Scientific Research and Essays Vol. 6(9), pp. 1991-1997, 4 May, 2011
Available online at http://www.academicjournals.org/SRE
DOI: 10.5897/SRE11.171
ISSN 1992-2248 ©2011 Academic Journals

Full Length Research Paper

Determining the visual preference of urban landscapes

Mahdieh Abkar[1]*, Mustafa Kamal M. S.[1], Suhardi Maulan[1] and Seyed Rasoul Davoodi[2]

[1]Department of Landscape Architecture, Faculty of Design and Architecture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.
[2]Department of Civil Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia.

Accepted 21 April, 2011

This study attempted to determine people's visual preference for urban landscapes in Malaysia. In an experimental study, 120 students from three departments in Universiti Putra Malaysia rated 4 predictors of preference (Coherence, complexity, legibility and mystery) and a criterion variable (preference) of 24 color slides depicting urban built landscape (UBL) and urban natural landscape (UNL) scenes. The results of this study showed that the mean preference and the four predictor ratings were significantly higher for UNL than UBL and it confirmed the role of urban nature in urban landscapes. Also, the results showed that all the predictors of preference could explain a large amount of variance in preference, except for "legibility" in UBL. "Mystery" and "complexity" are found to be the most influential predictors of preference in both categories. Furthermore, "coherence" in UNL notably predicts more preference than in UBL. However, knowledge about preferences and the characteristics of urban landscapes contributes to the designing of an enjoyable environment by designers or planners, and to the decision makers who manage the landscape settings for their users.

Key words: Preference, urban landscape, visual preference, predictors of preference.

INTRODUCTION

One of the basic demands of modern society is to have a high quality of life, particularly in urban settings (Simoni, 2006). In this respect, a good management of urban landscapes would have major influence in developing a quality environment (Tahir and Roe, 2006). Thus, there is a need to have beautiful and visual preferred landscapes. In order to have preferred landscapes, specific design criteria should be adopted based on the people's preference for a particular landscape. However, little is known about people's visual preferences for urban landscapes in Malaysia.

Landscape preference, as an approach to landscape assessment, is an evaluation on how people perceive the surrounding environment and what preferred landscape people have in mind. The visual landscape is an important part of humanity's everyday life experience (Bulut and Yilmaz, 2009). Visual preference for landscapes has received a lot of attention for the past half century and a number of theories explaining landscape visual preference have emerged from different disciplines, such as landscape architecture, geography, forestry, recreation and psychology (Daniel and Vining, 1983; Zube et al., 1982).

One of the theories is the informational processes theory (Kaplan and Kaplan, 1989; Kaplan, 1982). This theory is based on a cognitive or psychological model, which views humans as information processors and seeks to understand the cognitive processes and relevant variables that determine people's preference to an environment. The informational processes theory explains that information is central to all human experience and survival (Kaplan et al., 1998) and the environment is a source of information. The information in the environment is derived from the landscape contents and the organization or spatial arrangement of these contents.

The role of landscape content in people's preference was realized in a research when scenes, with a natural environment, recorded consistently higher preference ratings than the scenes that have little or no nature at all; and natural environments, particularly green spaces, were found to be effective content for people's preference

*Corresponding author. E-mail: mahdieh54ir@gmail.com.

(Hartig and Staats, 2006; Kaplan, 1977; Kaplan et al., 1972; Staats et al., 2003). Natural settings are environments provided by places such as parks and gardens in cities. People's preference for urban natural landscapes in Malaysia is not yet known, consequently leading to a lack of green spaces in urban areas due to buildings and roads in developing urban areas, particularly in Kuala Lampur (Lilian et al., 2002; Mansor and Said, 2008). Recently, researchers showed the relationship between nature and people's health (Abkar et al., 2010a, 2010b; Ottosson and Grahn, 2008; Stigsdotter et al., 2010; Van Den Berg et al., 2010).

