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Beyond Accessibility: Preference for Natural Areas

Terry J. Brown, Rachel Kaplan, and Gail Quaderer

Making natural settings accessible is vitally important. At the same time, however, attention must be paid to the choice of settings that are made accessible. The purpose of this study was to ascertain the perceptions and preferences of individuals with mobility limitations as well as their companions or caregivers with respect to parks and nature places. The results (based on 197 surveys) provided support for similarities in preferences regardless of degree of limitation. Forested scenes were far preferred over open field scenes, regardless of ease of negotiating the area. Within these two landscape types, however, scenes with paths were favored. While the results showed substantial consistency, they also pointed to variations. To increase the likelihood that there is a strong match between accessibility and satisfying destinations, it is essential to gain the participation of the intended users.

KEY WORDS: ADA—American with Disabilities Act, Mobility Limitations, Universal Design, Natural Areas, Landscape Design and Planning, Environmental Preferences, Public Participation

Access is essential to experiencing a setting. For that reason, the Americans with Disabilities Act (ADA) constitutes landmark legislation in its guarantee of access to public buildings, sites, and programs for persons with physical disabilities (Public Law 101-336;

Terry Brown is Professor of Landscape Architecture and Rachel Kaplan is Professor of Environmental Psychology at the School of Natural Resources and Environment, University of Michigan, where Gail Quaderer received her Master's of Landscape Architecture degree.

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U.S. Dept. of Justice, 1991). Since passage of the ADA, there has been considerable effort to establish accessibility guidelines that address the physical constraints imposed by various kinds of settings, most often indoor, built environments. The focus of this study was on outdoor, natural areas. The many challenges posed by outdoor settings have been the subject of publications on universal access (e.g., PLAE, 1993), as well as the concern of the Architectural and Transportation Barriers Compliance Board, a federal agency responsible for the development of design guidelines for accessibility. A draft version of the Board's *Recommendations for accessibility guidelines: Recreational facilities and outdoor areas* was released in 1994. Nonetheless, accessibility guidelines for park settings or other natural environments are not yet officially standardized (Crawford & Crabtree, 1998; Mulick, 1993).

The study discussed here examined the experiences with outdoor settings of people with mobility limitations, specifically their preferences for different types of regionally common natural environments. The benefits of leisure and recreation for people with disabilities have received some empirical attention. Anderson, Schlieen, McAvoy, Lais, and Seligmann (1997) reported positive changes in relationship development, recreation skills, and quality of life in a longitudinal study of people with and without disabilities who participated in an integrated outdoor adventure program. Cimprich (1993) found that even short outings to nearby natural places had profound benefits for individuals recovering from cancer; improvements were found both in the capacity to focus attention and in the choice of activities these individuals were willing to undertake. In reviewing a wide range of therapeutic recreation research, Shank, Coyle, Boyd, and Kinney (1996) concluded that there is a "substantive basis for believing that play, recreation and leisure can assist individuals to improve and maintain physical and psychological health and well being" (p. 190). Despite such benefits, and the work on the general popula-

tion showing the importance of the natural environment to well-being (e.g., Hartig & Evans, 1993; Kaplan & Kaplan, 1989; Kaplan, 1995), natural settings are often not readily accessible to people with disabilities.

There are a variety of reasons for this lack of access. Caldwell and Gilbert (1990) found that persons with disability are confronted with both external and internal barriers to recreation participation. The external barriers might be caused by lack of adequate transportation or problems of universal design; the internal barriers, by contrast, include personal motivation, social skills, and perceptions of one's competence. Moore, Dattilo, and Devine (1996) pointed out that access also may be reduced by lack of information or by misinformation leading to ignorance about places that are, in fact, accessible. Many of the settings included in the present study might fall into this category—places that are not specifically noted as accessible, although they are usable by people with mobility limitations.

It is important to acknowledge the significance of the ADA in the long struggle to make inclusion a reality; changing attitudes, universal design, and accessibility guidelines will help to make places more available to those with disability. Important as these are, however, they are not sufficient if the experience is to be satisfying. It is essential to have information about the settings that are to be made available. For example, a trail that is readily available from a parking lot and is easily negotiated by someone in a wheelchair is a great asset, but where the trail goes and what one will be able to see from it are issues that also must be addressed. In other words, although it has not been tested directly, it seems reasonable to hypothesize that individuals with disabilities care not only about accessibility, but also about the environment that is made accessible. If this is indeed the case, then emphasis on program accessibility and physical accessibility should be joined by an equal concern for the experiences afforded by the physical settings.

