-like five-point scale, with symbols to make it easy for children to understand the response method (1 = completely disagree 🙅 to 5 = completely agree 👍). The original scales were constructed in English and then translated into Spanish. The items were then re-translated into English by a native speaker, allowing ambiguities to be identified in the translations. (See Annex 5).

a) Emotional Affinity toward Nature (EAN).

The original scale measuring EAN was introduced by Kals et al. (1999) and adapted for use with teenagers by Müller et al. (2009). Six of the 11 items from Müller et al's (2009) scale were used in this study due to time and space constraints as well as to the difficulty for children to understand some of the original items (e.g., by direct contact with nature I feel respect for its uniqueness). We used the following items: “1) When I spend time in nature I feel free and easy, 2) I have the feeling I can live my life to the full in nature, 3) When surrounded by nature I get calmer and I feel at home, 4) I am often much absorbed through nature (landscapes, plants, animals, water, etc.) and I do not notice how time goes by., 5) Whenever I spend time in nature I do experience a close connection to it and 6) Sometimes when I feel unhappy I find solace in nature.” Reliability of the scale was good ($\alpha_{T1} = .82/\alpha_{T2} = .81$).

b) New Environmental Paradigm (NEP) for Children.

As described in Study 3, the scale (Manoli et al., 2007) is a measure of children's worldviews to be used with children from 10 to 12 years old. It was used as a unidimensional scale, with higher scores indicating a more ecological worldview ($\alpha T1 = .67/\alpha T2 = .70$).

c) Intentions to visit nature.

The following item was used "In the future, I am going to visit natural places more often".

d) Willingness to carry out daily conservation actions.

Four behaviours similar to the ones used in previous studies (Evans et al., 2007; Leeming et al., 1995) were chosen for this category. Items are: "I'm willing to: 1) recycle (or help my parents to recycle) at home 2) turn off the water while I wash my hands 3) close the refrigerator door while deciding what to eat or drink and 4) switch off electrical appliances (lights, TV, PC, video games, etc.) when I'm not using them". Reliability of the scale was considered sufficient ($\alpha T1 = .63/\alpha T2 = .60$), taking into account that the α tends to be lower when the number of items is small (Anastasi & Urbina, 1997).

e) Willingness to carry out environmental citizenship behaviours (see Stern, 2000).

Three behaviours based on items used in previous studies (Evans et al., 2007; Müller et al., 2009) were used: “I’m willing to: 1) at school, talk to my teachers and peers about the importance of taking actions to protect the environment, 2) remind friends not to litter after they left trash on a picnic table and 3) become a volunteer in activities aimed at environmental protection. Again, reliability was considered sufficient for a three-item scale ($\alpha T1 = .68/$ $\alpha T2 = .66$).

Procedure.

A pilot study was conducted with a group of 25 children to make sure that there were no comprehension problems and that the time needed to collect the data was not longer than the time given by the camps’ organizers. Authorizations were obtained from the camps’ organizers and data were collected on the first and last day of each camp. Children were divided into groups of 20-25 participants and they filled out the questionnaire in the dining place. The questions were read aloud twice in order to avoid reading comprehension problems and it took an average of 30 minutes to collect the data with each group. Doubts were solved when required.

5.3. Results

Effects of the summer camps on environmental attitudes and behaviours.

Repeated measures ANOVA with time (begin, end of stay) and type of camp (natural, urban) was used to test whether type of camp affected children's affective and cognitive components of the attitude toward the natural environment, and the three environmental behaviour measures (Hypothesis 1). The results of the repeated measures ANOVAs showed that all the interaction effects were significant (see Table 14). This indicates that the increases over time are different for the different camps, those in the nature camps being higher than the ones in the urban camp (see Table 15). Therefore Hypothesis 1 was confirmed.

Table 14

Repeated measure ANOVAs with Time (begin, end) as a within-subjects factor and Type of camp (nature vs. urban) as a between-subjects factor for each dependent variable

	NEP	EAN	Intentions to visit nature	Daily conservation actions	Environmental citizenship behaviour
Time x Type of Camp	$F(1,388) = 16.31^{***}$	$F(1,389) = 11.36^{***}$	$F(1,389) = 12.25^{***}$	$F(1,387) = 19.53^{***}$	$F(1,388) = 5.47^*$

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 15

Means, standard deviations and paired sample t-tests for all the dependent variables before and after the summer camp

		C1 (girls in nature)			C2(boys in nature)			C3(mixed in nature)			C4(urban)		
		M	SD	t^a	M	SD	t^a	M	SD	t^a	M	SD	t^a
NEP	Pretest	3.70	.51	7.68***	3.88	.52	2.81**	3.80	.42	4.80***	3.84	.36	-0.10
	Posttest	4.22	.45		4.06	.53		4.13	.40		3.83	.37	
EAN	Pretest	3.55	.73	6.33***	3.50	.78	4.13***	3.14	.69	5.50***	3.67	.46	1.22
	Posttest	4.09	.56		3.91	.75		3.74	.65		3.77	.53	
Intentions to visit nature	Pretest	3.74	1.01	4.95***	3.63	.95	3.41***	3.34	.77	4.95***	3.85	.078	0.10
	Posttest	4.35	.80		4.03	.87		3.98	.80		3.84	.71	
Daily conservation actions	Pretest	4.05	.61	5.48***	4.04	.69	3.02**	3.91	.69	5.38***	4.20	.37	-1.28
	Posttest	4.42	.48		4.30	.48		4.36	.51		4.11	.48	
Environmental citizenship behaviour	Pretest	3.46	.69	5.44***	3.50	.80	4.07***	3.20	.73	4.22***	3.46	.62	1.40
	Posttest	3.94	.60		3.89	.77		3.65	.65		3.60	.59	

* $p < .05$. ** $p < .01$. *** $p < .001$ (adjusted familywise error rate for paired sample t -test on pro-environmental variables)

^a Within-group, paired samples (Time 1/Time 2) t - tests

To test whether a nature camp with EE activities and longer duration had stronger effects than the two nature camps without EE activities and shorter duration (Hypothesis 2) we performed a repeated measures ANOVA with time (begin, end of stay) and EE program (yes, no) for the three nature camps only. No interaction effects were found between time (before, after) and EE program (yes, no) for any of the dependent variables, indicating that the increases experienced in the nature camps did not differ due to the inclusion of EE activities (see Table 16). Hypothesis 2 was therefore rejected.

Table 16

Repeated measure ANOVAs with Time (begin, end) as a within-subjects factor and Environmental Education (EE) of the three nature camps as a between-subjects factor for each dependent variable

	NEP	EAN	Intentions to visit nature	Daily conservation actions	Environmental citizenship behaviour
Time	$F(1,313)=.03$.	$F(1,314)=.89$.	$F(1,314) = .66$.	$F(1,312)=1.67$	$F(1,313)=.009$.
x EE	$p = .86$	$p = .86$	$p = .42$	$p = .19$	$p = .92$

*Explaining behavioural change by contact with nature and increases in
EAN and NEP*

We tested the expectation that both the emotional and the cognitive component of environmental attitude mediate the effect of a stay in a summer camp on children's willingness to carry out environmentally friendly behaviours (Hypothesis 3). Regression analyses were conducted using the change scores of each of the components of the model, followed by a bootstrap procedure (Preacher & Hayes, 2008)⁶, for each of the three kinds of environmental behaviours (see Figure 19).

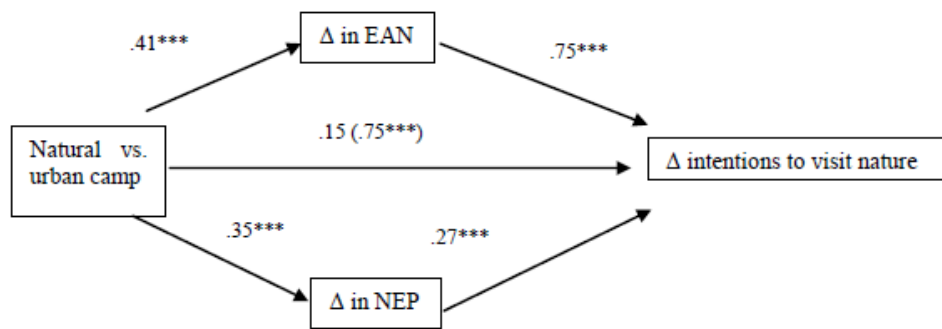
⁶ This method has several advantages over other methods for testing mediation, one of them being that multiple mediators can be tested simultaneously, which is our aim. With bootstrapping, n cases with replacement from the original sample are extracted and the size of the indirect effect is re-estimated with this new resample. Preacher and Hayes (2008) advice to repeat this process preferably more than 5.000 times. The size of the indirect effect in at least 95% (confident intervals with a significant level $\alpha = .05$) of the re-samples should be either above or below 0 in order to conclude that there is a significant indirect effect, (see e.g., De Kwaadsteniet & Van Dijk, 2010).

Two separate mediation analyses were conducted using the procedure proposed by Baron and Kenny (1986) and Sobel tests. The results indicated that each mediator significantly mediated the effect of the type of camp on the dependent variables.

Explaining the increase in intentions to visit nature.

A regression analysis with increase in intentions to visit nature as the dependent variable, type of camp (natural vs. urban) as the independent variable, and the two potential mediators, showed a significant effect of type of camp on the change in intention (Δ intention) to visit nature ($B = .75$, $SE = .15$, $p < .001$). Type of camp also had a significant effect on each mediator (Δ EAN: $B = .41$, $SE = .12$, $p < .001$; Δ NEP; $B = .35$; $SE = .08$; $p < .001$). Furthermore, each of the mediators separately significantly predicted the Δ intention (Δ EAN: $B = .75$, $SE = .05$, $p < .001$; Δ NEP; $B = .27$; $SE = .07$; $p < .001$). Finally, when the two mediators were included in the regression analyses, the effect of type of camp on Δ intention became non-significant ($B = .15$, $SE = .12$, $p = .21$).

To test whether this mediation was significant, a 10.000 re-samples bootstrap method was used. Bias corrected and accelerated confidence intervals for the total indirect effect and for the two mediators separately were obtained. None of them contained zero at 95% level (total indirect effect: CI: .24-.69; Δ NEP CI = .03-.18; CI Δ EAN = .16 - .48), indicating that Δ NEP and Δ EAN are both unique mediators ($p < .05$) of the effect of type of camp on the Δ intentions to visit nature. Moreover, an examination of the pairwise contrasts of the indirect effects (see Preacher & Hayes, 2008) indicates that the specific indirect effect through Δ EAN is larger (.31) than the specific indirect effect through Δ NEP (.09), with CI = .06-.40, $p < .05$.



