

DRIVING FACTORS FOR VISUAL LANDSCAPE PREFERENCES IN PROTECTED LANDSCAPE AREAS*

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The paper brings about results of a questionnaire survey on visual landscape preferences of Czech respondents – visitors of several Protected Landscape Areas situated in the Czech Republic. To ensure a wide range of landscape scenes to be chosen from, a set of 24 photographs divided into two groups – open landscapes and rural settlement landscapes – was at disposal. Considering possible driving factors of visual landscape preferences, these groups were divided into six categories. For each of them, two subcategories were consequently established. While open landscapes were generally positively rated, low ratings were listed for rural settlement landscapes. Open landscape scenes involving a cultural or natural landmark were the most preferred, while photos depicting vast arable land or settlements were rated the lowest. In rural settlements, the level of typicality of the buildings in the scenes seemed to be crucial. Among demographic data, gender and place of residence were found to be driving factors for the landscape preferences of the respondents.

visual quality; scenic aesthetic assessment; landscape value; perception

INTRODUCTION

The attempts to define the aesthetic value of landscape have lasted for many years. This truly is not an easy task, because perception and preferences for landscape are a subjective thing (e.g. Ewald, 2001; Arriza et al., 2004). Nevertheless, due to collective experience with landscapes and common cultural and social backgrounds, it is very likely some aesthetic values are shared (Hagerhall, 2001; Palmer, Hoffman, 2001), at least within the context of a given era and culture.

From philosophical viewpoint, two paradigms of aesthetic value in landscape have been established. While in the past philosophers regarded the aesthetic value of landscape as inherent in the physical landscape (objective paradigm), it has been considered as a product of the mind and eye of the beholder (subjective paradigm) (Lothian, 1999; Daniel, 2001) in recent centuries. By analogy with these paradigms, the following two approaches to assessing landscape aesthetics were defined:

Expert-based approach. This kind of assessment follows prescribed rules/guidelines and systematically evaluates landscape aesthetics in terms of its physical features (e.g. form, line, texture, colour) and in terms of the relationships among these features (e.g.

variety, unity, vividness, harmony) (Daniel, 2001). The rules and guidelines for expert-based assessment are commonly defined by law or by a methodology, e.g. in England and Scotland by Swanwick et al. (2002), in the Czech Republic by Vorel et al. (2003) and Low, Michal (2003), and in the United States by DOT regulations (1981, 1991a, 1991b, 1999) in Clay, Smidt (2004). The aims of the expert-based assessment are several. In the Czech Republic, for example, the main objectives are to consider the effects of a proposed building, activity or changes in land use on landscape character or to provide diversified protection of landscape character while helping local governments to make appropriate decisions regarding landscape changes (Vorel et al., 2003).

Perception-based approach. This approach is based on the cooperation with a sample of respondents who make selection, rankings or ratings of sceneries presented usually in form of photographs (see e.g. Clay, Smidt, 2004; de la Fuente de Val et al., 2006; Tveit, 2009) (Daniel, 2001). The aim of such assessments is to reveal the aesthetic preferences of landscape values perceived by respondents. For example, it has been found out that some landscape elements, such as vegetation (Angileri, Toccolini, 1993), water (Dramstad et al., 2006; Bulut, Yilmaz 2009), presence of well-preserved

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man-made elements and mountains (Arriaza et al., 2004), or meadows and flowers (Clay, Daniel, 2000), as well as certain visual attributes, e.g. openness (Strumse, 1994), unity (Coetier, 1996), diversity (de la Fuente de Val et al., 2006), and naturalness (Palmer, 2004; Ode et al., 2009), are more appreciated by respondents than the others.

Studies on landscape preferences have also suggested that respondents' demographic characteristics, such as occupation (Rogge et al., 2007) or level of education (Angileri, Toccolini, 1993), may play an important role.

