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A Cross-Cultural Ranking of the Pleasantness of Visual and Non-Visual Features of Outdoor Environments

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Abstract

Four groups of university students (N = 432) from Germany, India, South Africa, and the United States rated the degree to which 93 different visual and non-visual features of outdoor environments contributed to the pleasantness and beauty of outdoor settings. The results revealed a strong cross-cultural agreement as to the relative attractiveness of different landscape features and indicated that non-visual features of environments such as sounds and odors can be as important as visual features in determining the attractiveness of environments.

Key Words: Cross-Cultural Comparison, Human Landscape Preferences, Evolution of Environmental Preferences

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Although human reactions to landscapes undoubtedly involve both innate and learned components (Bourassa, 1990; Tooby & Cosmides, 1990), in recent years the perspective that sees environmental preferences as a by-product of human evolution has been growing in popularity (Ulrich, 1977, 1983; S. Kaplan, 1987, 1995; Kaplan and Kaplan, 1989). According to this view, human preferences have developed because they have been crucial for our survival as individuals and as a species.

The notion of environmental preference as an evolutionary adaptation fits nicely with the available data. Research has consistently identified specific natural features that increase the attractiveness of landscapes, and in almost all cases these landscape features are exactly the ones which would have offered a good combination of safety and necessary resources to early humans. Open meadows surrounded by woods are very well-liked (Zube, Pitt, & Anderson, 1975; Zube, 1976), and forests are most strongly preferred when there is little underbrush and an abundance of grass cover (Daniel & Boster, 1976; Patey & Evans, 1979; Schroeder, 1991). Natural scenes are strongly preferred over human-made environments (R. Kaplan, 1975, 1977; Wohlwill, 1976; Evans & Wood, 1981; Purcell, Lamb, Peron, & Falchero, 1994), and signs of human intrusion into natural landscapes usually reduce the attractiveness of these scenes (R. Kaplan, 1978; Schroeder, 1991). Conversely, the inclusion of natural features in human-made environments increase judgments of attractiveness (Hull & Harvey, 1989; Sheets & Manzer, 1991).

Many studies confirm that water is a highly preferred part of any natural scene (Yang & Brown, 1992; Hull & Stewart, 1995). Studies of waterscapes indicate that it is not just the amount of water that is significant - clarity and freshness seem at least as important. Mountain lakes and rushing water, especially waterfalls, are extremely well-liked, while swampy areas or water covered with algae bloom receive low ratings (Calvin, Dearinger, &

Curtain, 1972; R. Kaplan, 1984; Herzog, 1985). Although the importance of the more abstract "psychological" features of landscapes such as prospect and refuge (Appleton, 1975, 1984) and coherence and legibility (S. Kaplan, 1975; R. Kaplan, 1977; Kaplan & Kaplan, 1982, 1989) cannot be overlooked, the current study will focus specifically on the physical features of outdoor environments.

The goals of this study were relatively modest. The first goal of the study was to add to the cross-cultural data base on environmental preferences by getting judgments of the attractiveness of landscape features from individuals in four different nations on four different continents. Studies in which the landscape preferences of people from two or more cultures have been measured have indicated substantial cross-cultural agreement (Hull & Revell, 1989; Purcell, et.al., 1994; Yang & Brown, 1992), but the number of such studies has been relatively small. The second goal of the study was to obtain an explicit ranking of a wide range of discrete physical elements of landscapes. To accomplish this, we used verbal descriptions of landscape elements rather than visual stimuli. Still photographs and slides are not good at capturing dynamic aspects of an environment such as rushing water or wind-blown clouds and trees, and it is impossible to capture sound, odors, and other non-visual cues that are vital parts of the experience of a place (Anderson, Mulligan, Goodman, & Regen, 1983; Hetherington, Daniel, & Brown, 1993). For example, the few studies that have looked at the pleasantness of sounds typically find that natural sounds can induce states of physiological relaxation (Bjork, 1986, 1995), are almost always rated more positively than human-made sounds in both natural and artificial settings, and enhance ratings of visual images of environments that may be presented along with them (Carles, Barrio, & de Lucio, 1999). Carles, et. al. also found that among human-made sounds, sounds generated directly by people (voices, footsteps, etc) can increase the appreciation of some urban and social environments while technological sounds are disliked in almost all settings. Some research has even found that the sounds present in an environment may

have an stronger effect on reactions to that setting than does its visual features (Carles, Bernaldez, & de Lucio, 1992).