In addition to nature as an important content of preferred environments, informational processes theory states that the arrangement of the contents in a visual landscape significantly affects people's preferences for landscapes (Kaplan et al., 1998; Kaplan and Kaplan, 1989). More importantly, the arrangement provides an understanding and potential exploration about a landscape. Together, understanding and exploration form the framework for the informational preference matrix (Kaplan et al., 1998; Kaplan and Kaplan, 1989). This preference framework argues that people perceive scenes or images in two and three dimensions, and there are four cognitive aspects of landscape that are essential in the appreciation of a landscape: "Coherence", "legibility", "complexity" and "mystery". Understanding is enhanced in environments that are coherent and legible, while they provide information that can help people make sense of the environment. Exploration is favored by landscapes that are complex and mysterious because of the variety of the elements or because of cues that imply that there may be more to be seen (Kaplan et al., 1998; Kaplan and Kaplan, 1989).

"Coherence" refers to scenes that have different landscape parts fitted together, providing a sense of order and assisting in directing attention. "Legibility" refers to landscape scenes where the elements are distinctive and easily identified. "Complexity" postulates the internal variation of the scenes' wealth of information and offers many different kinds of distinct elements in the scene. The "mystery" of a landscape scene promises the opportunity for viewers to go deeper into the landscape (Kaplan et al., 1998; Kaplan and Kaplan, 1989).

The informational processes theory has been empirically tested in many researches about people's preference for natural settings, urban areas, mix areas, as well as urban nature. The results of these empirical studies showed that the majority of people preferred natural scenes over built environments scenes (Hernandez et al., 2001; Kaplan et al., 1972; Laumann et al., 2001; Purcell et al., 2001; Staats et al., 2003; Stamps, 1996).

Many researches have been done to investigate the predictors of preference in natural settings. However, a study about preferences for urban nature showed that the predictors of preference could also be found in urban environments (Herzog, 1992). Few studies compared the predictors of preference between natural and urban settings. Kaplan et al. (1972), in a study found that the "complexity" of nature is less in the urban areas, and in another study (Kaplan, 1975), they found a negative relationship between "complexity" and preference towards urban environments. It stated that people did not prefer urban scenes, which were complex; however, "mystery" for natural scenes was rated significantly higher than for urban areas.

Collectively, work on visual preference landscape has determined that: (1) The nature and spatial arrangements of the observed landscape played an important role in people's preference of the surrounding environment; (2). The natural environment was consistently preferred than the built ones; (3) The predictors of preference could also be found in urban environments, and (4) The "mystery" in nature is more than the "mystery" in urban environments, while "complexity" is higher in urban environments than in natural ones. However, the role of nature and spatial arrangements in people's preference of urban landscapes in the two landscapes' categories, urban natural environment (UNL) and urban built environment (UBL), in Malaysia is not yet known. As such, the following hypotheses are addressed:

H_1: There is a significant difference in the preference between UNL and UBL.
H_2: There is a significant difference in the four predictors of preference between UNL and UBL.
H_3: There is a significant relationship between the four predictors of preference and preference.

METHODOLOGY

Participants

Participants for this study consisted of 120 undergraduate students (43 males and 77 females aged 19 to 25 years) from two faculties (design and architecture, and forestry) in University Putra Malaysia. Moreover, they voluntarily participated in the study.

Stimulus material

Twelve slides each and a total of 24 slides were shown from the categories of urban natural and urban built landscape. These images were selected from a pool of slides taken from scenes in and around the capital city of Kuala Lumpur. In order to reduce the influence of subjective preference to the scenes' selection and increase the landscape variance of the scenes, five panelists with landscape visual analysis training judged the photographs. The judges were asked to judge the landscape pictures based on their "coherence", "complexity", "legibility" and "mystery", according to Kaplan and Kaplan's information-processing theory definitions of the four variables (Kaplan and Kaplan, 1989). Judgments evaluation scenes were on 7-point Likert scales (1 - not at all; to 7 - a great deal). The purpose of this procedure was to ensure the use of all variables in the presented pictures. Thus, for each preference predictors of both UNL and UBL, the scores were averaged to an index score. On the basis of the index scores, 24 slides of urban built landscape (UBL) and urban natural landscape (UNL) were

chosen for use as visual stimuli in later investigations. Urban built landscape is represented by a set of 12 scenes that show a diversity of city landscapes with shopping streets, residential areas, transportation center, office buildings and hotels, modern high rises, etc., but with little vegetation. Urban natural landscape is represented by 12 scenes that prominently portray natural components, such as trees, shrubs, flowers, weeds, grass, as well as water.