Environmental Preference

The purpose of the study reported here was to take a broad look at outdoor settings that contribute positively to people's leisure experience and to ascertain the preferences of people with mobility limitations for such settings. The study built upon considerable empirical literature on outdoor recreation (Francis, 1989; Pigram, 1993), with a particular emphasis on the research that addresses people's preferences for natural settings. Despite the extensive work in this area, very little of it has included people with limited mobility. The study by Moore et al. (1996) was a welcome exception. However, the total sample included relatively few people with disabilities and of these, only 10 had mobility limitations.

A great deal of the research on environmental preference is based on the use of photographs. Results of dozens of studies, carried out in several countries and using scenes of natural settings that are quite ordinary as well as some that are of distant, awesome places have shown some remarkable consistencies (e.g., Brown, 1994; Herzog, 1984, 1989; Hull & Harvey, 1989; Schroeder, 1989). Kaplan and Kaplan (1989) provided summaries of many such studies as well as a conceptual framework, the *preference matrix*, that puts preference research in the context of basic human needs. They suggested that people prefer settings that support the need to understand their surrounding and simultaneously, the need for exploration. The *preference matrix* incorporates a variety of environmental qualities (such as complexity and coherence) that enable people to interpret the likelihood that a setting will facilitate their safe and comfortable functioning.

It might well be the case that these needs are no different for people with or without mobility impairments. It might also be possible that despite a broad similarity in preference, the environmental indicators that support understanding and exploration are not the same for different populations, thus leading to differences in preference. The main objective

of our study was to explore perceptions and preferences for outdoor natural areas by a sample of people with mobility limitations and their companions/caregivers.

It is useful to determine whether and to what degree prior findings are applicable to individuals with special needs. It is particularly important to gain such insights through the direct involvement of those who will be most directly impacted by the design and management of outdoor areas. All too often, assumptions are made about people's preferences and needs, rather than permitting them to speak for themselves. The need for such participation by people with disabilities has been articulated in various contexts (e.g., Reynolds, 1993, with respect to programs and service; and Crawford & Crabtree, 1998, with respect to guidelines). In research on environmental preferences, however, such input has been sorely lacking.

Method

Participants and Sample Characteristics

The National Center on Accessibility (NCA), Martinsville, IN, provided access to its database of individuals with disabilities who have expressed willingness to participate in studies conducted by NCA or organizations associated with NCA. K. Mispagel (personal communication, January and December 1998) indicated that NCA recruited these individuals using a variety of techniques including: ads in disability organization newsletters and magazines, postings on "disability list serves" or the NCA internet site, and "mailing lists of people who belonged to support groups or disability organizations." In all recruitment methods, individuals were asked about their willingness to volunteer for studies as well as a series of questions about their "type of impairment, specific disability, and type of assistive devices used."

Our primary criterion for selection in the study was the "mobility" designation in this database (n = 210). This designation was

based either on NCA research staff categorization using volunteers' indication of their specific disability, diagnosis, and type of assistive devices, or on an individual's own indication of his or her impairment as "mobility." For many entries in the database, the only available information was the person's name, address, and phone number. In these instances, individuals with addresses in the northcentral states (IL, IN, IA, MI, MN, OH, or WI) were selected. Using these two selection criteria, a total of 289 participants comprised our initial sample.

Each participant was sent two sets of surveys with the request that the second survey be completed by a companion (someone with whom they would be likely to go on an outing to a natural area). Thirty sets of surveys were unusable because they were returned with no forwarding address or were received too late.

The results are based on 197 usable surveys of which 116 were completed by the person identified from the NCA database and 81 by companions. The completed surveys consisted of 76 matched sets (i.e., addressed person and companion). The return rate for the target group (those with mobility limitation) was 45%. As there is no way to ascertain how many individuals asked a companion to complete the survey, it is inappropriate to calculate an overall return rate for these subjects.

The target and companion samples were similar in age distribution with 40% and 42%, respectively, over age 50, and the remaining participants equally divided between those under 40 and in their 40s. There were 5 and 6 participants, respectively, over age 70; 3 individuals in each sample under age 20; and 3 and 4 individuals, respectively, who did not respond to the age question. While women were the majority of respondents in both samples, there were relatively more women in the companion sample (71%) than in the other group (56%). The companion group included spouses (43%), other relatives (25%), friends or associates from work (26%), and paid caregivers (6%).