* $p < .05$. ** $p < .01$. *** $p < .001$

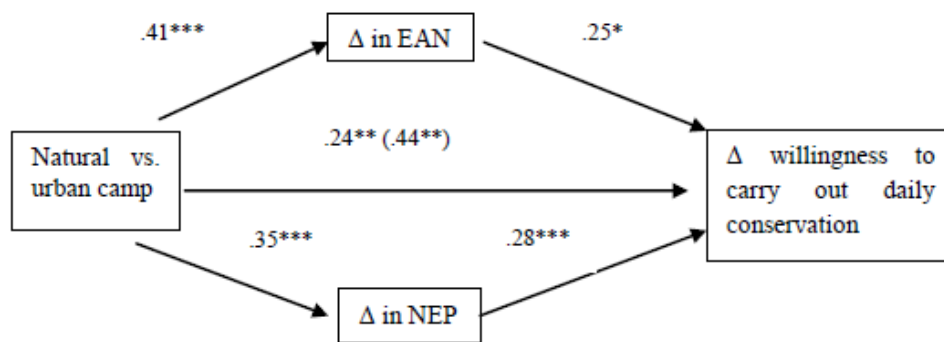
Figure 23. Mediation model for increased intentions to visit nature.

Δ stands for change from T1 to T2.

Explaining the increase in willingness to carry out daily conservation actions.

The results showed a significant effect of type of camp on the increase in willingness to carry out daily conservation behaviours (Δ daily conservation) ($B = .44$, $SE = .09$, $p < .001$). As mentioned before, type of camp had a significant effect on each mediator. Each of the mediators significantly predicted the Δ daily conservation (Δ EAN: $B = .25$, $SE = .04$, $p < .001$; Δ NEP; $B = .28$; $SE = .05$; $p < .001$). When the two mediators were included in the regression analyses, the effect of type of camp on Δ daily conservation was still significant ($B = .24$, $SE = .09$, $p < .01$), but had been considerably reduced, which indicates partial mediation. The bootstrap analysis showed that none of the accelerated confidence intervals for the total indirect effect and for the two mediators separately contained zero, at 95% level (total indirect effect: CI: .12-.29; CI

$\Delta\text{EAN} = .05 - .17$; $\Delta\text{NEP CI} = .04-.17$), indicating that ΔNEP and ΔEAN are both unique mediators ($p < .05$) of the effect of type of camp on the Δ daily conservation. An examination of the pairwise contrasts of the indirect effects indicates that both mediators have an equally strong effect, as the CI contains the zero, $\text{CI} = -.07 - .08$.



* $p < .05$. ** $p < .01$. *** $p < .001$

Figure 24. Mediation model for increased willingness of daily conservation.

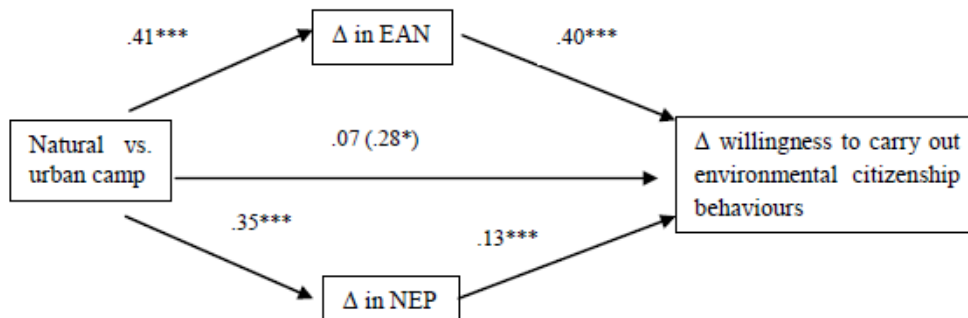
Δ stands for change from T1 to T2.

Explaining the increase in willingness to show environmental citizenship.

The regression analyses showed a significant effect of type of camp on the increase in willingness to show environmental citizenship (Δ environmental citizenship) ($B = .28$, $SE = .12$, $p < .05$). As mentioned, type of camp had a significant effect on each mediator. Moreover, increase in EAN significantly predicted the Δ environmental citizenship (ΔEAN : $B = .40$, $SE = .05$, $p < .001$)

and Δ NEP marginally predicted the DV ($B = .13$; $SE = .07$; $p = .05$). When the two mediators were included in the regression analyses, the effect of type of camp on Δ environmental citizenship became non-significant ($B = .07$, $SE = .11$, $p = .50$).

Following the bootstrap method, none of the bias corrected and accelerated confidence intervals for the total indirect effect and for the two mediators separately contained zero at 95% level (total indirect effect: CI: .12-.32; Δ NEP CI = .002-.11: CI Δ EAN = .08 - .27), indicating that Δ NEP and Δ EAN are both unique mediators ($p < .05$) of the effect of type of camp on Δ environmental citizenship. The pairwise contrasts of the indirect effects show that the specific indirect effect through Δ EAN is larger (.16) than the specific indirect effect through Δ NEP (.04), with CI .01-.23, $p < .05$.



* $p < .05$. ** $p < .01$. *** $p < .001$

Figure 25. Mediation model for increased willingness to carry out environmental citizenship behaviours.

Δ stands for change from T1 to T2.

5.4. Discussion

This study tested the effects that direct experience of nature through a summer camp has on children's environmental attitudes, the affective and cognitive experiences with regard to the environment, and their potential effect on several kinds of environmental behaviour. Our findings show that direct exposure to nature through a camp increases children's emotional affinity toward the natural environment as well as children's ecological beliefs, supporting the argument of previous authors that direct experience of nature may contribute to create an emotional bond with nature (Cheng & Monroe, 2012) and improve children's ecological worldviews (Evans et al., 2007). Therefore Hypothesis 1 was supported. The studies that have been carried out in summer camps until now have paid attention to the outcomes that a specific EE program based in the camp has on children's environmental attitudes. Researchers have used a participants group in an EE program outdoors and a control group, normally formed by children in a school environment who received EE. Such a design makes it difficult to conclude whether the positive effects reported are due to spending time in nature *per se* or to the combination of a stay in nature and the educational program that is being assessed (e.g., Duerden & Witt, 2010; Ernst & Theimer, 2011). The present study included two types of camps in nature, one with EE and one without it, thereby enabling this comparison. Our results indicate that exposure to nature *per se* is an important factor promoting EAN and ecological beliefs but that the EE program as applied in one of the nature camps has no additional effect, thereby rejecting Hypothesis 2. There is

no clear explanation for this. Speculating, it could be that just being in nature has such a strong positive effect on children's attitudes, that the effect of EE activities are overshadowed by the effect of being in nature *per se*. Another possibility is that the EE program in the camp was insufficiently intense to make a difference. Different results might be obtained for a summer camp which is entirely devoted to EE activities. At the same time the duration of the nature camp does not seem to have affected children's environmental attitudes, although we cannot isolate this effect from that of the EE activities, as the design of this study does not allow that. We can only conclude that a condition that in advance was considered much more powerful, through its combination of EE activities and longer duration, did not show the effects we expected. Therefore Hypothesis 2 was not supported.

An explanation for how being in nature leads to an increase in environmental behaviours was found. In line with Hypotheses 3, willingness to carry out daily conservation actions, environmental citizenship behaviours and intentions to visit nature increased for children in the nature camps, compared to children in the urban camp and this effect was mediated by the increases in EAN and in ecological beliefs. It is worth noticing that the strength of each of the two mediators is not the same for each kind of behaviour. Increase in EAN had a larger mediating effect than ecological beliefs, when change in the intention to visit nature was the dependent variable, similar to the finding of Hinds and Sparks (2008). Ecological beliefs had some independent predictive value, indicating that what children think about the human-nature relationship also

influences their desire to visit natural places more often. For increases in environmental citizenship behaviours, the increase in EAN also had a larger effect than the increase in NEP. It could be that these behaviours require more demanding involvement than frequent (almost automatic) behaviours such as the daily conservation actions (Stern, 2000). It can be suggested that in order to carry out more effortful behaviours and to wish to engage with nature in the future, a feeling of connection with nature is needed. These results are similar to the ones obtained by Müller et al. (2009) in which willingness of pro-environmental commitment was best predicted by EAN. Finally, the daily conservation actions are explained equally well by EAN and ecological beliefs. In general, our results are in line with previous studies that showed that both beliefs and affect predict environmental behaviours, but to a different extent depending on the specific environmental issue at hand (Pooley & O'Connor, 2000).

Limitations of the study.

The present study has several limitations. First, this is a quasi-experimental study because children could not be randomly assigned to the camps. Initial differences on scores (scores in T1) were controlled by calculating the gain scores between T1 and T2 and using these in our analyses but, nevertheless, the religious denomination of two of the camps may have influenced the results. Believing in God has been shown to be a motivator to protect nature (Chawla, 1999; Gardner & Stern, 1996) and, therefore, it could be

that children in C1 and C2 were influenced by the religious atmosphere of the camp. Future research should be carried out using a camp in nature without any religious connotations. Also, although the length of the camp did not have any effect on the results, it would be better to compare summer camps with the same duration as previous research has shown that it can influence EE program outcomes.

Second, actual behaviours were not measured, but willingness to carry out these behaviours. The reason for that is that actual changes in these behaviours, such as talking to teachers about environmental issues or closing the fridge door when deciding what to eat, could not be measured during the camp period. Willingness to behave pro-environmentally has been found to be a predictor of manifest behaviour (Montada, Kals & Becker, 2007). Moreover, researchers do suggest that the relation between attitudes and behaviours might be stronger for children, as their life is relatively simpler than adults' lives (Larson et al., 2011). We therefore are fairly confident that the reported increase in willingness has translated into behaviour once the children were home again.

Finally, to test this expectation, it would be interesting to include in a future study a follow up to evaluate the strength of the positive effects of nature after children left the camp. This was not possible in the present study due to the strong reluctance of the camps' organizers to provide children's personal information. Frequently, the effects of interventions become weaker over time (Stern et al., 2008) and it would be worthwhile to study the development of the

positive effects found in this study over time, preferably over a period of many years. The studies about experiences in youth leading to adults' pro-environmental attitudes, described in the introduction, rely on participants' retrospective self-reports, which may compromise their internal validity (Ewert, Place & Sibthorp, 2005; Wells & Lekies, 2006). For instance, the time spent in nature as a child could have been overestimated as a romantic distortion (Fischerlehner, 1993, in Kals, Schumacher & Montada, 1999). In a longitudinal study the influence of nature experience of young people could be tracked over time, to get a measure of the validity of these adults' self-reports. The more this gap is closed, the better our understanding of children's and adults' environmental attitudes and behaviours, their development and the factors that influence them.

