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Michael J. Manfredo  
*Oregon State University*

B. L. Driver  
*USDA Forest Service, Rocky Mountain Forest and Range Experiment Station*

Perry J. Brown  
*University of Montana - Missoula, [perry.brown@umontana.edu](mailto:perry.brown@umontana.edu)*

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# *A Test of Concepts Inherent in Experience Based Setting Management for Outdoor Recreation Areas*

**Michael J. Manfredro, B. L. Driver,  
and Perry J. Brown**

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**ABSTRACT:** *This study examines assumptions of the concepts which form the basis for experience based setting management of outdoor recreation areas. To test the assumptions a sample of wilderness users was surveyed and divided into experience groups based on differences in the specific experiences they desire. These experience groups were then tested for differences in their activity and setting preferences. The study was conducted at the Bridger Wilderness, the Fitzpatrick Wilderness, and the Popo Agie Primitive Area in Wyoming during 1978-79. Data were collected by questionnaire, and responses were examined by object cluster analysis to group users on the basis of the types of experiences important to them. Results offer support for the concepts tested; three groups with different preferences for experiences were identified and were found to differ on the activities, setting, and management actions they prefer. Directions for future research are given and recommendations concerning the usefulness of experience based information to recreation planning are discussed.*

**KEYWORDS:** *Experience-based recreation setting management, recreation management, experience preferences, management preferences, wilderness recreation.*

**AUTHORS:** *Michael J. Manfredro is Assistant Professor and Perry J. Brown is Professor and Head of the Department of Resource Recreation Management, Oregon State University, Corvallis. B. L. Driver is Research Forester, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins.*

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## *Purpose*

A frequently cited goal of recreation management—to provide opportunities for a wide range of satisfying recreation experiences appropriate for a given area—has been emphasized with slight variation by many researchers. Wagar (1964; 1974) suggested managing recreation areas to meet a range of

human needs; Driver and Tocher (1970) to provide opportunities for the "package" of highly desired experiences; Brown, Dyer, and Whaley (1973) to satisfy recreationist motives; Lucas and Stankey (1974) to maximize user satisfactions; and Hendee (1974) to provide multiple satisfactions. In a similar fashion Driver and Brown (1975; 1978) have called for planning that delineates the opportunities for experiences offered to users. In addition, they have offered a model of the recreation decision process useful in guiding behavioral research which will aid managers in meeting their goals (Driver and Brown 1975; 1978; Haas, Driver and Brown 1981).

The model proposed by Driver and Brown gives a general framework for understanding why recreationists are motivated to engage in specific recreation activities at specific areas. Their model was influenced heavily by developments in psychology's expectancy valence theory. Though this influence has been noted in several articles (Driver 1976; Driver and Brown 1975), it is best explicated in work by Haas, Driver and Brown (1981) using Lawler's expectancy valence formulation. Lawler proposes that one's motivation to engage in a behavior is a function of primarily two types of expectancies. One is the expectation that one's efforts will lead to certain performances, and the second is the expectation that these performances will lead to positively valued outcomes (Lawler 1973). Within this framework it is proposed that the motivation to engage in a given recreation opportunity is a function of (1) the expectation that one's efforts to recreate (e.g., expend money, travel, plan) will lead to performance (participation in certain activities at a specific type of setting), and (2) the expectation that the performance will lead to desired experience. In this model, recreation *activities* are behaviors such as hunting, hiking, and fishing. *Settings* are the places where activities take place and include all physical resource (e.g., topography, water, wildlife, fish, meadow) social (e.g., number of others, type of others) and managerial (e.g., fee systems, permits, facilities) conditions of these places. *Experiences* are defined as a package of specific psychological outcomes which are realized from a recreation engagement.

Two major conclusions can be drawn from this model. First, we define recreation opportunities as options to engage in a specific activity at a specific setting to realize desired experiences. This definition identifies three facets of recreation demand and supply: demands for an activity opportunity, a setting opportunity, and an experience opportunity (Driver and Brown 1975; 1978).