Participants with mobility limitations indi-

cated use of a variety of walking aids, with the vast majority (74%) dependent on motorized or manual wheelchairs. The remaining participants were about equally divided between those who use canes or walkers (and wheelchairs on occasion) and those who only used walking aids on occasion.

Survey Instruments

Photo-questionnaire. Using a procedure that has been employed in prior studies (see Kaplan & Kaplan, 1989, Appendix A for overview of method and Appendix B for summary of 32 studies), the survey included 24 black and white photographs of natural areas. The scenes were photographed at national, state, or city/county parks in Michigan and Ohio. Several of these locations had designated handicap-accessible trails and facilities. Scenes were selected to represent the kinds of places one might be able to see on a nature outing, with a focus on forested and relatively open scenes. The forested scenes represented a range of tree density and varied in the smoothness of the ground cover. None of the scenes included water or any people. Paths were evident in some of the scenes, including boardwalks, paved paths, and compacted soil. Each of the three photo pages consisted of a representative sample of all the scenes (i.e., some with paths, some open, some forested).

Participants were asked to view these scenes from the perspective of being on a nature outing and to assume that the setting would pose no particular accessibility problems. The focus of the task was to indicate how much they would like to be in the setting, using a five-point rating scale (5 = very much). Both subsamples were asked to complete these ratings.

A two-page structured survey for the subsample with mobility limitation included the following topics: (a) types of walking aids and frequency of their use; (b) travel options (how likely to use own car, another person's car, public transportation, special private service equipped for wheel chair); (c) accuracy of

accessibility information; (d) helpfulness of trail information; and (e) general health and well-being. A one-page survey of questions for companions inquired about the relationship of the companion to the person with the disability, frequency of going on outings together, and the companion's role in selecting where they might go. Both subsamples were asked about perceived barriers to going on nature outings (e.g., distance, parking, accessibility, knowing about good places); the importance to them of nature outings; and their enjoyment of outings to particular settings (sports events, shopping malls, movies, and natural areas), as well as their age and gender. In addition to the structured items on the survey pages, participants were encouraged to add comments. Many individuals did so, often with expressions of gratitude for just being asked their opinion.

Procedure

Each set of materials included a cover letter, 3-page photo booklet, survey, and prepaid return envelope. The cover letter identified the researchers' relationship to NCA and explained the purpose of the study; namely, to look at preferences for different natural settings by people with disabilities and their companions. A code number was used to permit us to match individuals with their companions since the responses were generally received in separate envelopes. Names of the first two authors were included on the cover page, as well as phone and E-mail contact. The first page of the survey included the instructions for the photo ratings and the demographic questions. Companions were asked to complete the final page of the booklet, while other participants were to complete the two pages immediately following the photo ratings.

Data Analysis

Descriptive statistics were used to examine the preference ratings. Analysis of variance was used for comparisons among groups.

Results

Photo Preferences

Mean ratings among the 24 scenes differed substantially, ranging between 2.7 and 4.4 (5 = highest preference). The two subsamples, however, were very similar in their preferences, with no significant differences between ratings by those with mobility limitations or their companions. Photo preferences also were not significantly different as a function of age, degree of mobility limitation, or the extent of perceived barriers to going on outings.

An analysis of the scenes based on the rank order of the mean preferences indicated a clear distinction based on the type and density of vegetation. Preference ratings were much higher for scenes of forests, characterized by a predominance of trees, as opposed to those of open fields, typified by a grassy, often shrubby, ground plane and few if any trees, except in the background. The 16 top rated scenes all showed forests; the bottom 8 scenes depicted open fields. The analysis of these preference ratings further divided both the forest and the field scenes into two subgroups, thus creating four sets of scenes. Although this categorization was neither based on a priori considerations nor on results of factor analysis, the alpha coefficients (a measure of internal consistency) were strong (see Table 1), suggesting that the scenes in each grouping can be considered a coherent category.