Conclusion.

Studying the psychological processes that lead to pro-environmental attitudes and behaviours and using these insights is essential for a sustainable future. This is especially important in the case of children, as they will be the ones in charge of taking pro-environmental actions in the coming years. The findings presented here indicate that long term exposure to nature through a summer camp is an effective way of promoting children's emotional affinity to nature as well as their ecological beliefs, both of which support their intentions to carry out environmentally friendly behaviours.

CHAPTER 6.- DISCUSSION, CONCLUSIONS AND LIMITATIONS

The dissertation is focused on studying children's experiences of nature. Its aims are 1) studying the effects of contact with nearby nature on children's wellbeing, specifically in their psychological restoration, and 2) studying the effects of contact with nature on children's environmental attitudes and behaviours. Within this second objective, the aim was to evaluate the impact that two different types of contact with nature have in children's environmental attitudes and behaviours. First of all, 2.1) the influence that daily contact with nature might have on children's environmental attitudes and behaviours was studied and secondly 2.2) the impact that a prolonged experience in a summer holiday camp in nature may have on children's ecological beliefs, emotional affinity towards nature and willingness to carry out different environmental behaviours. Overall, it has been shown that contact with nature has benefits for children's wellbeing and improves children's environmental attitudes and behaviours. The main results and conclusions for each of these topics are summarized in the following sections as well as the implications that they have for environmental education and city design. The highlights obtained in the empirical studies can be seen in Table 17.

Table 17

Highlights of the dissertation

		Study	Highlights
CHAPTER 3	1		<ul style="list-style-type: none">• Children who were more frequently exposed to adversity suffered more stress.
			<ul style="list-style-type: none">• Similarly to Wells and Evans (2003), access to nearby nature in the home area moderates children's perceived stress level.• Nearby nature in the school area moderates children's perceived stress level.• Similarly to the results obtained in previous research (Taylor et al., 1998; Taylor et al., 2002; Wells & Evans, 2003), daily access to nearby nature is important for children's life functioning.

	Study	Highlights
CHAPTER 3		
	2	<ul style="list-style-type: none">• The factor structure of the PRCS-C II in Spanish is similar to the one obtained with Australian children (Bagot, 2004; Bagot et al., 2007) and with adults (Laumann et al., 2001). The scale is formed by 14 items and 5 factors.• Similarly to previous studies (e.g., Berto, 2005; Hartig et al., 1997; Laumann et al., 2001) more natural settings (i.e., playgrounds) were perceived as more restorative than non natural ones.• As suggested by Bagot (2004), there were age differences in the perceived restorativeness, with younger children (6 to 9 years old) finding their schoolyard more fascinating, with more extent and more compatible than older children (10 to 13 years old).• In contrast to Bagot (2004), no gender differences were found.• Children's preference for their playground is partially mediated by children's perceived restorativeness in the playground.

	Study	Highlights
CHAPTER 4	3	<ul style="list-style-type: none"> • Children’s ecological beliefs system can be interpreted as unidimensional, with a single second order dimension that is common to all the responses given by the participants (general ecocentrism) and three first order dimensions: respect for nature, eco-responsibility and eco-deterioration. • Coinciding with previous research (Hinds & Sparks, 2008; Kals et al., 1999; Müller et al., 2009), participants with more contact with nature (living in rural areas) are more ecocentric than those living in urban areas. • As Evans et al. (2007) suggested, there is a positive correlation between children’s age and ecological beliefs. Older children seem to be more ecocentric than younger ones.

Study	Highlights
CHAPTER 4 4	<ul style="list-style-type: none">• The factor structure of the CEPS is different than the one proposed by the authors (Larson et al., 2011). It is formed by 13 items and it can be interpreted as unidimensional. The construct was called orientation toward nature (<i>orientación naturalista</i>). It registers items related to nature, to children's interest in nature and to willingness to taking care of nature.• Children in rural areas have more contact with nature than children in urban ones.• Similarly to Cheng and Monroe (2012), contact with nature, in our study through place of residence (rural area in the mountain range, rural area in an agricultural area or urban area), increases children's environmental attitudes.• Type of contact with nature and type of nature present in a certain area also seems to influence children's environmental attitudes (children living in agricultural area scored the lowest in the scale).• Similarly to the results found by Hartig et al. (2001) with adults and by Hartig et al. (2007) with teenagers, children's restorative experiences positively influence their environmental actions. Children's ecological behaviour is associated with the perceived potential for restorative experiences in natural environments.• Children who show higher orientation toward nature and who have more frequent contact with nature are the ones who carry out more pro-environmental actions.

	Study	Highlights
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHAPTER 5</p> <p style="text-align: center;">5</p>		<ul style="list-style-type: none"> • A prolonged experience in a nature camp improves children’s ecological beliefs, children’s emotional affinity towards nature and children’s willingness to carry out different environmental behaviours, compared to an urban summer camp. • Spending time in nature <i>per se</i> positively influences children’s environmental attitudes and behaviours. • The inclusion of EE activities in the program and the longer duration of the stay did not have any additional effect over the impact of spending time in nature <i>per se</i>. • Emotional affinity towards nature and ecological beliefs both mediate the relationship between type of camp attended (natural or non natural) and willingness to carry out environmental behaviours. • The strength of each mediator is different depending on the type of behaviour taken into account. Emotional affinity towards nature and ecological beliefs had the same strength when daily actions (e.g., recycling) were considered, but emotional affinity towards nature was a stronger predictor when intentions to visit nature more often and willingness to carry out environmental citizenship behaviours (e.g., becoming a volunteer of an environmental organization) were taken into account.

6.1. Children's contact with nature and environmental attitudes and behaviours

An important but quite under researched topic is the origin of children's environmental attitudes and ecological behaviour (Evans et al., 2007). As highlighted by several authors (Chawla & Cushing, 2007; Evans et al., 2007; Hinds & Sparks, 2008; 2009), early childhood experiences in nature could be a precursor of environmental attitudes and behaviours. Because of this, the studies presented here are focused on children's experiences of nature, as an intend to understand the factors and psychological paths that lead to pro-environmental behaviour.

One of the contributions of this dissertation is the adaptation of two recently presented instruments to measure children's environmental attitudes that can be used with Spanish speaking children: 1) the New Ecological Paradigm scale for children (NEP scale for children/NEP_Ñ) and 2) the Children's Environmental Perceptions scale (CEPS). Regarding NEP, Milfont and Hawcroft (2010) have pointed out the importance of the NEP in measuring adults' environmental attitudes during the last three decades, and encourage its use for future research. The NEP scale for children has been used in studies 3 and 5 of this dissertation. This provided a clearer idea about Spanish children's ecological beliefs, their structure, coherence and the way they may depend on external factors such as experiences of nature. Previous studies have assessed the

effect that an outdoors EE program in nature has in children's ecological beliefs (Evans et al., 2007; Manoli et al., 2007) which makes it difficult to differentiate whether the improvement on children's ecological beliefs is due to the experience of nature *per se*, to the EE program or to the combination of both of them. With the design used in study 5 some light is shed on this issue by showing that spending time in nature through a nature camp increases children's ecological beliefs. We did not find any additional effect of the EE program on children's ecological worldviews.

On the other hand, study 3 showed that daily contact with nature influences children's ecological beliefs. Previous studies have used participants' place of residence (rural vs. urban) as a way of registering their access to nature (Hind & Sparks, 2008; Müller et al., 2009). In our study we were able to show that children living in rural areas are more ecocentric than those living in urban areas. Similarly to studies conducted with adults (Hinds & Sparks, 2008; 2009; Kals et al., 1999) and teenagers (Müller et al., 2009) having more daily access to nature appears to have a positive impact on children's environmental attitudes.

A limitation found in study 3 is that the predictive power of the NEP scale is low. Future research should evaluate the NEP scale in relation to similar scales, such as CEPS, to analyze its predictive power and to compare both instruments. It would also be useful to use the scale system developed by Evans and colleagues (2007) and compare it to the NEP scale for children (Manoli et al., 2007). This could be done when enough time is allocated to collect the data

as the three games developed by Evans et al. (2007) require one to one interaction between each participant and the researcher.

The CEPS has also been adapted to Spanish and appears to be a useful tool to be used with younger children, as the items' wording is simpler. To the best of our knowledge, the only study conducted with this scale is the one of the scale's authors (Larson et al., 2011). The internal structure of the instrument that we obtained in study 4 is not similar to the one the authors proposed. In our sample, the scale is formed by 13 items and it is unidimensional. It registers a general orientation toward nature that children show and the items are simpler and more relevant for the child than the ones used in previous instruments (e.g., NEP scale for children). We have hypothesized that Spanish children have a different view of environmental problems than American children. Spanish children might find it more difficult to differentiate between environmental awareness and personal interest. However, it could also be that the adaptation of the scale still needs revision. Although the scale was translated into Spanish by two different people and then back into English, some items, specifically items 4 & 15 and items 7 & 16 sound quite similar in Spanish. In fact, items 4, 7 and 16 do not load into the factor and were taken out of the final construct. Appropriate vocabulary for children cannot differentiate nuances distinctly (Cheng & Monroe, 2012, p.13). It could be that due to the translation of the scale, children were not able to differentiate between eco-affinity and eco-awareness. It could also be that for Spanish children both constructs work together. Future studies using this scale will help to clarify these issues as well as to improve the

instrument. Also, as pointed out in Chapter 1, one of the aims of CEPS is to include affective items. However, most of its items are cognitive (e.g., people need plants to live) which indicates, as the authors state, that future amendments need to be done to this instrument.

A new insight of study 4 is that not only contact with nature is important, but the type of contact with nature also seems to be relevant. Speculating, children from rural agricultural areas would belong to agricultural families. These families usually work with nature for a living and it is common for Spanish children to help their parents with the agricultural work. I could be that this kind of contact does not promote children's orientation toward nature, as oppose to a more spontaneous and free type of contact that could be seen, for instance, in the mountain range areas. According to our results, children living in the mountain range showed more positive environmental attitudes than those living in the agricultural area. No significant differences were found between those children living in the city and those living in the rural areas (mountain range or agricultural area). Another possibility that could explain the results found is the variety of type of nature included in each area. The landscape in the mountain range might be quite different to the one in the agricultural area, including diversity of vegetation, structure of the landscape, type of animals in the area, etc. Future research taking into consideration type of contact with nature and kind of nature in the different regions should clarify whether these are the reasons of the results found.

