



Children's Perceived Restoration and Pro-Environmental Beliefs

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Abstract

This study intends to find a relation between children's perceived restoration and their environmental orientations. In order to do that, a designed perceived restoration scale adapted from the PRCS-C II was used as well as an adapted version of the Children's Environmental Perceptions Scale (CEPS). A total of 832 children aged between 6 and 13 participated in the study. The results show that there is a relation between the perceived restoration due to the nature present in the school playground and the environmental orientations children show.

Keywords: Children, environmental orientations, perceived restoration, nature.

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1.0 Introduction

It is well known that direct or visual contact with nature provides benefits to adults and children (Kaplan & Kaplan, 1989). However, the time people spend outdoors is decreasing and, as Pergams and Zaradic (2008) claim, modern society is moving away from nature-based recreation to activities mainly based on technology. In regards to children, time constrains, the use of technology and security issues have been pointed out as being the main causes for not playing outside as much as children did a few years ago (Clements, 2004). Children are experiencing a disconnection from the natural world and it is having negative consequences on their health as well as on nature itself. Recently, Louv (2005) has gathered the causes and consequences of children's disconnection from the natural world in the term Nature Deficit Disorder and, even though it is not a recognized illness, its causes and its consequences are evident. The present study tries to point out the importance that the contact with nearby nature has for children's wellbeing as well as for their environmental orientations.

2.0 Literature Review

2.1 Children's disconnection from nature. Nature deficit disorder

As mentioned above, empirical evidence shows that children spend less time outdoors than they did a few decades ago. This shift from playing outside, especially in nature, to playing inside is having negative consequences on children's health and well being, as well as on nature. Obesity has been pointed out as one of the main physical problems in today's children (Ozdemir & Yilmaz, 2008), partially due to the disconnection from nature. In the same way, the psychological effects of time spent in contact with nature have also been described. In a study carried out by Taylor, Kuo and Sullivan (2002), it was found that children who lived in houses with greener views showed higher self-discipline and recent studies have proved that children suffering from ADD or ADHD focus better when spending time in nature (Taylor & Kuo, 2009).

As mentioned before, the disconnection from nature is not only affecting children's health, but nature itself. Following this idea, Chawla (2006) has studied the effects that direct experiences in nature has on children's commitment to take action to benefit the environment. She concluded that positive, direct experiences in the outdoors and being taken outdoors by someone close to the child are the two most significant contributing factors to commit in protecting the environment as adults.

2.2 Children's environmental orientations

In a time when the ecological crisis has been recognized worldwide and the urgency of taking actions towards nature conservation has been pointed out, it is critical to understand children's environmental orientations, how they are formed and what can be done in order

to building a higher environmental concern in children. In this perspective, some researchers have developed instruments to measure children's environmental orientations, being most of them too complicated for the use with young children because of the complexity of the items and the length of the scales.

It has been only recently when Larson et al., (2009) developed an instrument that can be easily and quickly used with children from the age of 6. The Children's Environmental Perceptions Scale (CEPS) has been proven to be a reliable instrument, suitable for young children and able to register children's environmental orientations. The authors developed the scale using items from previous scales but with a simpler language and with a 5 point Likert type answer. The final version of CEPS consisted on 16 items and it was filled in by the participants who were attending an environmental education summer camp or an afterschool program. The results of the analysis showed that CEPS could measure two distinct components of a child's environmental orientation: eco-affinity and eco-awareness. They concluded that eco-affinity, eco-awareness and environmental knowledge were higher for those children who spent more time in direct contact with nature.

The present study intends to measure children's environmental orientations using CEPS with a Spanish sample and to link the results with children's positive experiences in nature. In this way, it is expected that those children who are in contact with nature more frequently will show higher environmental concern.

2.3 Nature's restorative effect on children

It is known that time spent in nature helps to restore the attention capacity lost while doing a task that requires concentration. One of the most important theories about restoration is the Attention Restoration Theory (Kaplan & Kaplan, 1989), concludes that natural environment is the best to promote restoration. In regards to children, some investigations that show the restorative effects that nature has on children (Taylor & Kuo, 2009).