Measures

Each participant is asked to rate the preference of each landscape, using the developed standard definitions of predictors of preference by Lee and Kozar (2009). It comprised 16 items measuring the four predictors of "coherence", "complexity', "legibility' and "mystery". We used this instrument, whereas standard definitions for assessing preference-matrix predictors may be difficult for most participants to understand and items should be straightforward, user friendly and free of jargon. Evidence showed that using positively and negatively worded items within the same scale can lead to differential response patterns. Therefore, this study used only positively worded items (Eys et al., 2007; Qingke et al., 2006; Pals et al., 2009; Weems et al., 2003). Thus, two items of "complexity" was revised. Nevertheless, items standard definition was slightly modified and their reliability (Cronbach's index of internal consistency) was calculated and compared to the reliability score of the original version. Further-more, an additional item assessed the target variable preference that was based on previous studies (Herzog and Bryce, 2007; Herzog and Kropscott, 2004; Herzog et al., 2003; Herzog and Stark, 2004; Nordh et al., 2009).

Each participant assessed each of the 24 settings with 17 items that include a target variable, preference and four predictors of preference (16 items). All items were rated on a 7-point Likert scale of agreement ranging from 1 (not at all) to 7 (a great deal). Consequently, all items were put in random order.

Procedure

Respondents were first briefed on the procedure of the study. After describing the task and getting informed consent, the first 5 slides were shown briefly without being rated. This was done to familiarize participants with the procedure; then the participants rated one practice slide. This procedure was designed to help all the subjects begin the actual experiment in a similar and stable condition so that possible biases might be reduced. The participants' task was to view the landscape slides as visual stimuli and to record their assessments of the variables of interest for each slide, while the slides were still being shown.

Respondents then rated each of the 24 scenes with 17 items, taking a break after every 6 scenes. These slides were presented in two orders. One was shown randomly with the constraint that no more than two slides of the same setting were in successive order. The second involved interchanging of the first order. The two slide orders were to reduce the effect of order on the results (Han, 2009; Herzog and Bryce, 2007; Herzog and Kropscott, 2004; Herzog et al., 2003). There were a total of six experimental sessions in order to incorporate enough subjects. Thus, all sessions were conducted in a room at the Faculty of Design and Architecture, University Putra Malaysia.

Analysis

For the research questions of this paper, the preference and four predictors of preference rating scores were studied. SPSS was used for descriptive statistics, reliability analysis and an independent sample t-test between two landscape categories, correlation analysis and regression analysis in each landscape categories. First, a reliability analysis was run for each of the subscales using Cronbach's alpha. Secondly, to validation study results, an independent sample t-test of preference and four predictors was run between UNL and UBL. Thirdly, the correlation was conducted to examine the associations between all the variables in each landscape category. The multiple linear regression analysis was performed with preference scores as the dependent variable and the four predictors of preference as the independent variable in each landscape categories. Unless noted otherwise, all analyses were based on the rating for each landscape picture.

RESULTS

Reliability analysis

A reliability analysis was performed for each of the subscales using Cronbach's alpha. The result showed a high internal consistency in line with earlier studies (Lee et al., 2009; Lee and Kozar, 2009); UNL: 0.85 for coherence, 0.83 for complexity, 0.83 for legibility and 0.89 for mystery; UBL: 0.84 for coherence, 0.84 for complexity, 0.86 for legibility and 0.90 for mystery.

Independent sample t-test of preference and four predictors of preference between UNL and UBL

An independent sample t-test was run to investigate preference and predictors between both landscape categories. The result showed that at $p<0.001$, the mean scores for all variables were reliably higher for UNL than for UBL (Table 1). Therefore, it was indicated that this measure may satisfactorily differentiate between UNL and UBL preference.