The kind of studies conducted here does not allow ruling out possible confounding factors such as socioeconomic status or family values. It is known that more educated adults usually score higher on environmental attitudes scales (Xiao & McCright, 2007). It could be that people living in the agricultural rural area have lower education than those living in the rural area in the mountain range, which may be influencing their children's environmental values. It could also be that those parents who have more affinity towards nature decide to live in places that are closer to nature and that it is parents' values towards nature what is actually influencing children's environmental attitudes, or a cluster of variables (parents' values toward nature, type of contact with nature, education level, etc.). It has been proven (Cheng & Monroe, 2012) that parents' values about nature influence children's feelings of connection with nature as well as their interest in pro-environmental practices and in participating in nature-based activities. According to these authors, parents transmit nature values to their children. These possible confounding factors should be considered in future research.

On the other hand, it is necessary to point out that the urban setting chosen is a small city compared to other cities in Spain (the population of Cuenca is almost 60.000). Future research could explore whether the results are similar when the differences between rural and urban areas are more pronounced including, for example, cities such as Madrid (population of 5 million people) or Barcelona (population of 4.200.000 people).

The final study of this dissertation shows that not only daily contact with nature can influence children's environmental attitudes and behaviours but also a onetime prolonged experience in nature, in this case through a summer camp. Our study shows that being in nature *per se* has positive impacts in children's emotional affinity towards nature, ecological beliefs and children's willingness to carry out different types of ecological behaviours. Until now, the impact of children's prolonged experiences in nature had been normally measured as the outcomes of a specific outdoor EE program (e.g., Bogner, 1998; Duerden & Witt, 2010; Ernst & Theimer, 2011; Evans et al., 2007, Stern et al., 2008). According to our results, being allowed to explore nature and to wander in nature positively influences children's environmental attitudes and behaviours, even when EE is not part of the program. It is also interesting to highlight that in study 5 a relation between being in nature and ecological behaviours has been found, but also the underlying process that explains this relation. Similarly to Pooley and O'Connor's results (2000), affective and cognitive components of environmental attitudes seem to have an important role in children's ecological behaviours, although the strength of each of these components is different depending on the type of behaviour taken into account. For instance, daily actions are equally influenced by affective and cognitive determinants of environmental attitudes but emotion has a stronger impact on environmental citizenship behaviour. As stated above, confounding factors could also have influenced the results of this study. For example, parents who have positive attitudes toward nature may prefer to send their children to nature camps. So our

results could be due to the possible influence of parents' values toward nature on their children's values. However, the fact that data were collected at the beginning and at the end of the camps allows seeing an increase in children's environmental attitudes without being in contact with their parents. It could also be possible that the camp's leaders who work in the nature camps are more pro-environmental than those working in an urban camp. Therefore the values regarding nature of these adults could have influenced the results. However, this explanation is less plausible for the religious camps in nature as people working in these two camps are nuns who may not necessarily have an interest in being in nature, but whose attendance to the camp is compulsory. Other variables that have been seen to influence children's feelings of connection with nature, such as self-efficacy (Cheng & Monroe, 2012) should be taken into account in future research. Similarly, there are several variables – for instance social norms, moral norms or feelings of guilt- that have been seen to influence people's pro-environmental behaviour (for a review see the meta-analysis of Bamberg & Guido, 2007) and that could be included in future research when trying to understand children's pro-environmental behaviour. Finally, it is also important to highlight that all the samples of children that participated in the studies seem to be pro-environmental, as can be seen in Table 18. Keeping in mind that all the variables assessed in this dissertation use a Likert-like five-point scale, the mean score for all of them is above three.

Table 18

Mean and standard deviation of each of the environmental attitude and behaviour measures used in this dissertation

NEP Study 3; N = 574		Orientation toward nature Study 4; N = 832		NEP Study 5 (T1); N = 397		EAN Study 5 (T1); N = 397		Intentions to visit nature Study 5 (T1); N = 397		Daily actions Study 5 (T1); N = 397		Environmental Citizenship behaviour Study 5 (T1); N = 397	
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
3.82	0.57	4.36	0.81	3.81	0.48	3.48	0.71	3.66	0.91	4.04	0.62	3.42	0.73

Spanish children appear to care about environmental problems and seem to carry out actions in order to protect the environment, especially daily actions such as recycling or switching off the lights. This aspect has been also pointed out by Ernst and Theimer (2011) who found that American children participating in seven outdoor EE programs scored high in measures of nature connectedness even before participating in the program. This opens the debate of whether children are actually disconnected from nature, as Louv (2008) states, and whether this alienation from the natural world actually has a negative effect on their environmental attitudes. Louv (2008) described the Nature Deficit Disorder based, among other theories, on the biophilia hypothesis. Bearing in mind what has been commented above, it appears that children are not, at least psychologically, as disconnected from nature as it might be thought. It could actually be that vicarious or indirect experiences in nature (Kellert, 2002) through, for instance, media or the school curricula are having a stronger effect on children's feelings of connection with nature than it was first thought. It

could also be that some other factors that are not being taken into account in the research are influencing children's connection to nature. This applies to our own results. Our findings indicate that time in contact with nature, through place of residence (studies 3 and 4), visits to natural places (study 4) and a stay in a nature summer camp (study 5) increases children's environmental attitudes and behaviours. However, the effect of these factors is small, one of the reasons being that children already showed highly positive environmental attitudes, even those living in cities and/or attending the urban camp. From our point of view, more research is needed in order to clarify the relation between contact with nature, type of experiences in nature and children's environmental attitudes and behaviours.

6.2. Restorative effects of children's contact with nature

Chang et al. (2008, p. 84) have claimed that "if there truly is a nature-deficit disorder in today's children, then the understanding of restorative environments and their utility is crucial". Children have usually been underrepresented within restorative environments research, even though the restorative theories are not focused on a specific age group. The results presented in this dissertation contribute by including children in this line of research. Regarding children's health, those who suffer more from stress tend to obtain lower marks, to take up risky behaviours, such as smoking or taking drugs, and are more likely to quit studying (Lewis et al., 1984). The first study of

this dissertation shows that nearby nature can help children to cope with stressful situations which, in the long term, might prevent them from taking up risky behaviours. It has been shown that nearby nature in the school area moderates the stress suffered by children due to daily adversity. The results obtained are in line with ART and previous studies (Kaplan & Kaplan, 1989; Taylor et al., 2002; Wells, 2000; Wells & Evans, 2003) showing that more access to nature improves children's life functioning. Nevertheless, these results should be taken with caution as confounding factors may have influenced these outcomes. For example, Wells and Evans (2003) found that children's stress level is lower when the socioeconomic status of their family is higher. We controlled this confounding variable by choosing schools as similar as possible and by the type of neighborhood children lived in. However, other factors could also have an impact on the results. For example, it could be that teachers in the schools with more nature are better than those in the other schools, which might be influencing children's stress level. It is also known that contact with nature increases children's social interaction (Taylor et al., 1998) and that social interaction positively affects children's stress level (Wills, Blechman, & McNamara, 1996). Therefore, we cannot rule out the possibility that it is social interaction and not restoration that is buffering children's stress level.

Naturalness of the schools and places of residence was registered by children's perceived nature and the *Observation of Nature Scale* (Collado, 2009). However, actual contact with nature was not measured. Although higher presence of nature has usually been taken as a way of registering children's

contact with nature (e.g., Taylor et al, 1998; Wells, 2000; Wells & Evans, 2003), it is not clear whether living or attending classes in more natural areas implies that children have more contact with them. Future research should register children's contact with nature and other possible confound variables such as families' socioeconomic status or other characteristics of the school (space per child, number of students per teacher or break time, among others).

Even with these limitations, our results are similar to the ones of previous studies and in concordance with ART, which makes us think that nature is in fact moderating the negative effects that adversity has on children.

Moving on to study 2, the results obtained in this dissertation show that children prefer natural over built environments and that this preference is due, at least in part, to the restorative potential that participants perceive in the given environment. In concordance with ART, human appreciation of contact with nature remains adaptive, even for children who live in cities. This adaptive function of environmental preference for certain kind of environment (more natural ones) fits the premises of the main restorative theories –ART and Psycho-evolutionary theory of stress reduction- that highlight the possible evolutionary basis for natural environments to be restorative. As stated in Chapter 1, both restorative theories are proponents of the biophilia hypothesis (Staats, *in press*), which proposes the idea of an innate need to affiliate with nature (Wilson, 1984). Even though children that participated in study 2 showed higher preference for more natural schoolyards and this may be based on

evolution, it is difficult to affirm that our findings show evidence of the biophilia hypothesis. For example, according to the results described in Chapters 4 and 5, contact with daily nature through place of residence and a summer camp positively influences children's environmental attitudes and behaviours. Therefore, it could be that the tendency to affiliate with nature can be acquired by learning, through culture or by experience (Kellert, 2002). If that is the case, the question of whether a need of connection with nature is innate or acquired remains for future research. From our point of view, it is difficult to distinguish how much of this affinity towards nature is innate (or even if it is innate) and how much is acquired. Moreover, the factors that seem to increase this tendency are becoming clearer within research carried out in the last few years. Place of residence and frequency of contact with nature (Hinds & Sparks, 2008; 2009; Müller et al., 2009), past experiences in nature (Chawla & Cushing, 2007), family values towards nature (Cheng & Monroe, 2012) and even a short experience of natural places (Nisbet et al., 2009; Olivos, 2009) seem to increase this "innate" need of contact with nature. Would children who never have contact with nature and whose parents do not care about environmental issues show this "innate" tendency? Three decades after the biophilia hypothesis was proposed, there is not enough evidence to conclude that people are born with a need to affiliate with the natural world.

Within restorative environments research, only a few studies have focused on children (e.g., Taylor & Kuo, 2009; Wells, 2000; Wells & Evans, 2003) compared to the large amount of research evaluating restoration with

general samples (mainly college students and adults) (e.g., Hartig & Staats, 2006; Johanson et al., 2011; Kaplan, 2001; Kaplan & Kaplan, 2011; Ulrich, 1984; Van den Berg et al., 2003). Moreover, most of the restorative research carried out with children has taken the residential environment as the area of study, showing that having access to nearby nature in the neighborhood is a beneficial factor for children's health (Taylor et al., 2002, Wells, 2000; Wells & Evans, 2003). Although schoolyards' characteristics have been proven to influence children's type of play, it being more creative when there is nature (Lindholm, 1995), as well improving children's satisfaction with the schoolyard (Ozdemir & Yilmaz, 2008), measuring the restorative qualities of schoolyards has received little attention (Bagot, 2004; Bagot et al., 2007). To the best of our knowledge, it has not been until Bagot (2004) designed the Perceived Restorativeness Components Scale for Children (PRCS-C) when the restorative potential of settings used by children has started to be measured. This dissertation brought new insights that are useful for restorative environments research. As far as we know, first of all, it is the first time that the PRCS-C II has been used with Spanish children. The internal structure and reliability of the scale were evaluated. The fact that the scale could distinguish between environments that theoretically have different restorative potential is also a new and interesting result. Children perceived more natural playgrounds as being more restorative. Also, as suspected by Bagot (2004), age differences were found, with younger children evaluating their playground more restorative than older ones.