Second, the earlier stated goals of recreation management (e.g., providing desired opportunities for experiences) best can be met by understanding the relationship between the valued psychological outcomes of a recreation activity and the types of settings which facilitate those outcomes. With this type of information managers can increase the probability that users will realize desired experiences and activities by ensuring that the physical, social and managerial settings which help facilitate them are available. This approach has been referred to as experience-based recreation setting management (Driver and Rosenthal 1982).

Although the logic and empirical support for experience-based setting management is still emerging, the approach has been gaining acceptance in recreation resource management training and practice. For example, the rea-

soning behind that approach and limited empirical data on relationships between user preferences for activity, setting and experience opportunities were part of the conceptual base for development of the Recreation Opportunity Spectrum, a planning system currently in use by land management agencies such as the U. S. Forest Service and Bureau of Land Management (Brown, Driver and McConnell 1978; Buist and Hoots 1982; Clark and Stankey 1979; Driver and Brown 1978.)

As a theoretical construct for guiding research and management, these concepts need further examination. The purpose of this research was to provide an initial test of these concepts by examining the relationship between activities, experiences, and settings desired by wilderness recreationists using the Wind River Range in Wyoming.

### *Hypotheses*

Past research tends to support the notion that those participating in different recreational activities receive different patterns of experience outcomes. For instance, Driver (1976) presented results showing there is some variability in the psychological outcomes important in activities such as camping, biking and tennis. Similarly, Brown (1981) in comparing results of studies of hikers, backpackers, fishermen, hunters, ORV users, river runners, and cross country skiers indicated some similarities and differences in experience outcomes which are important for participants in these activities.

Though research has shown a relationship between activities and experience outcomes desired by recreationists, it has also shown that activity classifications alone are inadequate for defining homogeneous experience groups (i.e., those having relatively common experience outcomes). Several studies have been conducted which have found that recreationists grouped by traditional activity classifications can be further segmented according to the psychologically defined experiences they prefer. Using a survey instrument designed to measure "desired psychological outcomes" and object cluster analysis, Brown and Haas (1980) found five separate experiences desired by the wilderness recreationists they surveyed. These user types were distinguishable by the emphasis placed on outcomes such as Escaping Pressure, Autonomy, and Achievement.

In studies using a similar methodology Driver and Cooksey (1980), and Manfredo, Brown and Haas (1980) found distinct experience groups among fishermen; Ballman, Knopp and Merriam (1981), Haas, Driver and Brown (1981) and McLaughlin and Paradise (1980), found different experience groups among cross-country skiers; and Hautaluoma and Brown (1978) found similar groupings among hunters.

Several studies have found relationships between settings and experience preferences. For example, Brown et al. (1977) found a relationship between management preferences and experiences among hunters. Ballman et al. (1981) and McLaughlin and Paradise (1980) offer some support for a relationship between social, resource, and managerial attributes of a setting and desired cross-country skiing experiences. Also, research by Brown and Ross

(1982) testing notions inherent in the Recreation Opportunity Spectrum, suggests that desires for specific experiences are related to preferences for different recreational settings. Despite these findings more research is needed on the relationship between desired experiences and the settings which facilitate them to confidently apply this concept in management (Brown 1981; Brown and Haas 1980; Harris 1981).

Examination of these past studies and the conceptual framework offered by Driver and Brown (1975; 1978) led to the following hypotheses:

1. There are definable segments of wilderness recreationists which differ according to the experience they desire. Desired experience is defined here as it has been in several past studies: it is the package of specific psychological outcomes desired by a recreationist when choosing to engage in a specific recreation activity.
2. Physical, social and managerial setting preferences differ among wilderness recreationists desiring different types of experiences.
3. Activity participation differs among wilderness recreationists desiring different experiences.

