



## Place attachment and identification as predictors of expected landscape restorativeness



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### ABSTRACT

This study explores the roles of place attachment and place identification in the evaluation of the restorative potential of landscapes. Two hundred university students recruited at campuses in the Basque Country (Spain) and Chile evaluated the restorative value of a set of landscape photographs including local and non-local locations. The results indicated that local natural landscapes were preferred and assessed as more restorative as compared to non-local ones, and that place attachment and identification positively predicted their restoration ratings. Conversely, urban local landscapes were less preferred and seen as less restorative than their non-local counterparts. In this latter case, attachment remained a positive predictor whereas identification was found to negatively contribute to the restorative potential of local urban landscapes. In line with recent research, we found that person-place bonding affects landscape preferences and the perception of its restorative properties. This study contributes to an emerging line of research that addresses the role of a wider set of personal, social and cultural variables in the psychological restoration process.

### 1. Introduction

Psychological restoration has been mainly investigated in relation to the objective characteristics of landscapes and from an evolutionary point of view. Criticism from several disciplines has pointed out to the need for further research on personal and social variables that may play a role in such restoration. This paper aims to contribute to this body of literature by exploring the roles of two person-place bonding variables in the evaluation of the restorative potential of landscapes: place attachment and place identification. Both variables may offer new clues on how we perceive the potential benefits of a landscape.

According to the European Landscape Convention, a landscape is “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (Council of Europe, 2000: Article I, Definitions). It is also: “an important part of the

quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognized as being of outstanding beauty as well as everyday areas” (Council of Europe, 2000: Preamble; see also Article 2, Scope). Landscapes have been analysed from the perspective of human and cultural geography (Berque, 1995, Cosgrove 1984; Jackson, 1984; Roger, 1997); ecological psychology and the cognitive sciences (Heft, 2010; Heras-Escribano & de Pinedo-García, 2018), health and medicine (Menatti & Casado 2016); the relationship with ecology (Gobster, Nassauer, Daniel, & Fry, 2007) and political concepts such as the idea of the commons (Olwig, 1996; Menatti, 2017).

Instead of considering the restorative and salutogenic values of landscapes as determined only by their objective characteristics, we build on previous research that has highlighted the importance of social and personal factors in landscape perception, by considering the role of

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place attachment and place identification (Morton, van der Bles, & Haslam, 2017a, 2017b; Ratcliffe & Korpela, 2016a, 2016b; Wilkie & Stavridou, 2013a, 2013b).

### 1.1. Evolutionary-based approaches to the perception of landscapes

Landscape preferences are typically defined and operationalized as overall judgements of attractiveness, aesthetics or scenic quality (Galindo & Hidalgo, 2005; Purcell, Lamb, Mainardi Peron, & Falchero, 1994). Several evolutionary-based theories have attempted to explain environmental preferences through objective characteristics of natural environments (e.g. coherence, openness, diversity ...). These approaches are relevant for studying the perception of landscapes and for evaluating the benefits obtained from the contact and interaction with them (Lothian, 2017).

One key evolutionary theory is Appleton's (1975) prospect and refuge theory, which posits that, beginning from hunter-gatherers, landscape preferences are more likely in environments that offer prospects (or clear vantage points), and refuges (or hiding places), both of which allow human beings to be protected and survive. Likewise, the savannah hypothesis (Falk & Balling, 2010; Orians & Heerwagen, 1992) specifies that, like the hominids in the African savannah, human beings consistently prefer open, relatively flat landscapes (savannah-like settings), with water directly in view, that allow us to scan the surroundings for detecting predators and to escape if needed. Furthermore, Dutton (2009) specifies that landscape preferences are innate and universal, arguing that: "people in very different cultures around the world gravitate toward the same general type of representation: a landscape with trees and open areas, water, figures, and animals" (Dutton, 2009, p. 14).