Correlation analysis

Table 2 contains the correlations among the rated variables in each landscape category. Preference, as the criterion variable, and all predictors of preference were highly correlated in both categories except for "legibility"; whereas all predictors of preference were highly correlated, except for "legibility", "complexity" and "mystery" in UNL and "complexity" in UBL.

Multiple linear regression analysis

The multiple linear regressions were used to see how the predictors worked. It was used to test the relationship of the four predictors of preference and the criterion variable (preference). Although some predictors had high correlation, there was no serious multicollinearity in the regression model. Some authors indicated that a regression model would have serious multicollinearity problems when the VIF is larger than 10, or tolerance is below 0.1 (Ho, 2006; Pallant, 2005). Tolerance range

Table 1. Mean (M) and standard deviations (S.D) and *p* for all variables in landscape categories.

Variable	UNL		UBL			
	M	S.D	M	S.D	t	*sig*
Preference	5.10	1.45	3.15	1.60	34.46	<0.001
Coherence	4.90	1.05	3.60	1.18	31.07	<0.001
Complexity	4.71	1.08	3.45	1.23	29.31	<0.001
Legibility	4.82	1.10	3.78	1.31	23.09	<0.001
Mystery	4.76	1.17	3.41	1.30	29.28	<0.001

p is the probability of the difference between the two landscape categories means.

Table 2. Correlations among the rating variables for each landscape category.

	1	2	3	4	5
Urban natural landscape (UNL)					
Preference	-				
Coherence	0.70**	-			
Complexity	0.71**	0.74**	-		
Legibility	0.59**	0.72**	0.67**	-	
Mystery	0.70**	0.72**	0.79**	0.60**	-
Urban built landscape (UBL)					
Preference	-				
Coherence	0.63**	-			
Complexity	0.73**	0.77**	-		
Legibility	0.57**	0.75**	0.73**	-	
Mystery	0.71**	0.72**	0.85**	0.65**	-

** p<0.01.

was from 0.21 to 0.44, so the model was not biased with any serious level of multicollinearity in UNL and UBL (Table 3).

Two regression analyses were run in both landscape categories. The results are reported in Table 3, showing that predictors of preference explain 60 and 57% of the variance of preference in UNL and UBL, respectively [UNL: F (4, 1435) = 526.52, p<0.001; UBL: F (4, 1435) = 466.86, p<0.001]. The results indicated that there were positive relationships between "preference" and each predictor. All the predictors were significant predictors of preference in both landscape categories except for "legibility" in UBL. The results indicated that "mystery" and "complexity" were influential predictors of the criterion variable in both categories, but "coherence" seemed to differ in predictive power as a function of the criterion variable in UNL and UBL. "Mystery" and "complexity" were found to be the most influential variables in UNL and UBL (UNL: $\beta_{mystery}$ = 0.31, t = 9.3, $\beta_{Complexity}$ = 0.26, t = 8.31, p<0.001; UBL: $\beta_{mystery}$ = 0.27, t = 9.2, $\beta_{Complexity}$ = 0.35, t = 9.35, p<0.001), while "coherence" had less explanatory power in predicting "preference" in UBL than in UNL (UNL: β = 0.26, t = 8.75, p<0.001; UBL: β = 0.12, t = 3.82, p<0.001). However, "legibility" also predicted PRP somewhat in UNL (β = 0.08, t = 3.04, p<0.01).

DISCUSSION AND CONCLUSION

In the present research, we introduced the role of urban natural landscapes on the "preference" of urban landscape as a landscape that people like. Furthermore, these were found to be effective predictors of landscapes that explained people's preference.

As a starting point for this study, the informational processes theory was used. According to the literature review, "preference" has been interpreted as an intuitive guide to effective functioning (Kaplan, 1982), while preference ratings have been accepted as reliable and valid measures of environmental evaluation for more than40 years (Kaplan et al., 1998; Kaplan and Kaplan, 1989). Many researchers have shown that natural settings were generally preferred to built settings (Hartig et al., 2003; Hartig and Staats, 2006; Herzog et al., 2003; Staats and Hartig, 2004; Staats et al., 2003). In line with

Table 3. Multiple Regression Analysis of four predictors of preference on Preference in UNL and UBL.