Research has demonstrated that having people generate mental images of scenes from verbal descriptions leads to results that are indistinguishable from what is found when using slides or photographs, and it appears that using verbal surrogates for photographs provides valid data (Herzog, Black, Fountaine, & Knotts, 1997; Herzog, Kaplan, & Kaplan, 1976). Thus, by presenting verbal descriptions rather than pictures, it was possible to directly assess the individual's reaction to specific features of landscapes rather than to an entire scene as a gestalt. This also allowed the participants to think in terms of idealized, prototypical landscape elements rather than specific objects embedded in a specific context. To the extent that reactions to these verbal descriptions correspond to the reactions to the visual stimuli used in other studies, a greater confidence and convergent validity for what is now believed to be true about the attractiveness of different landscape features might be attained. This technique also permitted the explicit ranking of the importance of sound, odor, and other non-visual aspects of environments relative to the more frequently measured visual features. To avoid ambiguity as to the nature of the preference being assessed, all participants were asked to evaluate each landscape element specifically in terms of how much it enhanced or detracted from the beauty of the outdoor setting.

Method

Participants

Participants were 432 college and university students in four countries. There were 95 Americans (38 males, 57 females) from Western Illinois University and Knox College, 67 Germans (29M, 38F) from the University of Freiburg, 172 Indians (62M, 110F) from Bombay University, Delhi University, and the Sawai Man Singh Medical College in Jaipur, and a racially mixed group of 98 South Africans (15M, 83 F) from the University of Pretoria. Students in India, South Africa, and the United States were volunteers who were solicited in classes; some of the American students received course credit for participation.

Some of the German students were members of a psychology class at the University of Freiburg; the rest were volunteers who were approached on campus by one of the experimenters.

Materials and Procedure

The American, Indian, and South African participants responded to instructions and a questionnaire in English; the German participants received instructions in German. The translation was done by one of the authors who is fluent in German, and the accuracy of the translation was checked by two native speakers. The written instructions were as follows:

> On the next few pages you will read a list of things that you might encounter outdoors. Some of these things are visual features that you can see, some are sounds, and some are odors that you might smell. Please read each item and imagine it as vividly as you can. Evaluate the item by rating it on a scale ranging from "1" to "10," with a score of "1" meaning that the feature is extremely unpleasant, undesirable, and would greatly detract from the beauty of an outdoor setting. A score of 10 would indicate that the feature is extremely pleasant, desirable, and would greatly enhance the beauty of an outdoor setting. Use numbers between 1 and 10 to indicate the degree to which you think the feature approaches these extremes. Write the number that expresses your feelings in the blank space next to each item.

Although the ultimate intent was to get a ranking of the landscape features, the task of actually ranking 93 items would have been extremely tedious and time consuming for the participants in the study. Thus, the easier task of simply evaluating each item on a 1 to 10 scale was used to expedite the data collection; the information would be later converted to ranks. The instructions were followed by a list of 93 verbal descriptions of things that might be experienced outdoors. Of these 93 features, 54 were visual descriptions of natural features, 21 were visual descriptions of human made or influenced features (including agriculture), 9 were auditory descriptions of natural features, 2 were auditory descriptions of human generated sounds, 3 were olfactory descriptions of natural features, and 4 were olfactory descriptions of human made features. Although there was an emphasis on "natural" elements of outdoor environments, the list included a range of features that were thought to vary from extremely pleasant to extremely unpleasant, and from human-made to completely free of human influence. Environmental features from all climates and parts of the world were included in the list. The items were presented in a randomly determined

order and each was preceded by a blank space where the subject recorded his or her response to that item. A complete listing of the items is presented in Table 1.

Results

To verify that the groups were in general agreement regarding which landscape features were being rated high and low in attractiveness. Pearson r's were computed for the mean ratings given to each landscape feature by each of the four samples. All correlation coefficients were extremely high and significant at $p < .0001$ with 91 degrees of freedom. The correlation between American and German ratings was .92, American vs. South African was .95, and American vs. Indian was .90. The correlation between German and Indian ratings was .82, and German vs. South African was .92. The correlation between the ratings given by the Indians and South Africans was .90.

One possible way of comparing the reactions of the different cultural groups to the various landscape features would be to combine similar features and conduct a cross-cultural comparison of the rankings given to the entire groups of features. This would only be valid if there were no significant differences among the groups as to how ratings were being assigned. Combining features that are being evaluated according to consistently higher or lower standards by different groups would pose a severe problem. Since the primary goal of the study was the assessment of differences between groups rather than differences between individuals within groups, the scores assigned to each item by each person were averaged across all participants within each national group. Then, in order to determine if a combination of features for analysis would be possible, these mean group ratings of each of the 93 landscape features were compared with a repeated measures Analysis of Variance (ANOVA) and a Tukey Test. These analyses revealed that the Indians generally gave lower ratings than any of the other groups, $F(3, 276) = 25.02$, $p. < .0001$, HSD = .286. The mean rating across all items for the Indian subjects was 5.38 vs. 6.02, 6.10, and 6.21 for the Americans, Germans, and South Africans respectively, and the Indian mean was significantly lower than each of the other groups ($p. < .0001$). Given this result, it

was decided that some sort of ordinal comparsion of the individual landscape features would be most appropriate.