Many environmental psychologists also adopt an evolutionary based approach in analyzing the restorative potential of landscapes. Restorativeness is the ability of certain environments to help people to recover from fatigue and stress. Attention restoration theory (ART, Kaplan & Kaplan, 1989), stress recovery theory (SRT, Ulrich, 1983; Ulrich et al., 1991) and the biophilia hypothesis (Kellert & Wilson, 1993)<sup>2</sup> invoke evolutionary arguments to explain psychological restoration. They propose that psychological restoration is the result of entering into contact with landscape features conducive to human survival (e.g. trees or water).

Despite the progress made in this research area, landscape preference studies based on biological evolution and universal mechanisms often underestimate the role of personal, social and cultural variables involved in the perceptual and evaluation process. We will address this issue in the following section.

### 1.2. Limits of the evolutionary-based approaches to the perception of landscapes

Evolutionary approaches to the perception of landscapes and to the human-landscape relationship have been questioned both in the humanities and psychology.

Menatti and Casado da Rocha (2016) raised three main critiques of evolutionary explanations: 1) they cannot be actually demonstrated; 2) they rely on *ad hoc* hypotheses to explain specific situations; and 3) they underestimate the role of cultural and sociological elements. This criticism aligns with claims by Buller (2009, pp. 74–81) who, writing about evolutionary psychology, stated that some of its arguments might stray from evidence to date and current methods and techniques.

Complementary limitations have been pointed out in the field of psychological restoration as well. Works by Joye and collaborators have consistently argued that many settings have empirically showed

restorative effects but lack features related to survival, such as food or shelter (Joye & de Block, 2011; Joye & Dewitte, 2018; Joye & van den Berg, 2011). Evolutionary-based theories of restoration would fail here at explaining the restorative effects of current urban parks, indoor plants or green roofs because these places do not appear to offer the expected survival advantages. Many parks do not contain fruit trees or bushes; an indoor plant cannot offer shelter from the rain or the sun; a green roof (see for example Lee, Williams, Sargent, Williams, & Johnson, 2015) does not provide additional survival advantages.

Some authors have extended the traditional scope of restoration studies by adding new measures or by designing studies suitable for testing non evolutionary-based explanations for restoration. Wilkie and Stavridou (2013a, 2013b) included a measure of environmental preference and found differences between country- and city- oriented people in terms of their perceptions of the restorativeness of natural and urban settings. Hägerhäll and colleagues used a sample partially composed of indigenous populations to test the possible effects of culture (e.g. western vs non-western) in the preference for natural landscapes (Hägerhäll et al., 2018). Their results did not support the assumptions of the savannah hypothesis. Other authors have also highlighted the general oversight of cultural variables in this respect (Qureshi, Breuste, & Jim, 2013). Such research aligns with theories from the social sciences, which consider landscape preferences and experiences as contextual to people, social groups, cultures and history (Berque, 1995; Cosgrove 1984; Jackson, 1984). Ratcliffe and Korpela (2016a, 2016b, 2017) have recently underlined the importance of including social and psychological variables in the study of restoration. The inclusion of such variables enables the consideration of possible top-down processes -for example, how place attachment, personality traits, values, social or cultural uses of places could influence restorative experiences- and subsequently may result in a better comprehension of them.

### 1.3. The role of place attachment and identification in the perception and experience of landscapes

Person-place bonding variables could enrich on the understanding of psychological restoration and landscape perception. The geographical concept of topophilia as elaborated by Tuan (1974, p.4) – "the affective bond between people and place or setting" – has been studied in connection with health and well-being, meaning that individual preferences for specific places and restorative environments are significantly associated with quality of life (Ogunseitan, 2005; Ruan & Hogben, 2007).

Numerous concepts and measurements have proliferated in the literature on person-place bonding (Droseltis & Vignoles, 2010; Hernandez, Hidalgo, & Ruiz, 2014; Lewicka, 2011), with place attachment and place identification being widely used. In this study we will use the taxonomical proposal by Hernandez and colleagues (Casakin, Hernández, & Ruiz, 2015; Hernández, Hidalgo, Salazar-Laplace, & Hess, 2007a, 2007b; Ruiz, Hernández, & Hidalgo, 2011), which define both as two different but interrelated same-level constructs.