Within the investigations about restoration, there is a line of research that studies perceived restoration or the restorative potential that a place has according to how people evaluate it. In order to do that, researchers have developed different tools which have been focused on adults. Two of the most important are: Perceived Restorativeness Scale (PRS) by Hartig et al. (1997) and Restorative Components Scale (RCS) by Laumann et al. (2001). It has been only recently that a scale for children has been developed by Bagot (2004). The author used RCS and PRS as her starting point and created a scale that could be easily understood by children. The Perceived Restorative Components Scale for Children (PRCS-C) has been proven to be a tool that measures perceived restoration and that is able to distinguish between different types of environments, and to register gender and age differences. It consists of 15 items and replicates the adults' factor structure, which includes 5 factors. The first factor is being away (being away from the attentionally fatiguing features), that can be divided into two different factors: being away physical (in a different location from the fatiguing features) and being away psychological (a conceptual shift, ie: a view from a window can bring us far away psychologically), fascination (the place is

interesting), compatibility (the place is compatible with what children want to do) and extent (the place gives a sense of a whole new world).

In a second study, Bagot, Kuo and Allen (2007) made some improvements to the scale, mainly to strengthen the extent factor, resulting in a new tool called PRCS-C II.

The present study intends to measure the restorative potential that children perceived in their school's playground, by using the PRCS-C II. Previous studies have shown that natural environments offer a greater likelihood of restorative effects than urban environments (Hartig, Korpela, Evans & Gärling, 1997; Taylor & Kuo, 2009) and, therefore, a higher score in the PRCS-C II is expected when more natural schools are evaluated.

3.0 Methodology

3.1 Participants

A total of 832 children from 6 to 13 years old ($M = 10.03$; $SD = 1.30$) participated in the study. 48.8 % of the participants were boys and 51.2% were girls.

3.2 Instruments

Nearby Nature Observational Scale (Collado, 2009): it registers the amount of nature children have access to. In order to do that, an observational process is followed. The scale is divided into two subscales that measure the amount of nature in the school area and the nature in the home area. For the purpose of this study, the subscale that measures the nearby nature that children have access to in the school area has been used. It includes items such as the amount of natural elements in the school playground or how natural the views are, among others. With the score obtained in the scale, the schools can be divided into four groups: very natural, natural, mixed and non natural.

The Nature Perceived in the School Playground: The perception that the child has about the nearby nature in his or her school is measured, with the next item "I consider that the playground in my school is natural". The child can answer: 1 (not at all), 2 (yes, there is a bit of nature), 3 (yes, there is some nature) or 4 (there is a lot of nature). The nature that people perceive has been used in previous studies as an indicator of the amount of nature existing in a place (Hur, Nasar & Chun, 2010).

Perceived Restorative Components Scale for Children and the Children's Environmental Perceptions Scale: The PRCS-C II and the CEPS were translated into Spanish by two different translators and then back into English by a native speaker in order to get a scale as close as possible to the original. A primary school teacher revised the scales and some amendments were made in order to make it easier to be understood by children. The adaptations of the scales are explained in the results section.

3.3 Procedure

Data were collected from around the province of Cuenca, in Spain, in three different areas: an urban area (with a population of 50.000 inhabitants), a mountain rural area and an agricultural rural area.

It was also intended to collect data from children whose school's playground differ in the amount of nature existing in them. In order to do that, 20 schools were selected by using the Nearby Nature Observational Scale. Five schools were classified as non natural, another five as mixed, seven schools were classified as natural and three schools were very natural. This scale is only used in order to classify the schools, from very natural to non natural, but results shown later on have been analyzed using the Nature Perceived in the School Playground.

Data were collected in the school. One of the researchers visited the classes and gave out a document which included the CEPS and PRCS-C II as well as the item to register the nature perceived in the school playground and demographic questions. The items were read aloud twice and children had enough time to answer.