Whereas expert-based assessment is widely employed in landscape management practice, perception-based assessment is used mostly in the scientific field (Daniel, 2001). As conflicts appear when expert-based assessment diverges from public preferences (de la Fuente de Val et al., 2006), combining objective and subjective approaches has recently gained support (Daniel, 2001; Arriaza et al., 2004; Stephenson, 2008). One such a combination presented by Stephenson (2008) is termed the Cultural Value Model. This model includes three components: forms (consisting of physical, tangible, and measurable aspects of landscape), relationships (proposed to encompass the relationships by people-people interaction in the landscape, those generated by people-landscape interactions, and valued relationships within the landscape even where there is little or no direct human involvement), and practices (capturing the continuum of valued cultural practices and natural/human processes of the landscape). Involving associated communities to help experts understand the nature and range of cultural values (Stephenson, 2008) can support the role of perception-based assessment. Daniel (2001), on the other hand, states that the role of perception-based assessments should shift to diagnosing pathological preferences for aesthetic

qualities of landscape if those are inconsistent with other important values, such as those of an ecological, cultural or historical nature.

The aims of our study are as follows: (1) to find out what differences exist among respondents' preferences for perceived landscapes (open landscapes and rural settlement landscapes); (2) to determine if respondents have different preferences for different perceived landscape scenes and, if so, to establish the possible driving factors for these different preferences; and (3) to examine which of the respondents' demographic factors are determining for preferences for the perceived landscape value.

MATERIAL AND METHODS

Study area

Landscape scenes from four Central Bohemian Protected Landscape Areas (PLAs) were presented within the research, namely Blaník (with the area of 40 km²), Český kras (128 km²), Kokořínsko (272 km²), and Železné hory (284 km²) (see Fig. 1). PLA is a Czech national category intended to protect large areas with harmoniously formed landscapes, characteristic relief, and prevalence of natural or semi-natural ecosystems. The landscape in the study area consists mostly of nature-close elements (wooded areas, water bodies, meadows, rock formations, and the like), with some man-made elements (settlements, castles, monuments, etc.) and fields. Thus, the basic landscape characteristics of the studied areas are similar. Nevertheless, there are significant regional particulars, such as natural or cultural-historical landmarks or specifics of architecture.

Fig. 1. Locations of study areas within the Czech Republic

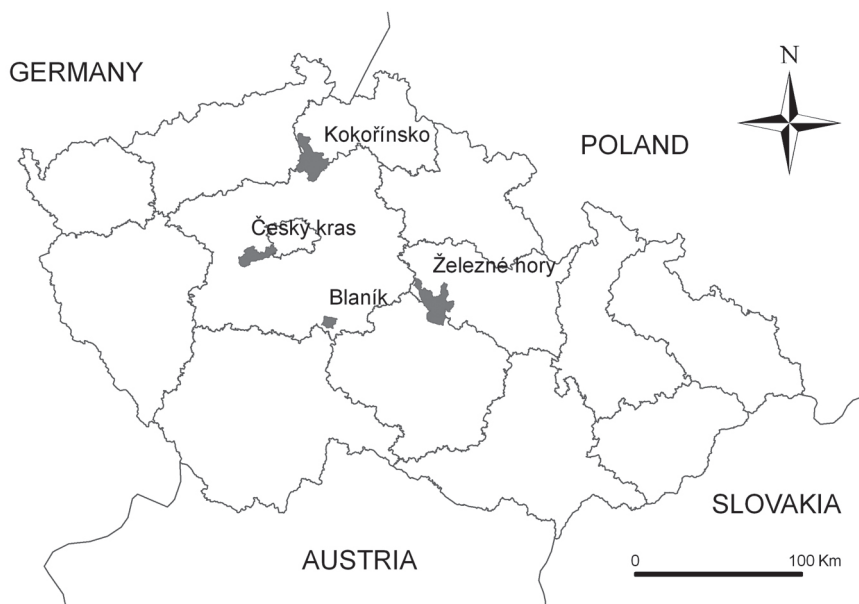


Table 1. Categorization of the scenes

Group	ID of category	Category
Open landscape	L1	agricultural landscapes with absence of greenery, without distinct natural or cultural-historical landmarks
	L2	agricultural landscapes with sufficient greenery, without a distinct natural or cultural-historical landmarks
	L3	landscapes with a cultural-historical landmark
	L4	landscapes with a natural landmark
	L5	landscapes with a settlement as a landmark
	L6	forest landscapes
Rural settlement landscape	S1	rural settlements with an agricultural character
	S2	rural settlements with a modified agricultural character
	S3	rural settlements with a mixed agricultural and suburban character
	S4	rural settlements with a suburban character
	S5	rural settlements with a modified suburban character
	S6	rural settlements with an urban character