Forested Scenes. The group mean for the top seven scenes was 4.1, while for the next nine it was 3.7. Perhaps the most notable distinction between these subsets concerns the visible path present in five of the seven top-rated scenes. While the other two scenes have no clear path, there is abundant light filtered through the mature trees providing easy visual access through the forest (see Figure 1, lower left). One of the scenes in this top-rated group is distinctly different from the others in its lack of distinct tree trunks and sense of light (Figure 1, lower right). Here the foliage is dense and impenetrable. The dominant feature of the

Table 1.
Photograph Groupings Based on Preference Ranking

Setting	Number of Scenes		Preference Rating ^a		Cronbach's Alpha
	Path	No Path	Mean	Range	
Forest	5	2	4.1	3.82-4.4	.88
Forest	0	9	3.7	3.5-3.80	.92
Open	4	2	3.2	3.1-3.4	.90
Open	0	2	2.7	2.6-2.8	.82

^a 1 = not at all . . . 5 = very much.

scene, however, is a curving boardwalk permitting access to an environment that would otherwise be difficult to access. Thus, for these seven scenes, the lack of shrub layer, amount of light, or the presence of a path contributes to

clear sightlines into and through these forested scenes.

The remaining nine forested scenes are characterized by less mature trees, lower light levels, and absence of paths. Several of these

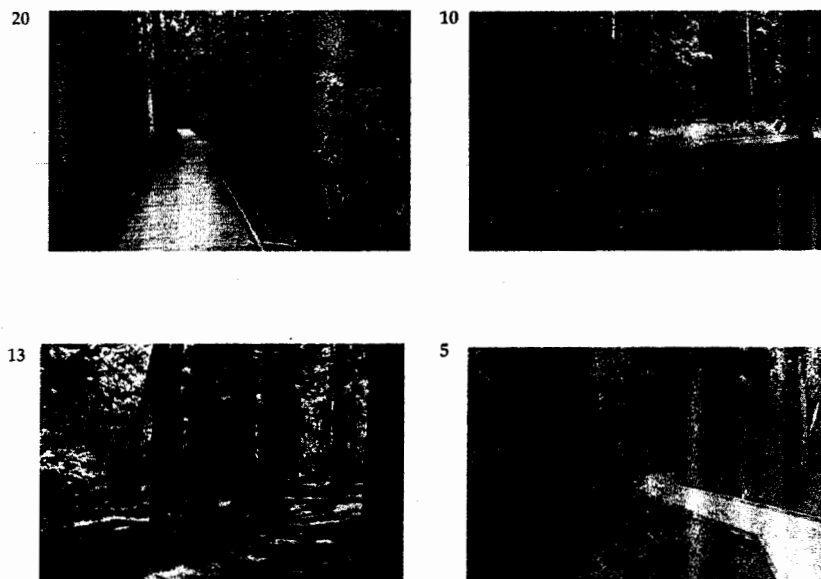


FIGURE 1. EXAMPLES OF THE TOP-RATED FOREST SCENES.

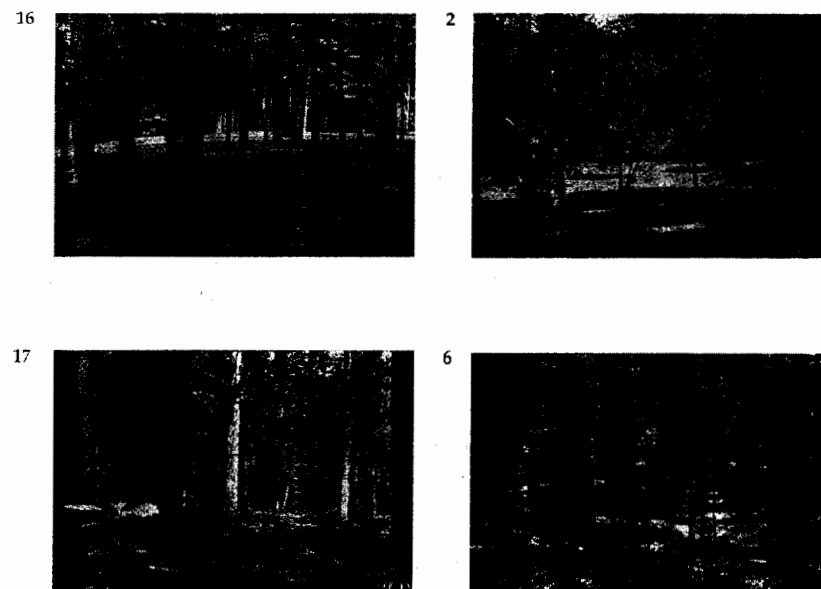


FIGURE 2. EXAMPLES OF SOMEWHAT LESS FAVORED FOREST SCENES.

scenes could be called "woodlawn," trees spaced apart and smooth ground cover (Figure 2, top row). In other cases visual access—the ability to see through the scene—was more limited (Figure 2, bottom row). Though less preferred than the top seven, these scenes nonetheless received relatively high ratings (all greater than 3.5).