The PRCS-C II needs future adjustments. First of all, the compatibility and the extent factors are formed only by two items. Their internal consistency is adequate but, from a methodological point of view, it would be useful to improve these factors by adding new items. Also, in Bagot's (2004) and in our own study, the four components proposed by ART have been considered to equally contribute to perceiving an environment as restorative. However, as described by Hartig (1996), this probably depends on characteristics of the environment, the person and the time of exposure to the environment. Future research with adults and children may help to clarify this issue.

A new insight from the results of this dissertation is the fact that children's restorative experiences predict their ecological behaviour and that this relationship is mediated by children's orientation toward nature. These results are similar to the ones obtained by Hartig et al. (2001) with college students and by Hartig et al. (2007) with adults. It is interesting to see that the same pattern holds for children. Children's gratifying experiences in nature appear to be a motivator for ecological actions. Moreover, as Hartig et al. (2007) suggested, there are variables that mediate the relation between restorative experiences and environmentally friendly behaviours. In the present study, children's orientation toward nature was found to be a mediator variable between restoration and ecological behaviours. This is in line with previous research which has pointed out that attitudes are significant predictors of behaviours (Kraus, 1995). In fact, the relationship between restorative experiences and environmental actions is fully mediated by environmental attitudes.

Hartig et al. (2007) found that age, gender, education, household income, size of the community of residence and distance of current residence from an outdoor recreation area do not have any influence in the relation between use of nature for restoration and ecological behaviour, except gender, with women scoring higher than men. It could be interesting to include these variables in future studies in order to check whether the same pattern remains for children.

The prediction model in study 4, although adequate, still left more than half of the variance unexplained. Future research could include other relevant predictors such as the role of aesthetics, ecological beliefs or emotional affinity towards nature. This should make the relation between restorative experiences and environmental actions clearer. It would also be interesting to use different kinds of behaviours as the ones used in study 5, as well as a standardized children's ecological behaviour measure such as the one proposed by Evans et al. (2007). Also, Kaiser et al. (2012) made a distinction between people's affinity towards nature and their affinity towards environmental protection. Future studies should include these two types of environmental motivators and the factors that influence them. This may be more accurate when predicting children's ecological attitudes and behaviours.

Nevertheless, our results are congruent with restorative theories. It was found that natural environments are considered more restorative than non natural ones. In the same line, children who spend their recess time in more natural playgrounds are able to cope better with daily stressful events than those who do

not have nature in their school, as described in study 1. According to previous studies carried out with children (Taylor et al., 2002; Taylor & Kuo, 2011; Wells, 2000), those whose daily contact with nearby nature is more frequent obtain cognitive benefits such as ability to focus and clearing the head which, in turn, could help children to cope with stressful events. In future research, it would be useful to relate actual restoration to perceived restorativeness in one single study. It would also be interesting to relate the restorative experiences in the schoolyard to other variables that are important for children's development, such as students' academic performance or children's type of play or behaviour, among others.

6.3. Some general comments

Some final remarks about the limitations of the studies presented and future lines of research should be made. First of all, children's socioeconomic background has been considered in the empirical studies through different measures such as the fee of the summer camps, the type of children's school (private, public) or participants' place of residence. We also tried we tried to infer the socioeconomic status by asking the participants about their parents' jobs. It did not work out because many of the children did not specify their parents' position. For instance, the child might say "my mum works at university" but he/she did not specify if the mother worked as a professor, as a cleaner, as a secretary or in any other position. Previous studies have shown that

children's socioeconomic status can be a confounding factor affecting the results at hand (e.g., Wells & Evans, 2003). It would be useful to find a another way of inferring socioeconomic status of children in the future, for example, by including a question about parents' income when the information letters about the purpose of the study are sent to their homes.

Secondly, the use of self-report behaviour data may have led to some limitations such as response bias. A big effort was made to clarify that the questionnaires were anonymous and that nobody except the author of this dissertation was going to look at them. Participants were explained that the data were going to be used as aggregate data, and never as individual, and that there were no right or wrong answers. Moreover, Kaiser, Frick and Stoll-Kleemann (2001) (cited in Hartig et al., 2007) stated that there is a close link between self-reported and observed ecological behaviour. Even with that, some improvements could be made. For example, a social desirability measure, such as the Children's Social Desirability Questionnaire (CSD; Crandall, Crandall, & Katkovsky, 1965) could be included in the questionnaires so that the possibility of children's answers being biased by their desire to please the researchers, their teacher or some other person is taken into account.

On the other hand, other type of measures could be used in the future apart from the ones described here, for instance, the set of games developed by Evans et al. (2007) to register children's ecological beliefs and environmental behaviours. This would be especially interesting when collecting data in summer

camps, as paper and pencil questionnaires are difficult to administer in these situations. Children are not enthusiastic about participating in an activity that they perceive as an academic one during their summer holidays. Although at the end campers would do what their camp leader said, some children refused to collaborate. Not willing to fill out the questionnaire might have created some response bias. Collecting data by using a method that may catch children's attention more easily, such as games, might be more adequate in this case. The disadvantage is that one to one interaction between the researcher and each child is needed, which increases the time required to collect the data and also the likelihood of the camps' organizers refusing to participate in the research.

Another point to consider is the degree to which the present findings can be generalized to a wider population. Most of the children participating in the studies of this dissertation are from the region of Castilla - La Mancha, mainly from Cuenca. Therefore, further studies with wider populations can determine the extent to which the present findings have broader applicability. Also, as stated in Chapter 5, randomly assigning children to different summer camps and using camps with similar characteristics (boys & girls' camps, no religious connotations, same duration, etc.) would improve the generalizability of the results. Keeping activities and program characteristics constant across conditions is also important.

It needs to be highlighted that Kellert's (2002) theoretical framework about the influence of different types of nature experiences in children's

development is based mainly on previous empirical studies showing that direct contact with nature positively affects children's development. However, there is little research about how indirect and/or vicarious experiences of nature affect children. The results reported here took into account mainly direct experiences in nature, but it has been seen that indirect experiences of nature, such as watching a film (Nolan, 2010) or reading books (Mobley, Vagias, & DeWard, 2010) can enhance people's environmental attitudes and behaviours. Indirect experiences in nature were taken into consideration in study 4, together with direct experiences. However, the individual effects that indirect and/or vicarious experiences of nature may have on children should be further explored. It might open new possibilities for EE programs that are less expensive and less time-consuming than bringing children to nature. Different types of experiences (direct, indirect and vicarious) could complement each other.

Similarly, as stated in Chapter 1, we have shown that contact with nature enhances children's wellbeing and environmental preference but it does not mean that not being in contact with nature negatively affects children. To the best of our knowledge, there are no studies about how disconnection from nature may affect children's development and environmental attitudes. A future experiment could explore, for example, what happens when children who live in a rural area in direct contact with nature spend a holiday in an urban summer camp, without contact with nature. Would their pro-environmental attitudes toward nature diminish?

Nevertheless, the findings described in the dissertation are congruent with the research literature that highlights the importance that contact with nature during childhood has for the development of a feeling of affective connection with it (Chawla, 2002; Cheng & Monroe, 2012; Hinds & Sparks, 2008; 2009). They are also in line with the previous work of Kellert (2002) and Millar and Millar (1996) by showing that direct experiences in nature have a positive impact in children's wellbeing. Similarly, repeated exposure to an attitude object (in this case nature) is related to an increase in more affectively based attitudes.

6.4. Implications for environmental education and city design

The findings of this dissertation have several implications for environmental education and city design. They shed some light on ways to promote environmental behaviour in children, which is one of the aims of EE pointed out in the Tbilisi Declaration (1977). "Although behaviour modification and/or development remain the primary goal of many programs and interventions, a clear understanding of how to best achieve these ends is still developing" (Duerden & Witt, 2010, p. 391). This dissertation tries to clarify this issue by studying the effects that experiences of nature have on children's environmental attitudes and the processes that lead to ecological behaviour.

First of all, the adaptation of the NEP and CEPS offers new tools to be used when evaluating EE programs. The number of instruments available to be

used with children is small (Evans et al., 2007; Manoli et al., 2007; Larson et al., 2011), especially in Spanish. Although the tools described here have some flaws, they are reliable and valid for evaluating environmental attitudes in childhood. Using standardized tools gives the opportunity of making comparisons between different countries, with different cultures and children from different backgrounds. For instance, the NEP scale has largely been used with adults and cross-cultural comparisons have been conducted. Differences in the ecological beliefs system of adults from different countries have been found (Corral-Verdugo, Carrus, Bonnes, Moser & Sinha, 2008; Ignatow, 2006). Similarly, children's ecological worldviews also seem to differ with culture (Van Petegem & Blicek, 2006). The NEP_Ñ and CEPS adapted to Spanish open up new research opportunities with Spanish speaking children. Researchers could evaluate, for instance, the possible differences in the ecological attitudes of children from South America and those from Spain.

It also brings the opportunity for future longitudinal studies on the developmental course of children's environmental attitudes and behaviour. To the best of our knowledge, there are no longitudinal studies approaching this issue and these would be very useful in order to understand how environmental attitudes develop from early childhood to adulthood and how (or if) they lead to ecologically friendly behaviour. These kinds of studies would help to close the gap between the knowledge accumulated about children's environmental attitudes, the factors that influence them (such as contact with nature or parents' nature values) and teenagers' and adults' environmental attitudes and

behaviours. The latter group of people seems to be influenced by childhood experiences in nature (Chawla, 2002; Olivos, 2009; Palmer et al., 1999). One methodological issue that arises is the comparability of the results obtained through different stages of development using different scales. For example, the results obtained with the NEP scale for children may not be comparable to the ones obtained with the NEP scale for adults. One possible starting point could be to use the scale designed for children through different stages of development.

Given that children spend a lot of time in the schoolyard during the academic year, schools' environments should be looked at as potential settings for children to regain contact with nature, to obtain restorative benefits and to enhance their pro-environmental actions. According to the results described in this dissertation, children prefer to be in contact with nature during recess and, in fact, they benefit from access to nearby nature. Including natural elements in schoolyards such as sand areas, trees, bushes and flowers could make a difference in children's daily routine. Even locating the school near a natural area, such as a park, might promote children's contact with nature before and after the school.