Scenes and questionnaire

A set of about 400 pictures was taken in early summer of 2010 using a Panasonic Lumix DMC-TZ5 (Pannasonic, Osaka, Japan) compact camera, focal length 35 mm, aspect ratio 4:3. Later, an expert selection was made on the basis of light, weather conditions, and picture quality. From the final pool of 175 photos, stratified random selection was conducted to ensure a wide range of landscape types to be rated. The strata divided the pool into two groups (open landscapes and rural settlement landscapes) with 6 categories in each group (Table 1). The categories for open landscape (L1–L6) were set with respect to land-use, presence of interspersed greenery, presence of historical-cultural (castle, manor, ruin, etc.) and/or natural (rock formation, lake, etc.) landmarks and presence of settlements. The categories of rural settlement landscapes (S1–S6) were set with regard to the state of vernacular and form of modern architecture and its spatial solutions, including the approximate proportions of hardened surfaces and greenery (to see all the criteria, please contact Corresponding author). Based on distance to the horizon, distance to the landmark, and the total landscape area depicted in the picture, the open landscape categories were additionally divided into two subcategories according to proximity (c = close-up view, d = distant view). The decision on proximity level was made by consensus among all the authors. While based on appearance of facades, fences, land cover, and the like, as well as on the presence of disturbing elements, the rural settlement landscape categories were divided into two subcategories according to tidiness (t = tidy scenery, u = untidy scenery). Finally, 24 photographs were randomly selected (to send all the photographs, please contact Corresponding author). These pictures, 150 ×

112.5 mm in size, were presented to the respondents on a poster, as suggested by Arriza et al. (2004).

A study was conducted on the basis of a sociological survey while using a close-ended, self-administered questionnaire, as recommended by Babbie (2010). There were 16 questions to answer and the set of photographs to evaluate. The questions were divided into three parts. First, respondents were asked to provide information about their stay in the PLA. Then, they were asked to indicate their aesthetic preferences according to the following instruction: ‘Please, assess the landscape scenes shown on the following pictures according to how much you like or dislike each picture while using a scale from –3 to +3’ (presented in Czech). A seven-degree scale was used for evaluating the photographs, with the anchors ‘very ugly’ and ‘very nice’ at the two extremes. Finally, respondents were asked to state their basic demographic characteristics. It took respondents about 10 min to complete the questionnaire.

Our survey was held in the summer months of 2010. The respondents were approached directly on tourist trails in the study areas and were asked to complete the questionnaire on site. The sample was constructed using a self-selective statistical procedure, so-called ‘haphazard’ or ‘convenience’ sampling (Babbie, 2010), which means that all hikers passing a given spot during a given period were asked to participate. Out of 125 respondents approached, 117 completed and handed in the questionnaire. The respondents’ demographic characteristics are presented in Table 2.

Statistical methods

First and foremost, the differences between the two groups were tested separately using the Friedman test to discover potential relationships between vari-

Table 2. Demographic characteristics of the respondents ($n = 117$)

	Respondents	Valid percent
Gender	male	53.9
	female	46.1
Age groups	under 25	14.5
	26–50	70.9
	51 and over	14.5
Level of education	elementary school	5.3
	secondary school	48.2
	university education	46.5
Occupation	industry and construction	25.7
	ecology and nature protection	9.7
	agronomy and forestry	7.1
	others	57.5
Place of residence	urban	57.5
	rural	29.2
	suburban	13.3

ables. To confirm the internal reliability of the data, Cronbach's alpha was calculated for both landscape groups separately. Only generally accepted means were used to ensure validity. For the purpose of data analysis, each scene was considered to be a separate variable. A standard t -test or One-Way Analysis of Variance (ANOVA) was used for examining relationships. If applicable, a Scheffé's post-hoc test was carried out, as recommended by Bryman, Cramer (2009). Cases with missing values were excluded analysis by analysis. A standard level of significance setting ($P = 0.05$) was used.