Open Field Scenes. The next six scenes based on the preference ranking, with a mean of 3.2 (range between 3.1 and 3.4), all depicted field settings (Figure 3). All but one of these scenes suggested that traversing through the area would not be difficult either because they included paths (four scenes) or a grassy ground plane (one scene). Two of the scenes included an isolated tree within the open field portion; none of them, however, would offer shade or protection from exposure to sun, wind, and rain.

The final two scenes—lowest in prefer-

ence, with a mean of 2.7—differ from the other field settings in a number of respects. These two scenes are not only pathless, but passage through them would be arduous because of the height of the ground cover (Figure 4). They also lack any notable highlights to help orient the visitor. While trees or shrubs form the edge of most of the open field scenes, these two scenes are the most rugged. It is interesting that only for these two scenes were there statistically significant gender differences in preference, with males rating them higher than females ($F = 4.09$, $df = 151$, $p < .05$; mean = 3.0 vs. 2.6).

Role of Paths. Although participants were instructed to assume no accessibility problems in indicating their preferences for the scenes, the visual presence of a path was a stronger signal than the instruction. It is hardly surprising that preference was greater for scenes that included a path. Paths make moving through

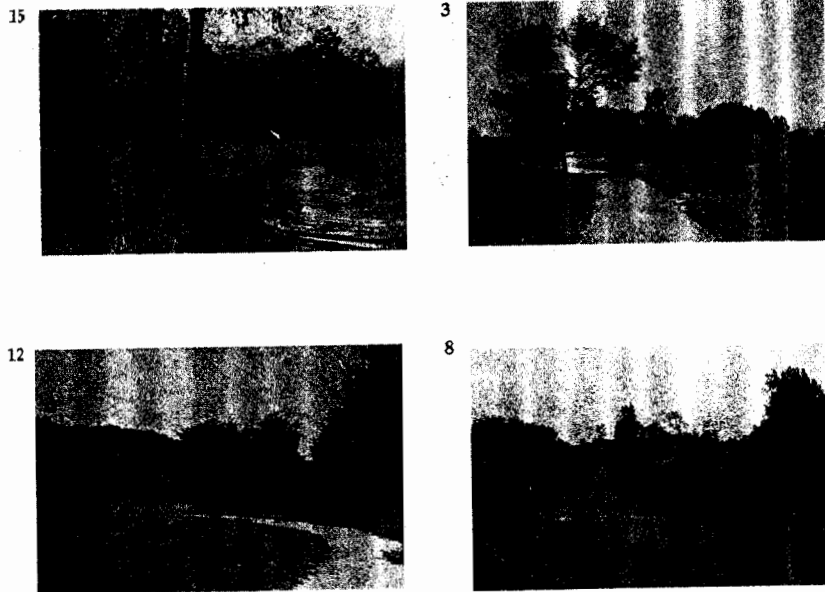


FIGURE 3. EXAMPLES OF OPEN FIELD SCENES.

an environment much easier for people with mobility limitations, but they are also important for those without such challenges. There is evidence that people's evaluation of a scene, even when viewed very briefly, is based on an intuitive and unconscious assessment of what it would be like to be in the setting (Kaplan &

Kaplan, 1989). The presence of a path suggests that access to information is facilitated, both in making locomotion easier and in providing a specific route to follow. Paths provide both passage and guidance.

Nonetheless, the preference for paths was secondary to the preference for types of set-

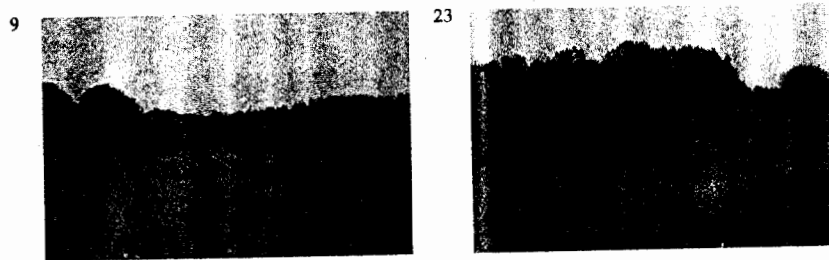


FIGURE 4. THE LEAST FAVORED SCENES.