Understanding how different types of experiences in nature (i.e., direct, indirect, vicarious) influence environmental knowledge, attitudes and behaviour is important in order to design more efficient EE programs (Duerden & Witt, 2010; Kellert, 2002). Bearing this in mind, the results of the present dissertation show that children's positive experiences of nature, such as restorative

experiences, are a motivator for pro-environmental behaviours (Hartig et al., 2001; Hartig et al., 2007). Outdoor recreation activities in nature might be a way of promoting pro-environmental attitudes and ecological behaviour. Taking children regularly to natural places brings them the opportunity to experience restoration which may, in turn, promote positive environmental attitudes and behaviours. As stated by Hartig et al. (2007), continuous use of certain places for restoration might promote ecologically friendly behaviours “both specific to particular places and, more generally, for example through ecological behaviours such as recycling” (p. 298). Including natural elements in schoolyards (for instance through school gardens) and residential areas seems a good way of promoting children’s contact with nature and enhancing their environmental attitudes. However, our studies do not allow specifying the kind of natural elements that should be included.

Differences according to age have also been pointed out throughout the dissertation studies, with younger children perceiving their schoolyard as more restorative than older ones, scoring higher on the orientation toward nature but being less ecocentric according to NEP. Understanding the development of environmental attitudes is essential in order to design EE programs aimed at the group of age at hand. This would shed some light about how to promote a more sustainable society. Similarly, it would be interesting to design schoolyards taking into account students’ age. It would be useful to reserve some areas of the playground to different age groups and to adapt them according to their needs. Older children (10 to 13 years old) perceive their schoolyard as less fascinating,

less compatible and with less extent than younger ones (6 to 9 years old). Designated areas appropriate for activities that older children usually engage in, such as sitting in a group, chatting and relaxing could be taken into consideration when designing a schoolyard.

Natural window views should also be considered when designing school and residential areas. It has been proven that natural views increase adults' neighborhood satisfaction (Kaplan, 2001), college students' cognitive abilities (Cimprich & Tenesse, 1995) and help hospital patients to recover faster (Ulrich, 1984) than those with built window views. Similarly, Masukuota (2010) found that teenagers obtain better grades when their access to nature during the school day is higher. Taylor et al. (2002) concluded that, for girls, natural views from their houses promoted their self-discipline. The results of previous studies, together with the findings of this dissertation suggest that natural views from children's daily environments can have a positive impact on children's wellbeing and life functioning.

In circumstances where settings frequently used by children (residential areas and schools) cannot be designed or modified, other options are possible. For instance, EE programs within school curricula could bring children to natural areas nearby where they can learn about their local environment while having the opportunity to restore their attention capacity. Learning is understood here as an informal learning, through direct experiences with the surrounding environment, thus not requiring much use of children's directed attention. Many

EE programs focus on bringing children to protected natural areas, such as National Parks or Nature Reserves. While these programs are important, they offer few opportunities for exploring the surrounding environment. As stated by Fisman (2001), “exploration may contribute to a child’s emotional attachment to a place, thereby laying the foundation for the development of effective environmental education programs” (p. 11). There is no doubt that nature protected areas are essential for conservation. Bringing children to protected areas is likely to be useful and important for their environmental attitudes. However, due to conservation issues, children’s free exploration of these kinds of areas is mostly forbidden. Therefore, nearby natural areas where children can regularly go and play might be a better option for EE. Similarly, prolonged experiences in nature appear to be a good strategy for EE programs. According to our results, spending time in a nature camp improves children’s emotional affinity towards nature and their ecological beliefs which, in turn, lead to willingness to carry out ecological behaviours. Prolonged experiences in nature have been pointed out as being restorative, giving time to think, to reflect, and also to promote a feeling of respect for nature (Talbot & Kaplan, 1986). The three nature camps included in study 5 promoted children’s environmental attitudes, and EE did not seem to have any additional effect over the fact of being in nature *per se*. “EE programs are overwhelmingly cognitively based” (Pooley & O’Connor, 2000, p. 719). However, cognition might not be the best way of achieving changes in children’s ecological behaviour (Pooley & O’Connor, 2000), which is the main goal of EE programs. According to the

results of this dissertation, it appears that letting children wander around a natural environment increases their attitudes towards nature and pro-environmental behaviours.

It is also worth mentioning that three different types of ecological behaviours were taken into account in study 5: intentions to visit nature more often, willingness to carry out daily actions and willingness to engage in environmental citizenship behaviours. All three kinds of behaviours improved after spending time in the nature camps, but the process leading to these increases were different depending on the behaviour. It would be interesting to take these insights into account when designing EE programs. It appears that in order to promote daily environmental actions, such as recycling, beliefs are as important as affect. Therefore, giving children information about the different types of behaviours (e.g., different containers available for recycling, importance of turning off the lights when not using them) might in fact help to promote this kind of ecological behaviour. Children's ecological beliefs about the human-nature relationship influenced the three kinds of behaviours so providing information about the role of human beings in nature could also help to improve EE programs.

On the other hand, in order to promote environmental citizenship behaviours and children's intentions to visit natural places more often, a feeling of emotional connection to nature seems more important. Environmental citizenship behaviours, such as becoming a volunteer in an environmental

organization, may require more effort than daily, more automatic behaviours (Stern, 2002). This kind of behaviour appears to need a more profound connection to nature in order to engage children and it could be promoted, for instance, by encouraging children's daily contact with nature in a park nearby or at school. Similarly, if the aim of the EE program is to create a habit in children so that they visit nature more frequently, a sense of emotional connection with the natural world is required. Allowing children to have experiences in nature, where they can explore and wander around might be a better option when these kinds of behaviours are the ultimate goal.

It is important to mention here that affective and cognitive aspects have been proven to covary (Eagly & Chaiken, 1993) and it is difficult to differentiate the effects of one and other, as "they often produce effects contributable to their combination" (Pooley & O'Connor, 2000, p. 718). Therefore, when examining the effects that EE programs have on children, it is worth checking both affective and cognitive outcomes in order to obtain a better understanding of the processes leading to ecological behaviour, as well as to include both components of environmental attitudes when designing EE programs.

Apart from these general planning suggestions, our findings do not have enough detail to allow specifying planning guidelines. More research is needed in order to check the impact that specific characteristics have on children's health and environmental attitudes and behaviours. Questions such as: how much green space does a schoolyard need to have in order to enhance children's

environmental attitudes and behaviours? Does it matter what kinds of trees/bushes/flowers are included in the design? / How long do children need to be in contact with nature in order to renew their attention capacity? How much in terms of type of contact (direct, indirect, and vicarious) and quantity is enough for beneficial effects? These and other research questions open up the field for new research that could bring nature closer to children.

Including nature and natural elements in neighborhoods and schools' designs might not be enough. Contact with nature should also be encouraged by parents and teachers. In the safety of the schoolyard, children can play in nature without worrying about traffic or strangers approaching them. Within the neighborhood, parents could allocate some time to bring their children to nearby nature due to its beneficial effects on children's life functioning. According to our results, living in a rural area such as the agricultural area, in which children have contact with nature, does not imply that they will be more pro-environmental. This indicates that the type of contact with nature is also important and, as previous authors have pointed out (Chawla, 1999; Kellert, 2002; Pyle, 2002) children should have direct, free and unstructured contact with nature that will allow them to explore their surroundings, learning from them and developing a sense of connection with them.

Finally, researchers have demonstrated that negative feelings such as guilt (Kaiser, 2006) or indignation about insufficient nature protection (Kals et al., 1999) can motivate people to carry out environmentally friendly actions.

However, it has been highlighted that the results can also be the opposite, making people feel that environmental problems escape their control or that the message EE organizations are sending is too alarmist (Gardner & Stern, 1996). Children's abstract thinking is not as developed as adults (Sobel, 1996), so environmental issues such as climate change can be confusing and overwhelming, generating fear among youngsters instead of action. Therefore, positive motivators such as gratifying experiences in nature or pointing out that nature is important for people's health might be a better approach when trying to promote nature conservation.

6.5. Conclusion

This dissertation shows evidence of the importance that contact with nature has on children's wellbeing as well as for their environmental attitudes and behaviours. It sheds some light on children's experiences of nature, a population group that has been underrepresented in this research area. New tools to be used with Spanish speaking children have been presented and the results open up fields of application and point out some interesting future lines of research.

Children in developed countries live mainly in cities and their lifestyle has greatly changed compared to a few decades ago up to the point of having little or no contact with nature (Karsten, 2005). This is mainly due to safety issues, such as traffic, to parents' fears of their children being hurt, to the spread

of technology that entertains children without leaving the house and to children's overscheduled day, among others (Clements, 2004). Louv (2008) has used the term Nature Deficit Disorder to define the negative consequences that being apart from nature may have for children's health as well as for their environmental attitudes and behaviours.

Whether Nature Deficit Disorder actually exists awaits for future research. Also, there is no doubt that theoretical and methodological improvements would be beneficial such as, for instance, conducting more experiments in which different variables can best be controlled. Nevertheless, the findings of this dissertation are useful to clarify the relation between children's experiences of nature as well as psychological processes leading to children's ecological behaviour. From our point of view, unstructured, spontaneous contact with nature should be encouraged with the aim of promoting children's healthy development as well as enhancing their emotional affinity towards nature, ecological beliefs and environmental behaviours. This might lead to a more ecologically engaged childhood which may, in turn, lead to more environmental commitment during adulthood and a more sustainable society. Future longitudinal studies, from childhood to adulthood will help to understand the relation between experiences in nature as a child and environmentalism as an adult.

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ANEXOS/APPENDIXES

Anexo/Appendix 1.- Escala de observación de naturaleza cercana

Este instrumento se ha utilizado para registrar la cantidad de naturaleza a la que tienen acceso los niños y poder así elegir de manera objetiva los colegios participantes en los distintos estudios y evaluar la naturalidad de las viviendas. Con este fin, se ha diseñado una Escala de Observación de Naturaleza Cercana, que mide la cantidad de naturaleza a la que tienen acceso los niños, tanto en el entorno residencial como en el entorno escolar. Para ello nos hemos basado en la *Naturalness Scale* de Wells y Evans (2003). Las variables medidas en la escala son las siguientes:

- **Entorno residencial:** cinco ítems han sido incluidos en esta primera parte de la escala. En primer lugar se han tenido en cuenta las vistas desde las ventanas, que varían desde *no naturales* hasta *más de 1/3 de la vista es natural desde varios puntos de la casa*. La medida de 1/3 ha sido utilizada basándonos en estudios anteriores en los que se medía la cantidad de naturaleza utilizando 1/2 de la vista es natural (Wells, 2000; Wells y Evans, 2003). En esta investigación se ha decidido utilizar 1/3, ya que en el caso de España es difícil encontrar viviendas donde más de la mitad de la vista sea natural y se ha decidido adaptar este ítem a las condiciones españolas.