RESULTS

In testing reliability, a high level of consistency was proven. For the rural settlement landscapes, Cronbach's alpha was 0.897. For the open landscapes, it was even higher at 0.916. Differences between scenes in both groups were proven not to be due to chance.

Preference scores for groups, categories, and subcategories

The histograms of expressed preferences (Fig. 2) show the overall results for the landscape groups. The strongly negatively skewed curve points to a generally very positive approach to the open landscapes. Rural settlement landscapes were rated dramatically lower. Unlike open landscapes, respondents did not hesitate to use the 'ugly' spectrum of the scale.

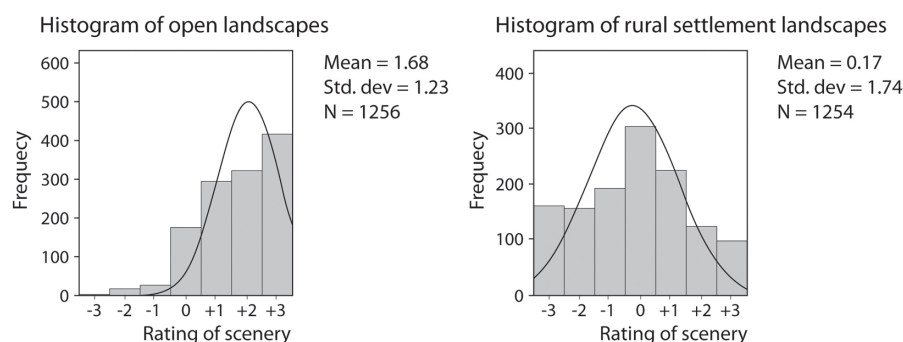
The results for the landscape categories are shown in Table 3, sorted in descending order according to visual quality, as expressed by the respondents. In open landscapes, presence of a cultural-historical and natural landmark was highly rated (L3, L4), while landscapes with a settlement as a landmark and agricultural landscapes were rated the lowest (L1, L5). In the rural settlement landscapes, categories were created according to typicality of rural areas (S1 = most typical/traditional – vernacular, S6 = non-typical – urban). Respondents scored the scenes in the same order with the exception of category S4, which outscored category S3.

Testing proximity, a significant influence on preferences was found only for landscapes with a natural landmark (L4) and landscapes with a settlement as a landmark (L5). In the subcategory of tidiness, tidy scenes were always rated higher. A significant influence was registered for the top three rated categories. The better a category was rated, the more significant the influence appeared. Moreover, tidy scenes often outscored untidy scenes of a more typical category. Samples of the highest- and lowest-rated photographs are shown in Fig. 3.

Preferences and respondents' demographic characteristics

Examining the influence of gender on aesthetic preferences shows that women generally awarded higher ratings for scenes than did men (in 21 out of 24 cases). The difference was significant in four cases with the highest standard deviation (low-rated scenes – settle-

Fig. 2. Histograms of expressed preferences



ments with a modified suburban or urban character). Place of residence also turned out to have a significant influence in four cases (L1c, L1d, L2d, and L5c). Moreover, some repeated patterns were evident. In 18 out of 24 cases, residents from the countryside rated scenes the highest, generally followed by residents from suburbs (13 cases). In 5 cases, suburban residents rated scenes the highest followed by countryside residents. In only 1 case urban residents awarded a scene the highest average rating while residents from the countryside rated it the lowest (S1t). Apart from the aforementioned results, no truly substantial links between demographic characteristics and preferences were discovered. Occupation, level of education, and age did not prove to be of any significant importance in relation to aesthetic preferences.