Place attachment is an emotional bond that people establish with significant places; that is, places they visit or use regularly and that make them feel at ease (Hernández et al., 2007a, 2007b; Hidalgo & Hernández, 2001; Low & Altman, 1992). On the other hand, place identification is the sense of belonging to a place which forms part of the self-concept and that specifies personal and social identities (Scannell & Gifford, 2010; Uzzell, Pol, & Badenas, 2002; Valera & Pol, 1994). Some studies propose that person-place bonding may shape environmental preferences and thus could frame and condition restorative experiences (Wilkie & Stavridou, 2013a, 2013b). Similarly, Ruiz, Pérez, and Hernández (2013) found that the perception of a place's restorativeness may be significantly influenced by an affective bond towards it. The presence of place bonding in restoration studies can be traced back to seminal studies by Korpela and colleagues, which

<sup>2</sup> These theories are the three main frameworks explaining the salutogenic properties of landscapes (Capaldi, Passmore, Nisbet, Zelenski, & Dopko, 2015).

examined the restorative experiences of children, adolescents and young adults in their favourite places (Korpela, 1989, 1992; Korpela, Hartig, Kaiser, & Fuhrer, 2001; Korpela, Kyttä, & Hartig, 2002). These authors proposed that psychological bonding to a certain place may emerge after experiencing restoration within that place.

Recent research has approached the relationship between place bonds and restoration in a different way, understanding that levels of attachment or identification with a place can boost the restoration experienced during a visit. In this regard, Ratcliffe and Korpela (2016a, 2016b, 2017) analysed the role of place attachment and place memories in the imagined restorativeness of favourite places. Similarly, other studies have shown that a match between a salient personal or social identity and the contemplated environment may elicit greater restoration. In two empirical studies, this match led to 1) a strengthening of self-esteem and perceived physical health (Ysseldyk, Haslam, & Morton, 2016), 2) an increase in intrinsic over extrinsic motivations (Morton et al., 2017a, 2017b), and 3) an improvement in attentional performance (Morton et al., 2017a, 2017b).

#### 1.4. Study aim and hypotheses

The main objective of this experimental study was to explore the roles of place attachment and identification in relation to landscape preferences and assessment of the restorative properties of landscapes. We proposed and tested three hypotheses.

Given the vast amount of evidence showing that natural or naturalized landscapes are preferred over urban or built ones and are generally perceived as more restorative (Hartig & Staats, 2006b; Korpela, 2013; Lothian, 2017; Staats & Hartig, 2004), we hypothesized that preference and expected restoration would be greater for natural than for urban landscapes ( $H_1$ ). We chose natural and urban landscapes because they are the two main landscape categories used in the field, so results could easily be compared to previous findings (Hartig & Staats, 2006a, 2006b; Korpela, 2013; Wilkie & Stavridou, 2013a, 2013b). Additionally, this would allow us to examine whether both landscape categories show a similar pattern of results regarding  $H_2$  and  $H_3$ .

Previous literature shows a positive relationship between familiarity, landscape preference and restorativeness (Berto, Barbiero, Barbiero, & Senes, 2018; Hernández, Hidalgo, Berto, & Peron, 2001; Lothian, 2017; Purcell, Peron, & Berto, 2001; Tang, Sullivan, & Chang, 2015). We understand that familiarity with a certain kind of landscape comes with direct or indirect experience of it. Thus, people living in a specific region or country are expected to be more familiar with its landscapes, geographical and biological features. Hence, we hypothesized that local landscapes would obtain greater preference ratings and would be evaluated as more restorative than non-local ones ( $H_2$ ).

In line with results of past studies on this issue, we hypothesized that preference (Hartig & Staats, 2006a; Staats, Kieviet, & Hartig, 2003; van den Berg, Koole, & van der Wulp, 2003), place attachment

(Ratcliffe & Korpela, 2016a, 2016b; Ruiz et al., 2013) and place identification (Morton et al., 2017a, 2017b; Ysseldyk et al., 2016) would positively predict expected restoration scores for local landscapes ( $H_3$ ). This hypothesis was tested only for local landscapes because attachment and identification measures relate to an actual person-place bond that requires at least some familiarity or experience with the place. This could not exist for the non-local landscapes located in a distant country and therefore a real bond could not be measured in that case.