Predictor	*β*	*Pr*	t	*sig*	Tolerance
Urban natural landscape (UNL)					
Coherence	0.26	0.23	8.75	<0.001	0.33
Complexity	0.26	0.21	8.31	<0.001	0.30
Legibility	0.08	0.08	3.04	<0.01	0.44
Mystery	0.27	0.24	9.31	<0.001	0.34
R^2 = 0.60					
Urban built landscape (UBL)					
Coherence	0.12	0.10	3.82	<0.001	0.32
Complexity	0.35	0.24	9.35	<0.001	0.21
Legibility	0.03	0.02	0.89	0.38	0.38
Mystery	0.31	0.24	9.18	<0.001	0.27
R^2 = 0.57					

Note: (*β*) Standardized regression coefficients, partial correlations (*pr*).

this, the results of the present study showed that urban natural landscapes were found to elicit a stronger preference than urban built landscapes, and it confirmed the role of nature as the content of the preferred urban landscape. Furthermore, consistent with previous studies, “mystery” and “coherence” ratings in UNL were higher than in UBL (Kaplan, 1975; Kaplan and Kaplan, 1989). However, in disagreement to this, “complexity” and “legibility” ratings in some studies were also higher in UNL (Kaplan et al., 1972; Stamps, 2004).

Furthermore, the results showed that all the predictors of preference could explain a large amount of variance in preference, except for “legibility” in UBL. In consistency with previous studies in natural settings, “mystery” and “complexity” were found as the most influential predictors of preference in explaining “preference” in both categories (Gifford, 2002; Herzog, 1992; Herzog and Bryce, 2007; Kaplan and Kaplan, 1989; Stamps, 2004). Moreover, their effect in predicting preference in UBL is higher than UNL. Consequently, it shows that urban landscapes provide a potential for exploration either as a result of the variety of the elements or the individuals that are invited to participate more deeply, which then lead to highly preferred landscapes. Thus, their effect on preference in UBL is higher than UNL.

Another variable that predicted preference in this study was “coherence”. Coherence refers to the organization of the elements in the scenes. It was illustrated that “coherence” notably predicted “preference” in UNL than in UBL. It showed that the urban natural landscape can provide a well-organized and distinctive landscape, can help people make sense of the environment and can be helpful for designers and planners in designing urban nature. Coherence can be increased by repeating similar elements in the spaces, but the element cannot be repeated overwhelmingly because it will invoke boredom.

The last predictor of preference is “legibility”, in that earlier studies did not report a power to predict preference. In line with this, the findings of this study showed that “legibility” was not a predictor of preference in UBL and that it predicted preference somewhat in UNL. Therefore, landscapes that contained memorable and distinct elements made it easy for people to figure out where they were not liked by people and where they were not highly preferred. However, in agreement with a previous study, a high relationship was found between “legibility” and “coherence”.

In general, two exploration variables have the ability to maintain an individual’s interests: “mystery” and “complexity”, which seem to be the most consistent of the four predictors of preferences. Furthermore, “coherence”, as an understanding variable, is also essential especially in natural settings and “legibility” appears not to be a strong predictor. Nonetheless, “coherence” is found to be a distinctive predictor of the four variables in UNL and UBL.

Although the present study investigated the preference of urban landscape in Malaysia, it is not without limitations. First, this research focused on the role of natural landscapes and the four predictors of preference on urban landscapes; however, questions about role, other exiting variables and the amounts and com-binations of certain elements in the prediction preference of urban natural landscape and urban built landscapes still remain. Secondly, due to the limitation of time and resources, the effects of the demographic features of the respondents, such as age, gender, residence, education and occupation on their responses were not investigated. Thus, the influence of these variables also warrants attention in future studies.

Finally, photographic surrogates were used instead of a real environment. Kaplan and Kaplan (1989) noted several advantages in using surrogates as compared to *in situ* evaluations. These included the ability to compare

large number of scenes, better control over testing conditions and ease of conducting tests. The validity of photographs and slides representing the actual environment have been addressed in a number of studies on preference (Hull and Stewart, 1992; Laumann et al., 2001; Shuttleworth, 1980; Vining and Orland, 1989; Zube et al., 1975, 1987).