DISCUSSION

Even though the study was designed on the basis of extensive background research consisting of similarly focused studies, due to its character and limited resources it was not possible to avoid all biases. Owing to the study area, the rated scenes were mostly composed of landscapes that have suffered no extreme damage. That fact limited the presence of landscape visual qualities. The scenes from open landscapes did not include any industrial zones, mining sites or suburban zones, which generally reduce the visual quality of a scene (Angileri, Tocolini, 1993). Furthermore, the scenes of rural settlement landscapes included only inhabited houses and areas. There were no brownfields or devastated or industrial

Table 3. Summary of preferences scores for individual categories

ID of category*	Mean	SD
L3	2.23	0.988
L4	2.03	1.116
L6	2.00	1.141
L2	1.47	1.187
L5	1.39	1.231
L1	1.04	1.326
S1	1.86	1.253
S2	0.12	1.371
S4	-0.11	1.233
S3	-0.46	1.334
S5	-1.11	1.662
S6	-1.31	1.494

*for names of groups and categories see Table 1; SD = standard deviation

buildings. When interpreting the results, one should also be aware that the sample group was formed of hikers, not unequivocally typical representatives of the general public.

On the other hand, the sample and method used for the survey could be of use in practical landscape management, namely for the marketing of PLAs or other valuable or protected areas. The survey provided data on specific preferences of visitors or specific groups of visitors that should be targeted. It is important to note, however, that general preferences should not be considered a main criterion in landscape protection. Low preferences, on the other hand, should be used to educate the visitors that these scenes are valuable



Fig. 3. Sample of the highest- and lowest-rated photographs

Each photograph is marked according to the following key: L = open landscapes, S = rural settlement landscapes; the number refers to the category (see Table 1); c = close-up view, d = distant view, t = tidy scenery, u = untidy scenery. Open landscape: L4c = the highest-rated photograph (mean = 2.50; SD = 0.810), L1c = the lowest-rated photograph (mean = 0.94; SD = 1.397). Rural settlement landscape: S1t = the highest-rated photograph (mean = 2.33; SD = 0.984), S6u = the lowest-rated photograph (mean = -1.41; SD = 1.450)

for other reasons (including their ecological, cultural, or historical values), as mentioned also by Daniel (2001).

Driving factors of visual preferences

Some of the scenes tested the respondents' attitudes toward various human activities in open landscapes. We generally found that man-made elements such as settlements and scenes showing human agricultural activities, i.e. less natural landscapes, were given low ratings. Palmer (2004), Ode et al. (2009), and Sklenicka, Molnarova (2010) also came to the conclusion that naturalness generally tends to be highly rated (with certain exceptions). Clay, Smidt (2004) and Bulut, Yilmaz (2008) warned, however, that natural landscapes are not necessarily preferred. In our study, some landscapes with man-made elements also yielded higher ratings. Above all, our results suggest that cultural-historical landmarks have a positive influence on the perception of open landscape sceneries. Some other authors have also concluded that man-made elements can improve the perceived quality of scenery. Fyhr et al. (2009) give an example of coastal hamlet scenes that are highly rated, while Arriaza et al. (2004) mention scenes with typical houses.

Although we did not conduct a statistical analysis of the correlation between preferences and amount of vegetation, the results show that categories with higher representation of greenery are, for the most part, more highly rated in open landscapes as well as in rural settlement landscapes. Angileri, Toccolini (1993) and Arriaza et al. (2004) arrived to the same conclusion. Although the amount of vegetation can be a strong predictor of landscape preferences, we agree with Coetier's (1996) conclusion that the type of environment also plays a significant role. In our study, the second most highly-rated open landscape scene depicts a castle with no greenery, while the greenest pictures, in the forest landscape category, occupied the fourth and fifth positions.

Our results show that the respondents clearly ordered the rural settlement landscape scenes according to the typicality, which had been the basic criterion in forming the categories. Similarly, Fyhr et al. (2009) also showed that typicality has a significant impact. The integrity of an element (in a settlement, primarily a building) relative to its context, however, also has a strong influence. Category S3, presenting typical but insensitively modified (i.e. with lack of integrity) settlement, was outscored by category S4, presenting non-typical structures with a clear architectural form (i.e. integral structure).

Proximity generally did not prove to have a significant influence on landscape preferences. Only two out of six categories produced significant differences, and those were mutually inconsistent. The fact that a

natural landmark, e.g. lake, pond, or rock formation, cannot be seen well at a great distance detracts from its visual impact. By contrast, a category with a settlement as a landmark (L5) was more highly rated in a distant view. We have found no research dealing with proximity in a similar way to our own approach, but Clay, Daniel (2000) and Dramstad et al. (2006) reached similar conclusions. They examined openness and depth of view, which is an attribute inherently linked to proximity. They found that both variables have a limited, non-significant effect on landscape preferences. Strumse (1994), on the other hand, claims that scenery openness is a crucial factor for the aesthetic value of a landscape.