We conducted the study in Chile and the Basque Country due to the fact that they are morphologically similar, with mountains and coastlines being key parts of the landscape in both countries. Moreover, given that Spanish is one of the official languages in both countries, the homogeneity of the questionnaire was guaranteed. Running the study in two different countries, using landscape photographs from each location easily allowed us to create the local/non-local experimental manipulation of interest.

## 2. Methods

### 2.1. Participants and design

We recruited 200 university students from the University of the Basque Country and the University of Chile campuses (100 from each). The sample was composed of 113 women (56.5%) and 87 men with a mean age of 21.94 years ( $SD = 3.69$ ). They were studying different programs (i.e. Psychology, Engineering, Anthropology, Geography, Sciences, Biology etc.).

The study presented here is a 2 (landscape: natural, urban)  $\times$  2 (place: local, non-local) within-subjects factorial design. Therefore, the design consisted of four different experimental conditions.

### 2.2. Materials & instruments

#### 2.2.1. Stimuli

We collected 165 Basque and Chilean natural and urban photographs from our personal photo archives by establishing two main landscape categories beforehand: a green natural path for the natural domain and an urban square or plaza for the urban one. These categories aimed to represent one of the most common experiences of interaction with each domain: walking through a path in nature and visiting an urban plaza. The final set of images was selected by considering the degree to which each image represented the geographical areas. They included, both for Chile and the Basque Country, common vegetation for the natural domain, as well as configurations and designs that are typical and well known for the urban domain.

We selected two pictures for each domain. Figs. 1 and 2 depict the selected pictures. We used four pictures, relatively fewer than in other studies (Hofmann, Westermann, Kowarik, & Van der Meer, 2012; Schirpke, Tasser, & Tappeiner, 2013; White & Gatersleben, 2011; Zhao,



Fig. 1. Pictures of Natural Green Paths (Basque - left side; Chilean - right side) used in the study.



Fig. 2. Pictures of Urban Squares (Basque - left side; Chilean - right side) used in the study.

Wang, Cai, & Luo, 2013). This allowed the collection of a greater amount of data per picture (more items and variables) in order to explore the hypotheses of the study. Furthermore, the use of a small sample of pictures is not an uncommon practice in the field (Khew, Yokohari, & Tanaka, 2014; Tang et al., 2015). The main reason behind that decision was to use an extensive representation of restoration using an 8-item scale, in contrast to other studies that have operationalized restorative potential with one only statement (Abkar, Mustafa Kamal, Maulan, Mariapan, & Davoodi, 2011; Nordh, Hartig, Hagerhall, & Fry, 2009; Pazhouhanfar & Kamal, 2014).

With respect to Chile, the natural landscape photograph depicted the Araucanía forest, a national symbol of a native southern landscape. The urban landscape picture depicted one of the main urban plazas (Plaza de Armas built in 1541), including Chilean colonial buildings and the neoclassical Santiago Metropolitan Cathedral (built at the end of 18th century). Regarding the Basque Country, the natural photograph depicted the humid and mild green forests characteristic of the Cantabrian zone. The urban landscape picture depicted a plaza dominated by a neo-gothic church and featuring native vegetation. For the natural pictures, both green paths go through native forests made up of beech (*Fagus sylvatica*) and monkey puzzle (*Araucaria araucana*) trees, respectively.

In the case of the urban settings, both of them showed a similar design. They depicted squares designed for leisure and pedestrian transportation, isolated from traffic, with urban equipment (i.e. benches) and a moderate level of vegetation (grass, trees and flowers). Similarly, both places are bordered on one side by a church. Following Zucker's classification of squares (Zucker, 1959), these serve as good examples of enclosed squares surrounded by the urban matrix with little domination by religious buildings. All the images included path and routes, following the idea that a landscape is not merely aesthetical and visual, but rather implies movements and lived-embodied experiences (see research by Heft, 2010, and Menatti & Casado, 2016 regarding relationships between the concept of affordance and landscape perceptions).