This research showed the role of urban natural landscapes and the arrangement of the contents in people's preferences for urban landscapes. Knowledge about preferences of urban landscapes is guidance for designers or planners to design an enjoyable environment and for the decision makers to manage landscape settings for their users. It may also provide opportunities to better understand the relationships between human preference and landscape features and aim to enhance the quality of life.

REFERENCES

Abkar M, Mustafa Kamal, MS.Mariapan M, Maulan S (2010a). Influences of Viewing Nature through Windows. Austr. J. Basic Appl. Sci., 4: 5346-5351.

Abkar M, Mustafa Kamal MS, Mariapan M, Maulan S, Sheybani M (2010b). The Role of Urban Green Spaces in Mood Change. Austr. J. Basic Appl. Sci., 4: 5352-5361.

Bulut Z, Yilmaz (2009). Determination of waterscape beauties through visual quality assessment method. Environ Monit Assess., 154: 459-468.

Daniel TC, Vining J (1983). Methodological issues in the assessment of landscape quality. Human Behaviour and Environment. Advances in Theory and Research (USA), Plenum Press. New York, 6: 39-84.

Eys MA, Carron AV, Bray SR, Brawley LR (2007). Item wording and internal Consistency of a measure of cohesion: The group environment questionnaire. J. Sport Exercise Psy., 29: 395.

Gifford R (2002). Environmental psychology: Principles and practice, (3rd ed.). Colville, WA: Optimal books.

Han KT (2009). An Exploration of Relationships Among the Responses to Natural Scenes. Environ. Behav., 42: 243-270.

Hartig T, Evans GW, Jamner LD, Davis DS, Gärling T (2003). Tracking restoration in natural and urban field settings. J. Environ. Psychol., 23: 109-123.

Hartig T, Staats H (2006). The need for psychological restoration as a determinant of environmental preferences. J. Environ. Psychol., 26: 215-226.

Hernandez B, Hidalgo MC, Berto R, Peron E (2001). The role of familiarity on the restorative value of a place. Research on a Spanish sample. IAPS Bulletin. 18: 22-24.

Herzog TR (1992). A cognitive analysis of preference for urban spaces. J. Environ. Psychol. 12: 237-248.

Herzog TR, Bryce AG (2007). Mystery and Preference in Within-Forest Settings. Environ. Behav., 39: 779-796.

Herzog TR, Kropscott LS (2004). Legibility, mystery, and visual access as predictors of preference and perceived danger in forest settings without pathways. Environ. Behav., 36: 659–677.

Herzog TR, Maguire CP, Nebel MB (2003). Assessing the restorative components of environments. J. Environ. Psychol., 23: 159-170.

Herzog TR, Stark JL (2004). Typicality and preference for positively and negatively valued environmental settings. J. Environ. Psychol., 24: 85-92.

Ho R (2006). Handbook of univariate and multivariate data analysis and interpretation with SPSS, New York: Taylor & Francis Group.

Hull Iv, RB, Stewart WP (1992). Validity of photo-based scenic beauty judgments. J. Environ. Psychol., 12: 101-114.

Kaplan R (1975). Some methods and strategies in the prediction of preference. Landscape assessment, pp.118-129.

Kaplan R (1977). Patterns of environmental preference. Environ Behav., 9: 195.

Kaplan R.Kaplan S, Ryan RL (1998). With people in mind: Design and management of everyday nature, Washington, DC: Island.

Kaplan R, Kaplan S (1989). The experience of nature: A psychological perspective, Cambridge Univ. Pr.

Kaplan S, Kaplan R (1982). Cognition and environment: Functioning in an uncertain world. New York: Praeger.

Kaplan S, Kaplan R, Wendt JS (1972). Rated preference and complexity for natural and urban visual material. Percept Psychophys., 12: 354-356.

Laumann K, Garling T, Stormark KM (2001). Rating scale measures of restorative components of environments J. Environ. Psychol., 21: 31-44.