El segundo ítem que se tiene en cuenta es la distancia a pie al parque más cercano. Se considera la distancia a pie, ya que este es el medio que utilizan la mayor parte de los niños españoles para desplazarse, seguido de la bicicleta.

La tercera variable evalúa el material de las zonas comunes dentro del barrio, que puede variar desde *formado únicamente por cemento* a ser *jardines casi en su totalidad*.

Finalmente, se ha dejado una pregunta abierta para el investigador (en este caso la doctoranda), en la que se anotará si existe algún elemento natural relevante, tales como que la casa tenga jardín, un río cercano, un árbol significativo, animales, etc. En el estudio piloto el jardín fue incluido como una variable aparte a tener en cuenta, pero se ha decidido incluirla aquí debido a que son pocas las casas españolas que tienen jardín propio.

Según su puntuación, el entorno de la vivienda es clasificado de la siguiente manera: No natural: 1-5; Mixto: 6-10; Natural: 11-15 y Muy Natural: > 15. Además, si la casa tiene algún elemento relevante adicional (jardín) se le sumará un punto adicional.

- La segunda parte de la escala evalúa la cantidad de naturaleza en el **entorno escolar**. En este caso las variables que se miden son cuatro:

En primer lugar, se tienen en cuenta las vistas desde el aula de los niños. Al igual que en las casas, éstas pueden variar desde *no naturales* hasta *más de 1/3 de la vista es natural desde varios puntos del aula*.

En segundo lugar, se tienen en cuenta las características del patio del colegio. Se mira si es de cemento en su totalidad o de lo contrario la cantidad de elementos naturales presentes.

A continuación, la escala tiene en cuenta cómo es el entorno cercano al colegio; es decir, si existe algún parque cercano, si las calles tienen árboles o si todo el colegio está rodeado de asfalto.

Finalmente, al igual que en el caso de la vivienda, el investigador anotará si existe algún elemento natural relevante, como el sonido constante de los pájaros, un río cercano, etc.

Con la puntuación obtenida, el colegio será clasificado según sea: No natural: 0-5; Mixto: 6-11; Natural: 12-17 o Muy Natural: > 17. Si el colegio cuenta con elementos naturales relevantes se le suma un punto adicional.

Una vez halladas las puntuaciones de la naturaleza cercana a la casa y la naturaleza cercana al colegio para cada niño, se procede a hallar la naturaleza cercana al niño como una combinación de las dos.

Tabla 19

Tabla para medir la naturaleza cercana al niño de manera objetiva

		Casas			
		No Natural	Mixta	Natural	Muy Natural
Colegios	No Natural	0	2	4	6
	Mixto	2	4	6	8
	Natural	4	6	8	10
	Muy Natural	6	8	10	12

Con el objetivo de validar la escala, se realizó un procedimiento de jueces que consistió en lo siguiente: uno de los investigadores explicó a tres voluntarios de qué trata el estudio y lo que se intenta medir con la escala de observación de naturaleza cercana. Se les explicó que se necesita validar el instrumento y que se quiere ver si todos obtenemos los mismos resultados. La primera parte de la sesión consistió en pedirles su opinión acerca de cuáles son las variables, tanto en el entorno residencial como en el del colegio, que creen que influirán en mayor medida en la investigación. Los tres voluntarios coincidieron que son *la distancia al parque más cercano* en el caso de la vivienda y *el tipo de patio del colegio* en el caso del centro educativo.

Los jueces y la doctoranda fueron a distintos colegios y casas de la ciudad de Cuenca a evaluar la cantidad de naturaleza cercana y a comprobar si el resultado de la escala coincidía con el esperado y si todos los participantes obtenían los mismos resultados. El procedimiento de jueces confirmó que la escala mide de manera objetiva la cantidad de naturaleza cercana a los niños por lo que dicha escala es la que se utilizó posteriormente en el estudio.

Anexo/Appendix 2.- Cuestionario usado en el estudio 1

Edad ¿Eres un niño o una niña?:.....

Colegio: Curso:

Fecha:

Rodea con un círculo el número que mejor indique tu opinión sobre las siguientes frases

	No, para nada	Sí, hay un poco de naturaleza	Sí, hay bastante naturaleza	Sí, hay mucha naturaleza
Creo que mi casa está en un entorno natural	1	2	3	4
Creo que mi colegio está en un entorno natural	1	2	3	4
En general, en mi vida diaria la naturaleza está presente	1	2	3	4

A continuación, encontrarás una serie de frases que hacen referencia a situaciones o hechos ante los cuales puedes sentir NERVIOSISMO o TENSIÓN de una forma más o menos habitual. Después de cada una de ellas encontrarás los números 1, 2, 3, y 4.

Rodea con un círculo el número que mejor indique si antes estas situaciones te sientes nervioso o tenso: 1 = NUNCA o CASI NUNCA; 2 = ALGUNAS VECES; 3 = MUCHAS VECES; 4= SIEMPRE o CASI SIEMPRE.

S1

Antes de un examen.	1	2	3	4
Cometer fallos o equivocarme en cosas importantes.	1	2	3	4
Cuando me riñen sin causa justificada.	1	2	3	4
La gente que se cree superior.	1	2	3	4
Hacer un examen que no he preparado.	1	2	3	4
Que bajen las notas en clase por causas ajenas a mí.	1	2	3	4
Que el profesor me tome el pelo.	1	2	3	4
Si me acusan de algo que no he hecho.	1	2	3	4
Que aparezca un líder y todos vayan detrás de él/ella.	1	2	3	4
Si se castiga a alguien por no saber algo.	1	2	3	4
El momento antes de un examen.	1	2	3	4
No poder dar mi opinión en algunas situaciones.	1	2	3	4
Si el profesor riñe a un compañero/a.	1	2	3	4
Que haya más de un examen en el mismo día.	1	2	3	4
Ver como un compañero/a no respeta a los demás.	1	2	3	4
Cuando pienso que las cosas no me salen como esperaba.	1	2	3	4
Que me gasten una mala pasada.	1	2	3	4
No poder expresar mis ideas, pensamientos y sentimientos.	1	2	3	4
No comprender una cosa (por ejemplo, los problemas) por más que me empeñe.	1	2	3	4
Que los compañeros/as no me ayuden cuando lo necesito.	1	2	3	4
Cuando un compañero/a se siente superior a los demás.	1	2	3	4
Cuando hablan a escondidas y piensas que es de ti.	1	2	3	4
Que me pregunten cosas personales.	1	2	3	4
Cuando el profesor/a abusa de su autoridad.	1	2	3	4
Si se me olvida en casa algo que necesito para ese día.	1	2	3	4

Los problemas en casa.	1	2	3	4
Cuando me riñen.	1	2	3	4
Cuando me tengo que callar aunque tenga razón.	1	2	3	4
Hacer algo mal.	1	2	3	4
Cuando no me prestan atención cuando hablo.	1	2	3	4
Cuando no me dejan hacer algo sin razón.	1	2	3	4
Cuando discuto con mis padres o abuelos.	1	2	3	4
La incomprensión.	1	2	3	4
Pagar por las peleas de mis padres.	1	2	3	4
Cuando me dicen que no he estudiado y sí lo he hecho.	1	2	3	4
Cuando se me exige más que a mis hermanos.	1	2	3	4
Cuando me dicen que estudie todo el rato.	1	2	3	4
Que la gente mayor siempre quiere tener razón.	1	2	3	4
Estudiar porque mis padres me obligan.	1	2	3	4
Cuando, con o sin razón, la gente mayor me repite las cosas muchas veces.	1	2	3	4
Callarme, incluso si sé que llevo razón.	1	2	3	4
Cuando digo una mentira y me pillan.	1	2	3	4
Que mis padres no me entiendan.	1	2	3	4
Portarme mal con mis padres.	1	2	3	4
No tener tiempo para hacer lo que quiero.	1	2	3	4
Ser forzado a hacer algo que no quiero hacer.	1	2	3	4
Que no confíen en mí.	1	2	3	4
Que me consideren irresponsable.	1	2	3	4
Que me digan SI en un principio y después, sin ninguna razón, NO.	1	2	3	4
Que no me preguntan sobre cosas que me afectan.	1	2	3	4






Señala haciendo una X en la casilla correspondiente cuántas veces te ha pasado alguna de las siguientes situaciones en el último año

	Nunca me ha pasado (1)	Casi nunca me ha pasado (2)	Me pasa alguna veces (3)	Me pasa bastantes veces (4)	Me pasa siempre (5)
No paso suficiente tiempo con mis padres.					
Mis padres discuten delante de mí.					
No me da tiempo a hacer los deberes.					
No tengo nada que hacer.					
No tengo suficiente dinero para gastar en lo que quiero.					

Anexo/Apendix 3.- Cuestionario usado en el estudio 3

Por favor, rodea con un círculo si estás de acuerdo o no con las siguientes afirmaciones, y en qué grado.

Señala sólo una de las casillas (del 1 al 5) por cada una de las frases.

	Totalmente en desacuerdo 	En desacuerdo 	No lo sé 	De acuerdo 	Totalmente de acuerdo 
1. Las plantas y los animales tienen el mismo derecho a vivir que las personas	1	2	3	4	5
2. Hay demasiada gente en la Tierra para los recursos (comida, agua, etc.) que la Tierra tiene.	1	2	3	4	5
3. Las personas podemos parar la destrucción de la Tierra.	1	2	3	4	5
4. Todavía hoy, las personas debemos obedecer (cumplir) las leyes de la naturaleza.	1	2	3	4	5
5. Cuando las personas hacemos cosas sin tener en cuenta la	1	2	3	4	5

importancia de la naturaleza obtenemos malos resultados.					
6. La naturaleza puede soportar los efectos negativos de nuestros estilos de vida modernos.	1	2	3	4	5
7. Las personas tenemos derecho a controlar el resto de la naturaleza.	1	2	3	4	5
8. Las personas estamos tratando mal a la naturaleza.	1	2	3	4	5
9. En el futuro, las personas sabremos tanto sobre la naturaleza que seremos capaces de dominarla.	1	2	3	4	5
10. Si las cosas no cambian, tendremos un desastre medioambiental pronto.	1	2	3	4	5
11. La "crisis ecológica" no es tan grave, tan mala como nos quieren hacer creer.	1	2	3	4	5

Anexo/Appendix 4.- Cuestionario usado en los estudios 2 y 4

A continuación tienes algunas preguntas sobre lo que tú opinas del medio ambiente. No hay respuestas buenas ni malas, sólo estamos interesados en saber qué opinan los niños sobre el medio ambiente. Contesta con la mayor sinceridad posible.