### 2.2.2. Measures

The questionnaire was comprised of four different sections, one per experimental condition. The first part of each section contained six items to be answered on a 0 to 5 Likert scale (0 = not at all, 5 = totally). These items, adapted from the Place Attachment and Identification Scale by Ruiz et al. (2011), measured preference (1 item, "I like this place"), place attachment (3 items, e.g. "If I do not have the chance to visit these kinds of places, I miss them") and place identification ("I identify myself with this place").<sup>3</sup> Finally, we included one

<sup>3</sup> According to the original version of the scale (Ruiz et al., 2011), the items selected for this study were: 1) item 1 (preference), 2) items 3 and 4 (attachment) and, 3) item 7 (identification). Item number 3, whose original form was

item to measure whether the picture showed a landscape that is characteristic or representative of the country of origin of the participant ("This place is representative of the Chilean/Basque landscape"). Place attachment items showed fair to good internal consistency along landscape conditions (Cronbach's  $\alpha = 0.80-0.87$ ).

The second part of each section began with a short vignette asking participants to think of themselves after working hard on a project, and then to imagine how they would feel if they visited the place that appeared on the screen. The vignette text was: "Now please imagine that you have been working hard in a project that required an intense effort. After working for some hours, you feel tired and notice that it is difficult for you to stay concentrated and make any progress on the task. Besides, you feel a little stressed and realize that the good mood you had before has faded and now you are somewhat nervous and moody. Imagine that you go to the place that appears in the picture for a while and think about how you would feel after contemplating the landscape and walking in it using the scale that appears below". After reading the text and imagining themselves in such a psychological state, we invited them to fill in the Spanish adaptation of the Restoration Outcome Scale (Subiza-Pérez, Vozmediano, & San Juan, 2017; ROS-S, e.g. "I would feel calmer after being here") with the same score range used in section 1. The ROS-S, originally developed by Korpela, Ylén, Tyrväinen, & Silvennoinen (2008; 2010), measures the main dimensions of restorative experiences: Relaxation and Calmness, Attention Restoration, Clearing one's Thoughts and Reflection. This scale showed very good internal consistency ratings (Cronbach's  $\alpha = 0.93-0.96$ ).

### 2.3. Procedure

The study received ethical approval by the Committee for Research with Human Beings at the University of the Basque Country (ref.no M10\_2016\_221). We invited participants from the aforementioned university campuses to voluntarily participate in a research session. Interested students were led in groups between six and 26 participants ( $M = 13.33$ ,  $SD = 6.26$ ) to a lecture hall to receive more information, as well as instructions about how to complete the questionnaire. Due to the fact that no personal data were gathered in the questionnaire, a written informed consent was not required from participants, following institutional ethics guidelines. However, participants were given and

(footnote continued)

"when I've been away for a while, I really want to come back" was modified for this study and presented as "I wish to have life experiences in that place". Item number 4, whose original form was "when I'm away, I miss this neighbourhood" was adapted to "if I do not have the chance to go to this kind of place, I miss it". We conducted these changes because we expected that, even if participants recognized the landscapes from their countries as such, they may have no direct experience with them – as they usually do with their neighborhoods – and thus the original formulation of items 3 and 4 might appear odd.

explained an information sheet describing the nature of the study, the implications of taking part in it and contact information. After orally expressing their willingness to participate, they filled in the demographic and general information section of the questionnaire. Then, the first picture was displayed, and participants were asked to answer the related section of the questionnaire. After all participants had finished responding, the next picture was shown, repeating the procedure until all four pictures were shown and the questionnaire was fully completed.

This procedure took between 10 and 15 min depending on participants' speed of filling out the questionnaire. We randomized the order of picture presentation for each of the sessions. There were no repeated picture sequences in the within-campus or the inter-campus level. Participation in the study was voluntary and compensation was not offered.