Lee Y, Ellis M, Chen A (2009). Designing Perferable Virtual Worlds: An Analogy of Space. AMCIS 2009 Proceedings, p. 349.

Lee Y, Kozar KA (2009). Designing usable online stores: A landscape preference perspective. Inform Manage., 46: 31-41.

Lilian TYC, Ho CS, Ismail S (2002). Some planning consideration of garden city concept towards achieving sustainable, 1: 261-279.

Mansor M, Said I (2008). Green infrastructure network as social spaces for well-being of residents in Taping, Malaysia. Jurnal Alam Bina,. p. 11.

Nordh H, Hartig T, Hagerhall CM, Fry G (2009). Components of small urban parks that predict the possibility for restoration. Urban For Urban Gree. 8: 225-235.

Ottosson J, Grahn P (2008). The role of natural settings in crisis rehabilitation: how does the level of crisis influence the response to experiences of nature with regard to measures of rehabilitation? Landsc. Res., 33: 51-70.

Pallant J (2005). SPSS survival manual, Open Univ. Press.

Pals R, Steg L, Siero FW, van der Zee KI (2009). Development of the PRCQ: A measure of perceived restorative characteristics of zoo attractions. J. Environ. Psychol., 29: 441-449.

Purcell T, Peron E, Berto R (2001). Why do preferences differ between scene types? Environ. Behav., 33: 93-106.

Qingke G, Dan H, Zhao W (2006). Effects of Positively and Negatively Worded Items in Personality Measurement. Acta Psychologica Sinica. 38: 626-632.

Shuttleworth S (1980). The use of photographs as an environment presentation medium in landscape studies. J. Environ. Manage., 11: 61-76.

Simoni T (2006). Urban landscape as a restorative environment: preferences and design considerations. Acta agriculturae Slovenica. 87: 325-332.

Staats H, Hartig T (2004). Alone or with a friend: A social context for psychological restoration and environmental preferences. J. Environ. Psychol., 24: 199-211.

Staats H, Kieviet A, Hartig T (2003). Where to recover from attentional fatigue: An expectancy-value analysis of environmental preference. J. Environ. Psychol., 23: 147-157.

Stamps AE (1996). People and places: Variance components of environmental preferences. Perceptual and motor skills. 82: 323-334.

Stamps AE (2004). Mystery, complexity, legibility and coherence: A meta-analysis. J. Environ. Psychol., 24: 1-16.

Stigsdotter UK, Ekholm O, Schipperijn J, Toftager M, Kamper-Jorgensen F, Randrup TB (2010). Health promoting outdoor environments-Associations between green space, and health, health-related quality of life and stress based on a Danish national representative survey. Scand J. Public Healt, 38: 411-417.

Tahir M, Roe H (2006). Sustainable Urban Landscapes: Making the Case for the Development of an Improved Management System. ALAM CIPTA, Int. J. Sustain. Trop. Design Res. Practice. 1: 17-24.

Van Den Berg AE, Maas J, Verheij RA, Groenewegen PP (2010). Green space as a buffer between stressful life events and health. Soc. Sci. Med., 70: 1203-1210.

Vining J, Orland B (1989). The video advantage: a comparison of two environmental representation techniques. J. Environ. Manage., 29: 275-283.

Weems GH, Onwuegbuzie AJ, Schreiber JB, Eggers SJ (2003). Characteristics of respondents who respond differently to positively and negatively worded items on rating scales. Assess. Eval.

Higher Educ., 28: 587-606.
Zube EH, Pitt DG, Anderson TW (1975). Perception and prediction of scenic resource values of the Northeast. Landscape assessment: values, perceptions, and resources. Dowden, Hutchinson and Ross, Inc., Stroudsburg, Pennsylvania, USA, pp. 151-167.
Zube EH, Sell JL, Taylor JG (1982). Landscape perception: research, application and theory. Landscape Plan., 9: 1-33.
Zube EH, Simcox DE, Law CS (1987). Perceptual landscape simulations: history and prospect. Landscape J., 6: 62.