In rural settlement landscapes, tidiness has turned out to be a very important driving factor. This seems to confirm the statement of Coetier (1996) that old dilapidated buildings are generally valued negatively. Nevertheless, our research indicates that scenes with an old and untidy typical house (S1u) are perceived better than are those with non-typical houses that are in good condition (Table 3). This implies that typicality is an even stronger driving factor than is tidiness or condition.

In our study, we were concerned particularly with the physical qualities forming the landscape sceneries (i.e. elements). Nevertheless, we want to emphasize that also composition (Hamitt et al., 1994) or colour contrast (Hands, Brown 2002) of the sceneries (i.e. attributes) may play notable roles in determining preferences of perceived landscape value.

Preferences and respondents' demographic characteristics

The results suggest that females are significantly less likely to award an extremely negative rating, whereas males do not hesitate to use extreme ratings. Significantly different ratings were recorded for scenes of rural settlements with urban and villa characteristics. The reason may be that women, to a greater extent than men, base their aesthetic preferences on living comfort (according to 'off record' comments made by respondents). Ode et al. (2009) also found that gender had a significant influence, while Angileri, Toccolini (1993) found none in their research.

Our survey revealed that residents from the countryside expressed greater familiarity with and affinity for rural landscapes. Different backgrounds of landscape interaction imply different idealized (expected) images of the landscape, which is an important driving factor for aesthetic landscape preferences (Hagerhall, 2001). Urban residents' mental image of the landscape is further from reality (i.e. more idealized) than that of countryside residents due to time spent in the landscape, and thus their ratings differ. Another, more prosaic explanation is possible: residents from the

countryside may be more tolerant by nature or due to their way of life.

We had hypothesized that, due to dynamic changes in landscapes in recent decades, there would be significant differences in the ratings awarded by older, more conservative people and by the younger, more open-minded generation. This hypothesis failed. A possible explanation is that older people played a big part in transforming the landscape to its current shape and are therefore not so critical. On the other hand, the younger generation grew up in this landscape and has adapted its preferences. Angileri, Toccolini (1993) also observed no significant difference due to age. It should be mentioned, however, that our study did not include many people over the age of 65, as typical visitors of PLAs refer to younger age groups.

Contrary to expectations, our results showed no significant influence of respondents' occupation or level of education on landscape preferences. However, Rogge et al. (2007) and Ode et al. (2009) have found that occupation contributes the most to the formation of preferences. Also Angileri, Toccolini (1993) recorded that a high level of education produces a high degree of homogeneity.

CONCLUSION

The assessments of the photographs taken from four Protected Landscape Areas pointed to numerous factors driving visual landscape preferences. In sum, four basic conclusions emerge from our study:

- Within open landscapes, presence of natural or historical-cultural landmarks is the most important positive driving factor
- Within rural settlements, typicality and tidiness are highly rated
- Women tend to rate scenes higher than do men
- A respondent's place of residence is clearly inherently linked with his/her visual preferences

Other conclusions mentioned further on are rather intuitive and may be considered banal, however, they reinforce the general presumptions. The suggestions will hopefully be beneficial for management practice.

Landmarks – and in particular natural ones – should be well indicated and sights view should not be blocked by forests. Another important conclusion for open landscape management worth noting is that agricultural landscapes should include sufficient greenery.

Concerning the settlements, we conclude that these are perceived as a weak point of landscape aesthetics. Nevertheless, they constitute the economic bases in tourist areas and, therefore, should attract visitors.

In addition to females awarding higher ratings, and especially concerning low-rated sceneries, the different approaches of urban, suburban, and village dwellers turn out to be interesting. Residents from the

countryside, who live surrounded by rural landscapes and settlements, show a higher degree of tolerance. Urban residents, by contrast, apparently have a more idealized mental image.

While detailed information on respondents' preferences to all sceneries was obtained owing to the chosen statistical approach, a more complex approach should be chosen in subsequent studies.

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