## 2.4. Data analysis

We ran a factorial (place x landscape) repeated measures MANOVA with a Bonferroni correction including all the study variables that allowed us to check if 1) local landscapes scored more highly on representativeness scores than the non-local landscapes (first manipulation check), 2) local landscapes scored more highly on place attachment and identification than the non-local landscapes (second manipulation check), 3) natural landscapes were preferred over urban ones and seen as more restorative ( $H_1$ ) and, 4) local landscapes received higher scores on preference and expected restorativeness ( $H_2$ ). We used  $\eta^2$  as an effect size indicator for these contrasts.<sup>4</sup> Finally, we constructed Linear Regression Models to explain the restorative potential of the local landscapes through preference, attachment and identification scores in order to test  $H_3$ .

## 3. Results

### 3.1. Manipulation checks

Table 1 shows the scores for each variable and landscape included in the study. A repeated measures factorial MANOVA indicated that local landscapes were rated by participants as more representative of their own landscapes [ $F(1, 199) = 350.70, p < .001, \eta^2 = 0.64$  (95% CI = 0.56–0.69)] and elicited greater place attachment [ $F(1, 199) = 66.63, p < .001, \eta^2 = 0.25$  (95% CI = 0.15–0.34)] and identification [ $F(1, 199) = 47.85, p < .001, \eta^2 = 0.19$  (95% CI = 0.10–0.19)] than non-local ones.<sup>5</sup>

### 3.2. Comparisons of preference and expected restoration in local and non-local landscapes

First, natural landscapes obtained a higher score on preference [ $F(1, 199) = 320.09, p < .001, \eta^2 = 0.62$  (95% CI = 0.54–0.68)] and expected restoration [ $F(1, 199) = 451.73, p < .001, \eta^2 = 0.69$  (95% CI = 0.63–0.74)] ratings than did the urban ones. The size of these two effects is large. These results fully support  $H_1$ . Regarding  $H_2$ , we found two first order interactions (place x landscape category) for preference [ $F(1, 199) = 40.79, p < .001, \eta^2 = 0.17$  (95% CI = 0.09–0.26)] and expected restoration [ $F(1, 199) = 56.27, p < .001, \eta^2 = 0.22$  (95% CI = 0.13–0.31)]. Both effects were medium in size. This indicates that local natural landscapes were more preferred and evaluated as more restorative than non-local natural landscapes, whereas urban local

<sup>4</sup> Even though some previous literature describes the sensitivity of this indicator for studies with unbalanced or small samples (Lakens, 2013; Levine & Hullet, 2002), the within-subjects design of this study and the large size of the sample avoid possible concerns about the overestimation of the effects.

<sup>5</sup> According to  $\eta^2$ , these differences were large for representativeness and medium for place attachment and identification.

**Table 1**

Mean ( $\pm 1$  SD) Representativeness, Attachment, Identification, Preference and ROS scales scores per landscape.

Natural landscapes	Local	Non-local
Landscape representativeness (0–5)	3.71 (1.20)	1.90 (1.45)
Attachment (0–5)	3.37 (1.06)	2.73 (1.18)
Identification (0–5)	3.16 (1.41)	2.46 (1.63)
Preference (0–5)	4.29 (0.86)	3.92 (1.05)
ROS (0–5)	3.78 (0.95)	3.33 (1.24)
Urban landscapes	Local	Non-local
Landscape representativeness (0–5)	2.99 (1.46)	1.14 (1.44)
Attachment (0–5)	1.96 (0.90)	1.55 (1.20)
Identification (0–5)	1.75 (1.41)	1.19 (1.36)
Preference (0–5)	2.41 (1.13)	2.86 (1.22)
ROS (0–5)	1.34 (0.98)	2.01 (1.26)

landscapes were less preferred and less restorative than the urban non-local ones. These findings support  $H_2$  for the natural landscapes only.