We were specifically interested in analyses which would reveal something about the way in which the attractiveness of the landscape features was being ranked and the degree to which this was similar across cultures. Based upon the mean score for each landscape feature, a ranking of the items within each group was determined and the means were converted to ordinal level data in the form of ranks. The rankings are presented in Table 1, and they are listed in descending order of preference based upon the composite mean derived from the mean ratings of that item by each of the four student groups. The means ranged from a low of 1.50 for the least preferred item (a shoreline strewn with trash and the bodies of dead fish) to a high of 8.81 for the most preferred item (the clear blue water of a tropical sea). The ranks assigned to each landscape feature by the four groups of students as they appear in Table 1 will serve as the units of analysis for the rest of the study, where the essential question is the degree of agreement among the four groups regarding the ranks assigned to the 93 environmental features.

The classic technique for assessing agreement among a set of judges (in this case, the four student groups) who have ranked or ordered the same set of stimuli (i.e., the 93 landscape features) is Kendall's Coefficient of Concordance, W (McNemar, 1969; Marascuilo & McSweeney, 1977; Lindeman, Merenda, & Gold, 1980; Lehman, 1991). This statistic describes the amount of the maximum possible variance that can be accounted for by the agreement among the judges, and it provides a valid measure of the extent of agreement displayed by judges based on ordinal level data. If all of the judges agree exactly on all rankings, Kendall's Coefficient W would be equal to one. The Kendall's Coefficient obtained for the rankings of the landscape features for the four groups of students was $W = .85$, indicating substantial agreement among the four groups. The test of significance for W verified that this value was in fact highly significant, $\chi^2(92) = 313.64$, $p.<.0001$.

The data analysis in this study established that the rank ordering of landscape features among the four groups was highly similar and well above chance levels. This is not the same, however, as saying that the rankings were identical or equally similar between all groups, as some features obviously received very different ranks by different groups. The contribution of specific ranked items to any disparity that might exist between the rankings of different groups can be assessed by examining the degree of inversion (the difference in the ranks assigned by two groups) for that item. For example, a landscape feature that was ranked third by one group and fifth by another decreases overall agreement only slightly; a rank of three by one group and a rank of 50 by another group would have a much greater impact. Thus, some sense of which landscape features provoked the most cross-cultural disagreement could be reached by identifying features associated with the greatest degree of inversion.

Examining the ranks in Table 1 reveals that Indians as a group gave higher ratings to features associated with mountains than did other groups, and they consistently gave higher scores to cultivated flowers, golf courses, and city parks than the others, indicating a greater tolerance for human influence in outdoor settings. Also, the Indian subjects especially liked morning dew on the grass, ranking it fourth out of the 93 landscape elements; no other group ranked it higher than 30th. Americans and Germans were apparently more taken by water sounds (surf, bubbling brooks) than South Africans and Indians, who did not rank these as highly. Germans also seemed to be much fonder of smells associated with the ocean than were any other group. South Africans, on the other hand, consistently ranked waterfalls of all types as even more pleasing than did other groups. Thus, while overall agreement was quite high, there was room for differences of opinion as to how strongly specific features of an environment contributed to its attractiveness. It should be emphasized, however, that this usually does not reflect disagreement over *what* is liked, but it is more a question of the degree to which positive features are liked and negative features are disliked.

Discussion

Based upon the high correlations and significant agreement revealed by the analysis of ranks, the results of this study indicate strong cross-cultural agreement as to the relative attractiveness of different landscape features. Given the dramatically different geographic locations of the participants in this study, this is strong evidence consistent with the presence of universal reactions to features of the natural environment.

There was a strong similarity between the findings of this study and the results of other research utilizing slides and photographs. We found, as have others, a VERY strong preference for natural features over human influenced landscape features, and it was apparent that natural features free of human influence were preferred over features associated with human beings by all groups. For example, herds of wild animals such as antelope were ranked higher than herds of domestic animals such as cattle by everyone, just as naturally flowing water was prized more highly than water flowing in fountains. Based upon the composite mean ratings of the features, only two human features were ranked in the top half of the list: an orchard of blossoming fruit trees (ranked 24th) and the sound of children on a playground (ranked 45th). On the other hand, seven of the lowest ten rated items on the list were associated with a human presence. We replicated the finding that fresh water is one of the most strongly preferred landscape features as six of the top ten ranked items were water related. We also found a consistently high ranking for non-agricultural vegetation and for features that provide prospect (e.g., a rock ledge overlooking a valley).

It was clear that sounds and odors make a powerful contribution to the impact of an environment, as sounds and odors were ranked among both the most (e.g., the fragrance of blossoming fruit trees, the fresh moist smell that follows a rainstorm, waterfall sounds) and least (e.g., the smell of automobile exhaust, traffic sounds) preferred features of environments.

In summary, the research reported here demonstrates significant cross-cultural agreement as to the attractiveness of landscape features. Additionally, the replication of the results obtained by studies utilizing slides and photographs regarding the relative attractiveness of landscape features not only creates more confidence in these previous findings, but indicates that having people rate verbal descriptions of landscape features may be a valid and useful alternative to the more traditional procedures that rely on visual stimuli alone.

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