3.4 Analysis

The collected data were analyzed with the statistic program SPSS (v. 18.0). Factor analyses were carried out in order to determine the structures of the PRCS-C II and CEPS. Once the structures were decided, Cronbach's alpha were calculated for the factors of both, the CEPS and the PRCS-C II, to determine internal consistency. Following, student's t test were carried out with the objective of checking whether there were significant differences between different environments and groups of people. Finally, Pearson correlations were calculated to evaluate the possible link between perceived restoration and environmental orientation.

4. 0 Results

4.1. Adaptation of PRCS-C II and CEPS to a Spanish sample. Importance of nearby nature in perceived restoration and children's environmental orientations

First of all, the Spanish version of the PRCS-C II was evaluated. A factor analysis was carried out in order to determine the structure of the instrument and the results are similar to the ones obtained by Bagot, Kuo and Allen (2007). Therefore, the scale consists on 15 items and 5 factors: fascination, being away physical, being away psychological, compatibility and diversity of stimulus. In order to determine the internal consistency, Cronbach's alpha of each of the factor is calculated. As shown in Table 1, alphas are high for all the factors.

Table 1: Cronbach's alpha of the five factors and the total scale for perceived restorativeness.

	Fascination	Being Away - Psychological	Being Away - Physical	Compatibility	Stimulus diversity	Total
Variance Explained	19.61%	16.32%	11.06%	12.55%	11.76%	71.30%
Cronbach Alpha	.832	.869	.762	.822	.786	.840

After analyzing the PRCS-C II, the children's environmental perception scale (CEPS) was evaluated. The Cronbach Alpha for the total scale was 0.83, indicating that this scale could be used as unidimensional. However, as Larson et al. (2009) found a two-factor solution, a PCA was carried out. Item 2 "plants and animals are important to people" was eliminated as it did not load strongly into any factor. The best factorial solution was a 3-factor solution, explaining 54.95% of the variance. However, it was decided to use the scale as unidimensional as the Cronbach's alpha of the scale is high and the 3-factor solution was not the same as the one proposed by the authors. Moreover, other environmental orientation scales such as NEP have been both used as unidimensional (Dunlap, Van Liere, Merting & Jones, 2000) and multifactorial (Vozmediano & San Juan, 2005).

In order to compare whether there were differences in the perceived restoration according to the amount of nature existing in the school playground, children were classified into two groups according to the nature they perceive in the playground: children who perceive a high amount of nature and children who perceive a low amount of nature. The amount of nature perceived was measured using the Nature Perceived in the Playground item. There is a significant positive correlation between the nature that children perceive in their playground and the nature registered with the Nearby Nature Observational Scale, (.701; $p < .001$). Therefore, it was decided to take perceived nature as a measure of the nature existing in the playgrounds as the research is intended to take into consideration the users point of view.

Possible differences were also evaluated when age, gender and home location were taken into consideration. Therefore, children were classified in two groups according to their age: younger children, from 6 to 8 years old and older children, from 10 to 13 years old.

When location was taken into account, children were classified within three groups: those who live in an urban area (the city of Cuenca), those who live in the mountain range and those who live in the agricultural area.

Once the groups were done, mean scores for the total scale and each factor were calculated and then students' t- tests were carried out. Mean scores of the five factors and the total perceived restorativeness scale were higher in the natural playgrounds (the playground perceived as more natural) than in the playgrounds perceived as non natural. Significant differences were also found when age was taken into account. Younger children perceived their playground as more fascinating, more compatible with what they want to do and with a higher diversity of stimulus than older children. There were no significant

differences according to gender. See Table 3.

Table 3: Perceived restorativeness according to the amount of nature perceived in the playground and children's age.