### 3.3. Regression analyses to predict expected restoration through preference, attachment and identification

As stated in section 2.4, we conducted regression analyses to predict the expected restoration for each of the local landscapes. Table 2 shows the Pearson correlations between the three predictor variables and the outcome. The model for natural local landscape was statistically significant [ $F(3, 196) = 64.60; p < .001$ ] and predicted a significant amount of the variance in ROS-S (49%). All three predictors were positively and significantly associated with ROS-S scores, meaning that the greater preference, attachment and identification scores, the greater the expected restorativeness of the landscape. Results of this analysis are shown in Table 3. Tolerance and VIF coefficients results were far from the multicollinearity risk level (Sheskin, 2007: 1464).

Similarly, the model for the urban local landscape was statistically significant [ $F(3, 196) = 34.03; p < .001$ ] and predicted a significant amount of the variance in ROS (33%). All three predictors were significantly related to expected restoration. Preference and attachment were significant positive predictors of ROS-S scores, and identification was a significant negative predictor. Table 4 shows the results of this analysis. Tolerance and VIF coefficients did not reach the multicollinearity risk level (Sheskin, 2007: 1464).

## 4. Discussion

### 4.1. Study overview and results

This study examined the roles of place attachment and place identification in landscape preferences and expected restoration. Results indicated that: 1) not-surprisingly, natural landscapes were preferred and assessed as more restorative than urban ones, 2) local natural landscapes were preferred and assessed as more restorative than non-local natural ones, 3) local urban landscapes were less preferred and assessed as less restorative than non-local urban ones, 4) place attachment positively and significantly predicted the assessment of the restorative properties of local landscapes (both natural and urban), and 5) place identification was a positive and significant predictor of restorativeness for the local natural landscape and a negative one for the local urban landscape. Therefore, these results fully supported  $H_1$  and  $H_3$  but only partially supported  $H_2$ , which was confirmed only for natural landscapes.

The consistent effect of attachment as a predictor of expected restoration in regard to  $H_3$ , contrasts remarkably with the one of place identification. Classic studies on the perception of landscapes reported that familiarity with landscapes of little aesthetic potential and/or

**Table 2**  
Pearson r correlations between predictor variables and ROS for natural and urban local landscapes.

	Preference	Attachment	Identification
Natural local landscape ROS	.62***	.64***	.48***
Urban local landscape ROS	.54***	.38***	.07

Note: \*\* =  $p < .001$ .

**Table 3**  
Regression model for expected restoration in natural local landscape.

	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Constant	0.67	0.26		2.59	.01
Preference	0.39	0.07	0.36	5.34	< .001
Attachment	0.29	0.07	0.32	4.07	< .001
Identification	0.13	0.06	0.15	2.25	.026

Note: Adjusted  $R^2 = 0.49$ .  $N = 200$ . Preference, attachment and identification were used as predictors of expected restoration.

**Table 4**  
Regression model for urban local landscape.

	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Constant	0.19	0.16		1.19	.236
Preference	0.41	0.06	0.47	7.13	< .001
Attachment	0.29	0.08	0.26	3.49	.001
Identification	-0.16	0.06	-0.19	-2.82	.005

Note: Adjusted  $R^2 = 0.33$ .  $N = 200$ . Preference, attachment and identification were used as predictors of expected restoration.

urban landscapes did not increase their preference (Canter & Thorne, 1972; Kaplan & Herbert, 1988; Nasar, 1984). This could be also true for the present study, where both urban landscapes were seen as far less restorative than the natural ones ( $\eta^2 = 0.69$ ). On the contrary, the positive association between identification and expected restoration for the natural landscape easily aligns with previous results positively linking familiarity with preference and restorativeness (for a review, see Lothian, 2017). These results could be interpreted using one of ART's basic premises. Kaplan and Kaplan (1989) asserted that, to be restorative, a place should foster the feeling of being away from one's every day's context. Subsequently, it may be that – in a sample of urban citizens – nature readily contributes to the experience of that psychological distance. Following this line of thought, local urban landscapes that are expected to form a part of the person's daily environment, might be easily associated to sources of attentional fatigue and stress and thus be perceived as less restorative. This former explanation plausibly explains why place identification and expected restorativeness may be negatively associated in local urban environments.