¿Eres un niño o una niña? Soy: Niño Niña

Edad:

Colegio: Curso:

¿En qué trabaja tu padre?

¿En qué trabaja tu madre?

Ejemplo: Cuando estoy en casa por la tarde, veo la televisión.

Nunca Casi nunca Algunas veces Casi siempre Siempre

1. Cuando estoy en el patio del colegio, hago cosas distintas a cuando estoy en la clase.

Nunca Casi nunca Algunas veces Casi siempre Siempre

2. Cuando estoy en el patio del colegio, me siento libre de todas las cosas que los maestros quieren que haga.

Nunca Casi nunca Algunas veces Casi siempre Siempre

3. Hay muchas cosas que puedo descubrir en el patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre

4. Cuando estoy en el patio del colegio, siento que todo lo que me rodea es distinto al ambiente de la clase.

Nunca Casi nunca Algunas veces Casi siempre Siempre

5. Las cosas que me gusta hacer puedo hacerlas en el patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre

6. Cuando estoy en el patio del colegio, me siento libre de las horas de clase y de las tareas que hacemos en clase.

Nunca Casi nunca Algunas veces Casi siempre Siempre

7. Hay muchos lugares interesantes para mí en el patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre

8. Puedo hacer muchas cosas diferentes en alguna de las zonas del patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre

9. Cuando estoy en el patio del colegio, me siento como si estuviese en un lugar distinto a cuando estoy en la clase.

Nunca Casi nunca Algunas veces Casi siempre Siempre

10. Hay muchas cosas en el patio del colegio que me gustan mucho.

Nunca Casi nunca Algunas veces Casi siempre Siempre

11. Las cosas que quiero hacer, puedo hacerlas en el patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre

12. Cuando estoy en el patio del colegio, me olvido, no pienso, en las cosas que debo hacer.

Nunca Casi nunca Algunas veces Casi siempre Siempre

13. Hay muchas cosas interesantes que puedo ver en el patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre

14. Hago cosas distintas en diferentes zonas del patio del colegio.

Nunca Casi nunca Algunas veces Casi siempre Siempre






15. El patio del colegio es aburrido.

Nunca Casi nunca Algunas veces Casi siempre Siempre






16. Creo que todas las distintas zonas del patio del colegio son como pequeños patios unidos juntos.

Nunca Casi nunca Algunas veces Casi siempre Siempre






17. El patio del colegio es el mejor sitio para pasarlo bien.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






18. Creo que el patio del colegio es un buen lugar para estar a gusto.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






19. Me gustaría jugar en el patio del colegio por las tardes y los fines de semana.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






20. Me gusta el patio del colegio tal y como está ahora.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






21. Me gusta aprender cosas sobre plantas y animales

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






22. Las plantas y los animales son importantes para la gente.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






23. Me gusta leer cosas sobre plantas y animales.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






24. Las plantas y los animales pueden ser dañados o heridos fácilmente por la gente.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






25. Estoy interesado en aprender cosas nuevas para ayudar a proteger a las plantas y los animales silvestres.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






26. Las personas necesitamos las plantas para vivir.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






27. Mi vida cambiaría si no hubiese árboles.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






28. Yo estaría dispuesto a dar parte de mi dinero para ayudar a salvar o proteger las plantas y los animales silvestres.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






29. Yo estaría dispuesto a utilizar parte de mi tiempo libre (después de las clases) en actividades para ayudar a resolver los problemas que hay en la naturaleza.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






30. Las personas debemos cuidar mejor las plantas y los animales.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






31. Me gusta pasar tiempo en lugares en los que hay plantas y animales.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






32. Me pongo triste cuando veo casas construidas en lugares donde las plantas y los animales solían vivir.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






33. Me gusta aprender cosas sobre la naturaleza.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






34. Yo estaría dispuesto a ayudar a limpiar las áreas verdes (zonas donde hay naturaleza) de mi barrio o cerca de éste.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo

35. La naturaleza puede ser fácilmente dañada o herida por las personas.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo

36. Mi vida cambiaría si no hubiese plantas ni animales.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo

37. Si pudieses poner algo en el patio del colegio para hacerlo más divertido o más bonito, ¿qué pondrías?

38. ¿Por qué pondrías eso?

39. Creo que el patio de mi colegio es:

Nada natural Un poco natural

Bastante natural Muy Natural

40. Creo que el entorno de mi colegio (lo que está cerca de mi colegio) es:

Nada natural Un poco natural

Bastante natural Muy Natural

A continuación, se presentan una serie de actividades en la naturaleza. Rodea con un círculo cuántas veces has realizado esas actividades en el último año (en los últimos 12 meses).

Nunca Entre 1 y 2 veces Entre 3 y 6 veces
Entre 7 y 10 veces Más de 10 veces

41. Pasar tiempo en un lugar natural (por ejemplo en el campo, en el bosque, cerca del río, en la montaña, etc.).

Nunca	Entre 1 y 2 veces	Entre 3 y 6 veces
Entre 7 y 10 veces	Más de 10 veces	

42. Ir a ver animales al aire libre (al bosque, al campo, etc.) o a un zoo, acuario, etc.

Nunca	Entre 1 y 2 veces	Entre 3 y 6 veces
Entre 7 y 10 veces	Más de 10 veces	

43. Leer sobre naturaleza en Internet, un libro, revista o visto algún documental o programa sobre naturaleza en la tele.

Nunca	Entre 1 y 2 veces	Entre 3 y 6 veces
Entre 7 y 10 veces	Más de 10 veces	

Indica con qué frecuencia (cuántas veces) realizas algunas de las actividades siguientes:

44. Hablar con tus padres, familiares o amigos sobre naturaleza, animales o problemas del medio ambiente.

Nunca	Casi nunca	Algunas veces	Casi siempre	Siempre
-------	------------	---------------	--------------	---------

45. Durante la semana, después del colegio, ¿juegas en lugares al aire libre (barrio, en tu calle o en el parque)?

Nunca	Casi nunca	Algunas veces	Casi siempre	Siempre
-------	------------	---------------	--------------	---------

46. Durante el fin de semana, ¿juegas al aire libre (barrio, en tu calle, en el parque, en el pueblo de papá, mamá, los abuelos, etc.)?

Nunca	Casi Nunca	Alguna vez	Casi Siempre	Siempre
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




47. ¿Te gusta jugar al aire libre (fuera de casa, fuera de cualquier edificio)?

No, no me gusta nada Sí, me gusta un poco






Sí, me gusta bastante Sí, me gusta mucho

48. Cuando oyes la palabra NATURALEZA, ¿en qué piensas? Descríbelo brevemente con tus palabras.






49. Llevo a cabo actividades para ayudar a proteger el medio ambiente.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






50. Para ahorrar agua, uso menos agua cuando me ducho o me baño.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






51. En el colegio, hablo con los profesores y compañeros de los importante que es hacer cosas para proteger el medio ambiente (como por ejemplo reciclar)

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo






52. En casa ayudo a separar y reciclar la basura.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo

53. Para ahorrar energía, apago los aparatos eléctricos (la luz, la TV, la video consola, el ordenador, la radio, etc.) cuando no los estoy usando.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo

54. Me preocupa el medio ambiente.

 Muy en desacuerdo  En desacuerdo  No estoy seguro  De acuerdo  Muy de acuerdo

Anexo/Appendix 5.- Cuestionario usado en el estudio 5

Código:








¿Eres un niño o una niña? Niño Niña







Edad:

¿En qué ciudad o pueblo vives?

¿Habías estado antes en este campamento? Sí NO

**INDICA HASTA QUÉ PUNTO ESTÁS DE ACUERDO CON LAS SIGUIENTES FRASES,
DESDE "MUY EN DESACUERDO" HASTA "MUY DE ACUERDO"**

	Muy en desacuerdo	En desacuerdo	No estoy seguro	De acuerdo	Muy de acuerdo
	  1	 2	 3	 4	  5
	1	2	3	4	5
1. Las plantas y los animales tienen el mismo derecho a vivir que las personas.	1	2	3	4	5
2. Hay demasiada gente en la tierra para los recursos (comida, agua) que la Tierra tiene.	1	2	3	4	5
3. Las personas podemos parar la destrucción de la Tierra.	1	2	3	4	5
4. Todavía hoy, las personas debemos obedecer (cumplir) las leyes de la naturaleza.	1	2	3	4	5
5. Cuando las personas hacemos cosas sin tener en cuenta la importancia de la naturaleza obtenemos malos resultados.	1	2	3	4	5
6. La naturaleza puede soportar los efectos negativos de nuestros estilos de vida modernos.	1	2	3	4	5
7. Las personas tenemos derecho a controlar el resto de la naturaleza.	1	2	3	4	5
8. Las personas estamos tratando mal a la naturaleza.	1	2	3	4	5
9. En el futuro, las personas sabremos tanto sobre la naturaleza que seremos capaces de dominarla.	1	2	3	4	5
10. Si las cosas no cambian, tendremos un desastre medioambiental pronto.	1	2	3	4	5
11. La "crisis ecológica" no es tan grave, tan mala como nos quieren hacer creer.	1	2	3	4	5
12. Tengo la sensación de que puedo vivir en la naturaleza	1	2	3	4	5
13. Cuando estoy en la naturaleza el tiempo para muy rápido	1	2	3	4	5

	Muy en desacuerdo	En desacuerdo	No estoy seguro	De acuerdo	Muy de acuerdo
	 1	 2	 3	 4	  5
14. Cuando paso tiempo en la naturaleza me siento libre	1	2	3	4	5
15. Cuando estoy en la naturaleza me como si estuviera en casa	1	2	3	4	5
16. Me siento relajado en la naturaleza.	1	2	3	4	5
17. Cuando estoy en la naturaleza, siento respeto por ella, porque es única	1	2	3	4	5
18. Cuando estoy en la naturaleza, NO me siento conectado a ella	1	2	3	4	5
19. A veces, si estoy triste, encuentro consuelo en la naturaleza	1	2	3	4	5
20. Estaría dispuesto a cerrar el grifo cuando me lavo los dientes	1	2	3	4	5
21. Estaría dispuesto a apagar la luz de la habitación cuando salgo de ella	1	2	3	4	5
22. Estaría dispuesto a ayudar a reciclar en casa	1	2	3	4	5