	Age	Nature Perceived in the playground
Total Restorativeness	Younger children perceive the playground as more restorative (M = 4.29; SD = .47) than older children (M = 3.96; SD = .57); t (719) = 5.64; p < .005	Children who perceive their playground as more natural also perceived it as more restorative (M = 4.17; SD = .45) than playgrounds perceived as less natural (M = 3.67; SD = .62); t (826) = -13.28; p < .005
Fascination	Younger children perceive their playground as more fascinating (M = 3.90; SD = .81) than older children (M = 3.46; SD = .91); t (719) = 4.80; p < .005	Children who perceive their playgrounds as more natural also perceive them as more fascinating (M = 3.03; SD = .95) than playgrounds perceived as less natural (M = 3.71; SD = .82957); t (826) = -10.78; p < .005
Being away physical	There are not significant differences.	Playgrounds perceived as greener scored higher in being away physical (M = 4.77; SD = .41) than those perceived as less natural (M = 4.45; SD = .71); t (830) = -8.21; p < .005
Being away Psychological	There are not significant differences.	Playgrounds perceived as more natural scored higher in being away psychological (M = 4.50; SD = .71) than those perceived as less natural (M = 3.85; SD = .1.06); t (830) = -10.52; p < .005
Compatibility	The playground is more compatible for younger children (M = 4.33; SD = .76), than for older children (M = 3.70; SD = .97); t (723) = 6.67; p < .005	Playgrounds perceived as more natural are evaluated as more compatible (M = 3.90; SD = 3.45) than those playgrounds perceived as less natural (M = 3.45; SD = 1.10); t (839) = -6.53; p < .005
Diversity of stimulus	Younger children perceive their playground with a higher diversity of stimulus (M = 4.10; SD = .93) than older children (M = 3.77; SD = .98); t (723) = 3.32; p < .005	Playgrounds perceived as more natural are seen to have a higher diversity of stimulus (M = 3.95; SD = .89) than those perceived as less natural (M = 3.54; SD = 1.11); t (830) = -5.77; p < .005

The same procedure was carried out to evaluate whether there were differences in children's environmental orientations depending on the amount of nature perceived in the playground, their age, gender and their home location. Significant differences were found in the score among children who attended classes in a school that they perceive as more natural (M = 4.49; SD = .44) and those who attended classes in a school perceived as less natural (M = 4.42; SD = .49), t (830) = -2.119; p < .05, showing that children whose

playgrounds are more natural scored higher in CEPS than those whose playgrounds are less natural.

In the same way, there are significant differences depending on children's home location. Children who live in the mountain range are more environmentally orientated ($M = 4.54$; $SD = .41$) than children who live in the agricultural area, ($M = 4.40$; $SD = .45$), $t(310) = 2.922$; $p < .01$. These results are surprising as it was expected to find differences between the urban (the city of Cuenca) and the rural areas (mountain range and agricultural area), as previous studies have found (Hinds & Sparks, 2009). These results are further discussed in the discussion section. No age or gender differences were found

4.2. Relation between perceived restoration and environmental orientations

The next step was to evaluate whether there was a relation between children's environmental orientations and their perceived restorativeness. First of all, a significant positive correlation between these two variables was found ($.143^{**}$; $p < .01$) indicating that children who are more restored show also a higher score in the environmental orientations scale. Empirical evidence has shown that the perceptions of the restorative qualities of a natural environment predict adult's environmental behavior (Hartig, Kaiser & Bowler, 2001). It was not intended to evaluate causality in the present study, but in order to check whether there were significant differences in children's environmental orientations according to how restorative they perceived their playgrounds, students t-tests analysis were carried out. Results show that those children who perceive their playgrounds as more restorative are more environmentally oriented ($M = 4.53$; $SD = .44$) than those whose perceived restoration is lower ($M = 4.37$; $SD = .48$), $t(826) = -4.775$; $p < .01$.

5.0 Discussions

One of the places where children spend most of their daily time is in their school and that is the reason why this study is focused on the evaluation of the physical elements of the school playground, in particular on the amount of nature existing in the playground. Adults are usually asked to evaluate the restorative potential of different places, using a designed scale. However, it is unusual to ask children to evaluate the spaces they use in terms of restoration. Children will probably suffer attentional fatigued after carrying out school tasks in the same way that adults are fatigued after work. Therefore, it is important to design tools such as the PRCS-C II that can be used by children in order to evaluate perceived restoration.