Another issue that deserves mention is the observation that, regardless of the direction of the prediction, place identification showed a smaller association with expected restoration than did place attachment. This aligns with some recent works that have found that the emotional components of place bonding are more strongly associated with restorative outcomes than are cognitive ones (Knez & Eliasson, 2017; Knez, Sang, Gunnarsson, & Hedblom, 2018).

#### 4.2. Theoretical and methodological implications

This study supports the theoretical importance of personal variables, such as place attachment and identification, in predicting the restorative potential of a landscape. Results showed that when attached to a landscape, people tend to evaluate its restorative potential as higher in comparison to personally non-significant landscapes.

Within the field of restoration research, this study provides evidence beyond the traditional evolutionary explanations of perception of landscapes and cognitive and affective restoration processes. It thus contributes to the growing body of research investigating the role of personal, social and cultural variables (Hägerhäll et al., 2018; Knez & Eliasson, 2017; Knez et al., 2018; Morton et al., 2017a, 2017b; Qureshi et al., 2013; Ratcliffe & Korpela, 2016a, 2016b; Wilkie & Stavridou, 2013a, 2013b; Ysseldyk et al., 2016). Our study contributes to this emerging line of research by showing that place attachment and place identification are significantly linked to the expected landscape restoration in natural and urban settings. The inclusion of such variables will help to frame perceptions and experiences of landscapes as complex processes in which different psychological, cultural and physical elements are intertwined (e.g. see the concept of processual landscape by Menatti and Casado, 2016; see also Dupré, 2010).

#### 4.3. Limitations

We should acknowledge some limitations. Even though the selected landscapes contained many distinctive elements that are familiar to participants (e.g. native plants or urban patterns), it might be the case that participants had never been there or actually known them. Therefore, one may argue that the bonding to those landscapes might have been more cultural or symbolic than psychological. However, we understand that this limitation is inherent to any perception study on landscape properties that relies on audiovisual stimuli. One possible way of overcoming this issue – not without certain limitations too – could be to work with pictures of landscapes taken by the participants in places with which they are bonded. In addition, we should specify that attachment and identification measures were only composed of three and one item respectively; however, these items were selected from the only scale available in Spanish with remarkable reliability and validity guarantees (Ruiz et al., 2011).

Secondly, we did not assess direct experiences within the places (e.g. a walk or in situ contemplation), as participants rated pictures shown on a screen. We are aware and agree on the limits of the visual approach to the perception of landscapes and in the evaluation of restorativeness (see for instance Heft & Nasar, 2000). However, there is meta-analytic evidence of the value of both picture-based and in situ methodologies for evaluating landscapes qualities (Stamps, 1990, 2010) and we suggest that in landscape perception studies both approaches should be considered.

Furthermore, we should consider that landscape preferences are related to cultural elements and, namely, to images. For instance, history of landscape paintings, history of art, and aesthetics have played major roles in influencing landscape preferences (Cosgrove 1997). We thus recommend future studies to consider how cultural and media elements influence perception.

#### 5. Conclusion

This study examined landscape preferences and perception, and found that person-place bonding affects preferences and the perception of its restorative properties. We demonstrated that place attachment consistently and positively predicted the assessment of the restorative properties of local landscapes. However, the role of place identification was not that straightforward. According to our results, it positively contributed to expected restoration of the local natural landscape but was a negative predictor for the local urban landscape.

Our study focused on the role of two specific psychological variables but future studies could include a wider set of personal, social and cultural variables far beyond them. In this sense, personality traits could be of great use here, as some initial studies have shown (Felsten, 2014; Johnsen, 2013; Meagher, 2016). Furthermore, the exploration of cultural values (Schwartz 1992) might also offer a relevant contribution to this field of study.

## Conflicts of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Authors contribution

Laura Menatti and Mikel Subiza-Pérez contributed equally to this paper as first authors in all the steps of the process (design, sample recruiting, analyses and writing of the manuscript). Arturo Villalpando-Flores, Laura Vozmediano and César San Juan collaborated in the design of the study and the statistical analyses of the results. They also made suggestion to previous versions of the manuscript and accepted the current version of it.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jenvp.2019.03.005>.

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