Table 2.
Relation Between Nature-Based Survey Items and Photograph Ratings
for Participants with Mobility Limitations

Survey Item	Forest Settings		Open Settings	
	Top-7	Bottom-9	Top-6	Bottom-2
Enjoy fairly open natural areas	n.s.	n.s.	29.81	25.50
Enjoy mostly wooded natural areas	17.49	19.05	n.s.	n.s.
How important are nature outings	23.24	19.15	6.43*	11.01

Note: Table shows F values based on ANOVA, $df = 2, 108$, $p < .001$, except *, $p = .002$.

tings. While both forested and open field scenes with paths received higher preference ratings than those without, the photographs of open fields were less favored than those depicting forests. In other words, forests lacking a path were more highly rated than open scenes that included a path. This pattern was equally true for individuals who rely on wheelchairs for locomotion as for those who generally use canes or walkers, or those who indicated that they do not use walking aids on a regular basis.

Relation of Photo Preference to Preferred Settings

Participants in both subsamples were asked how much they enjoy outings to sports events, shopping malls, movies, "natural areas that are mostly wooded," and "natural areas that are fairly open." In addition, the survey inquired about the importance to them of nature outings. (All ratings are based on 5-point scale with 5 = very much.) Sports events were the least favored settings of the five (although rated as more preferred by those with mobility limitations than their companions, means = 3.1 and 2.6, respectively). Both groups rated outings to "mostly wooded" natural areas as the most preferred (mean = 4.1); the other three settings received mean ratings around

3.6. Both groups rated going on "nature outings" as important (mean = 4.0).

Preference for sports events, shopping malls, and movies had no bearing on participants' preferences for the photographs. By contrast, those who indicated that they particularly enjoyed "fairly open" natural areas were far more appreciative of the photographs showing open fields than individuals who indicated that such settings are not highly preferred (see Table 2). For example, ratings of the two least liked scenes by the participants with mobility limitation ranged between 2.2 and 3.9 depending on their degree of preference for the "fairly open" setting item. Results were comparable for the other six open field scenes with means ranging between 2.7 and 4.2. Responses to the "fairly open" item, however, did not yield strong differences with respect to preference of the forest scenes.

In similar fashion, responses to the item about enjoyment of "natural areas that are mostly wooded" were strongly related to the ratings of the photographs of the forest scenes. Means for the top seven scenes ranged between 3.6 and 4.5, and between 3.0 and 4.1 for the remaining forest scenes. Responses to the "mostly wooded" item, however, were not significantly related to preference for the open field scenes.

Both questions regarding enjoyment of go-

ing to natural areas (i.e., "fairly open" and "mostly wooded") provided construct validation with respect to preference ratings of scenes depicting similar contexts. Further validation came from the item inquiring "how important are nature outings to you." Responses to this item were significantly related to both the natural area enjoyment items as well as each of the four photo-based groupings. In other words, individuals who indicated that nature outings were particularly important, very much preferred the two subsets of forest scenes as well as the two subsets of open field scenes; while those for whom nature outings were less important, rated the photographs less favorably.

Discussion

The findings from this study show both striking consistency in the pattern of preferences, as well as important individual differences in the desire for natural settings among individuals with mobility disabilities. Both of these themes—consistency and variation—are important to consider with respect to gaining input from diverse user groups, as well as in the design and management of natural areas that meet the needs of all visitors.

Moore et al. (1996) reported similarities between individuals with or without disabilities in terms of their motivations to visit national parks (as well as several other psychological and social factors). The findings from the present study suggest that preferences for forested and open natural settings also show strong similarities. Consistency is evident in the strong agreement in preferences for these scenes regardless of the degree of mobility impairment. The implications of these findings are important. They suggest that a substantial body of empirical work on environmental preference is applicable in the context of accessibility as well. In other words, individuals with mobility limitations are no different than any one else in the kinds of settings they would like to experience. For all of us, certain features of the environment foster comfort and confidence, and these characteristics are im-

portant to consider when deciding on accessibility as well.

It is useful to discuss some of these salient features. The importance of paths is undeniable. It is hardly surprising that individuals with mobility limitations would be concerned about the availability of paths and about the ease of traveling on these paths. Paths, however, also were favored by those without mobility limitations. While this finding may be due to their concerns for their friends with disability, other studies (e.g., Hull & Harvey, 1989; Ryan, 1997) also have shown that, on average, the general public rated scenes with paths as more preferred than those without paths.