As Bagot (2004) suggested, it has been tested whether the PRCS-C II could distinguish between environments with a different amount of nature. The results show that children evaluate greener playgrounds as places where the likelihood of restoration is higher than in playgrounds where the amount of nature perceived is low. These results are consistent with the theory and with prior studies that demonstrate that more natural places are more restorative.

The present investigation has also contributed to the evaluation of the PRCS-C II. The five factors structure was replicated with the Spanish sample, following the results of previous research with children (Bagot, Kuo & Allen, 2007) and adults (Hartig et al., 1997; Lauman, 2003). The scale has been proven to be a reliable instrument that distinguishes between different types of environments (environments perceived as more natural and environments perceived as less natural).

Age differences were found in the present study. Younger children evaluated their playgrounds as more restorative and the scores of three out of five of the factors were also higher than for older children. Perhaps, the familiarity with the playground makes it less fascinating, less compatible with what older children want to do and with a lower diversity of stimulus. It could be that for younger children the playground is a newer place, a place to explore, but it might be different for children who have been in the same playground for a longer period of time.

On the other hand, not only the nature perceived in the playground was found to be related to the perceived restoration, but also as an element that might encourage pro-environmental orientations. The direct daily contact with the natural elements of the playground seems to be positively affecting children's environmental orientations so that those children who attend classes in a more natural school are more environmentally concerned than those who do not have nature in their school area.

CEPS has been proven to be a reliable instrument, usable with young children and faster to apply than previous scales. Further investigations with the use of CEPS will provide more information about the dimensionality of the scale.

There were no differences found between the environmental orientation of children who live in the urban area and children who live in the rural areas. However, there are differences in the environmental orientation shown by children who live in the mountain range and those who live in the more agricultural area, although both of them are considered to be more natural than the city of Cuenca. Our hypothesis is that not only contact with nature is important but also the type of contact, being it orientated towards a financial end in the agricultural area. In rural areas in Spain, it is common for children to help their parents in the agricultural labors and, therefore, it is thought that children's contact with nature in this case is linked to working time, and not to a positive experience. The positive experiences are the ones that have been proven to build environmental concern (Chawla, 2006; Hartig et al., 2001) and, this may be the reason why the kind of contact that children in the agricultural area have with nature is not linked to a higher environmental orientation. In the mountain range, however, the contact that children have

with nature is freer and more unstructured, the type of experience described as being the one that influences environmental orientations.

Finally, one of the main objectives of the present investigation was to check whether there was a relation between children's environmental orientations and their perceived restoration. In this respect, it was found that children's environmental orientations and children's perceived restoration are related so that those children who perceive their playground as more restorative show a higher environmental orientation. As Hartig et al., (2001) pointed out, it is seen that a positive restorative experience affects people's attitudes towards nature. However, causality is not evaluated in this study as it is just an exploratory research in this aspect, so further investigation should contribute to a better understating of the results. It could be that more pro environmental children experience time spent in the playground in contact with nature as being more positive than those who are less pro environmental. Future research should be done in order to check whether children's environmental orientations are mainly due to the experience of nature in the playground or to the experience of nature in a wider area, such as the home location. Actual restoration could also be taken into consideration in future studies, although perceived restoration has been used before as a measure that provides useful information about the potential for a person to experiences restoration in a given environment (Hartig et al., 2001).

6.0 Conclusion

The results have implications for understanding how places intended to be restorative for children can be designed. Natural elements could be included in school playgrounds and daily contact with nature should be encouraged by parents and teachers in order to promote restorativeness and environmental concern. Including natural elements in children's playgrounds, such as trees, sand, bushes and grass seems to be important for children's state of mind as well as for the of environment. The two instruments used in this study are very new so more research should be done in order to confirm their reliability with other samples. However, the results are an important contribution to the development of instruments that are for the use of children and they are a step forward in the direction of taking the children into account when designing places for children's use. Providing children with experiences that restore their minds has been proved to be linked to children's environmental orientations, although, as an exploratory study, causality has not been evaluated in this investigation. This is a line of research that should be looked at in a time when children's health and environmental concern are both suffering the negative consequences of the disconnection from nature.

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