Paths, however, are only part of the story. Several other factors play an important role in preference for natural settings. Results indicated that forests were far better liked than open settings. Furthermore, the forests that were most appreciated offered not only substantial trees and relatively little undergrowth, but also abundant light filtering through the trees, making it possible to see through the forest. At the same time, open areas, offering less shade, and scenes that suggest that locomotion could be difficult were less likely to be preferred. Kaplan, Kaplan, and Brown (1989) reported very similar pattern of results based on entirely different photographs and a sample of college students with no known disabilities.

While it is useful to look at the patterns of preferences in terms of the features in the environment (e.g., tree density, light through the trees), it is also helpful to understand the findings in terms of how people might perceive their opportunities for being in these settings. The results from this study parallel previous work that has shown that when people look at scenes, without realizing it they interpret them in terms of locomotion and visual access. This preference, in turn, can provide reassurance with respect to safety and way-finding (Kaplan, Kaplan, & Ryan, 1998). Thus, the features in the environment and the arrangement of the spaces help people to determine whether they would feel confident and

comfortable in the setting, thereby supporting their needs to understand and explore their surroundings.

At the same time, however, it is important to remember that consistency in preferences does not preclude variation as well (Kaplan, 1984). The strong preferences for forest scenes and considerably lower preference for open areas was the dominant pattern in the findings from this study. Notable among the variations found in the study was the pattern of preferring open areas shown by some participants. This pattern was expressed both in the kinds of settings this subgroup preferred for nature outings and in their preference ratings for the scenes. Further, there was substantial range (2.2 to 4.2) in the mean preferences for the scenes depicting open areas, indicating considerable difference in the degree of appreciation of these photographs. Our data do not permit explanation for these differences; future research might address this issue. Such research might consider factors that explain individual differences as well as examine a wider variety of natural areas and their special features.

Recommendations

The *Recommendations for Accessibility Guidelines* (U.S. Architectural and Transportation Barriers Compliance Board, 1994) wisely recognized that access routes in outdoor settings often serve as recreational activities in their own right. In other words, rather than serving as a means to get from one place to another, the use of these trails is, itself, recreational. The findings from this study suggest that in addition to factors that have been recognized as critical to the design of trails (e.g., trail width, gradients, and surface materials), other qualities also need to be considered. The experience of the natural setting is strongly impacted by the vegetation and its foliage density, smoothness of the ground plane, and the ability to see and yet not to see everything at once. These are qualities that foster understanding and exploration (Kaplan & Kaplan, 1989; Kaplan et al., 1998).

The ADA is a tool for social change. Its

mandate to create equal opportunity and access for people with disabilities in all facets of life, work, and play is inspired by a philosophy of inclusion for all. With its focus on abilities rather than disabilities and its recognition of the design implications of the process of change throughout life, universal design accommodates people with disabilities in a way that is not stigmatizing and directly reflects the inclusive spirit of ADA. As part of a research and demonstration project to further the development of universal design, sponsored by the U.S. Department of Education's National Institute on Disability and Rehabilitation Research (NIDRR), the Center for Universal Design identified seven principles that apply to the design of environments, products, and communications. As the Center stated in the development of these principles, "It is important to understand that these principles of universal design in no way comprise all criteria for good design, only universally usable design. Other factors such as aesthetics, cost, safety, gender and cultural appropriateness must also be taken into consideration" (Story, 1997, p. 1). It seems to us that the ongoing development of these universal design principles would benefit from research that extends them to a variety of natural settings that are readily available, yet not now accessible.

While design guidelines and principles are essential for action, the study also speaks to the importance of inclusion in the design process itself. Perhaps accessible places can be designed without input, if the main concerns are to provide negotiable paths and accessible facilities. For such issues, guidelines may be sufficient. The purpose of the nature outing, however, is to experience preferred places. In order to increase the likelihood that there is a strong match between accessibility and satisfying destinations, it is essential to invite input from the intended users. This study provided an effective methodology for such participation, as well as highlighted some key issues on which user input is likely to be important. Central to this methodology is the use of visual images. Such images might also play another important role, namely,

to increase awareness about natural areas that are accessible though not widely known to be so. If indeed there are people with disabilities for whom nature outings are important, it is vital that such places are not only accessible but aesthetically satisfying as well.

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