#### *Procedures*

The study population included recreationists who used the Popo Agie Primitive area and the Fitzpatrick and Bridger Wilderness areas during the summer of 1978. These areas are located in Wyoming's Wind River range southeast of Teton National Park. The Bridger (970 sq km) stretches approximately 130 kilometers along the west side of the Continental Divide. The Fitzpatrick (430 sq km) and the Popo Agie (170 sq km) are contiguous with the Bridger and are located on the east side of the Divide. The areas are popular for private recreation excursions but are also used by organized groups and outfitters. Forest Service estimates of recreation use in 1977 were 50,000, 23,000 and 220,000 visitor days for the Popo Agie, Fitzpatrick and Bridger, respectively. Estimates prior to 1977 indicate annual use had been steadily increasing.

Survey research techniques were employed to collect data with the sample frame for mail questionnaires developed on-site. Subjects questioned were non-commercial recreation users of the areas; outfitters, commercial groups, and organized groups were not included in the study. Names and addresses were obtained from interviews at trailheads and mailback postcards distributed on windshields of cars parked at trailheads. In both approaches the users were told the purpose of the study and that later they would be sent a mail questionnaire. They were then asked to participate.

Samples were obtained at all primary trailheads for the Popo Agie and Fitzpatrick areas and two of the ten primary trailheads for the Bridger area. The Bridger Trailheads sampled were those most used for western access to the Popo Agie and Fitzpatrick areas.

The strategy for sampling involved stratifying by trailhead and time of week. Within these strata, time periods containing clusters of users were ran-

domly sampled. All recreationists within a cluster were sampled. Since travel distances limited the number of times that Bridger trailheads could be sampled, a mailback postcard was used to supplement the sample of Bridger recreationists. At the end of each sampling day, mailback postcards were placed on the windshields of cars parked at these trailheads. Four hundred forty-six of these cards were distributed, of which 37 percent were returned. Comparisons of these subjects' responses to the responses of interviewed subjects revealed no differences between the two groups, so the two groups of subjects using the Bridger Wilderness were pooled.

All subjects were sent a follow-up questionnaire. This questionnaire was designed to collect information concerning preferences for psychological outcomes, setting attributes and potential management actions. Additional information was collected concerning respondents' activities during the trip.

To assess experience outcomes, forty-six items were selected from a pool of items.<sup>1</sup> Psychological outcome items were sampled to represent a broad range of outcomes potentially important to people. Seventy-two items measuring setting attribute preferences and 57 items measuring preferences for management actions were also included on the questionnaire. These items were developed using judgment, results of past research, input from area managers, and data from Shoshone National Forest public involvement efforts. For each set of items, subjects were asked to indicate whether the item listed would add to or detract from their satisfaction on a trip similar to the one they had when they were contacted. We did not ask for specific reports of past trips in order that we might pose hypothetical management actions, setting attributes, and psychological outcomes to which users could react.

Responses to outcome, setting, and management action items were elicited on a 9-point response format with the following response categories: Most Strongly Adds (+4), Strongly Adds (+3), Moderately Adds (+2), Slightly Adds (+1), Neither Adds nor Detracts (0), Slightly Detracts (-1), Moderately Detracts (-2), Strongly Detracts (-3), Most Strongly Detracts (-4).

The questionnaire was pretested for clarity by administering it to recreationists during a two week period at the beginning of the 1978 use season. Of 96 pretest questionnaires, 36 were returned. Evaluation of these responses indicated few changes were needed. Pretest respondents were included in the group of study respondents and pretest non-respondents were sent a questionnaire when the mailing was made to all other subjects in the study. Thus the pretest subjects were pooled with other subjects in the study.

Data were analyzed in three stages. First, three separate I-Clust variable cluster analyses (Revelle 1977) were performed on each set of items relating to experience outcomes, setting attributes and potential management actions. These analyses provided clusters of empirically associated groups of items for each set included on the questionnaire.

<sup>1</sup>Items were selected from a pool developed to measure 42 different outcomes in 20 domains. They are available from B. L. Driver, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.



I-Clust is a hierarchical routine which uses the unattenuated correlation as a measure of similarity. Two statistics are used for identification of a cluster: (1) alpha, which is Cronbach's (1951) estimate of internal consistency and is the mean of all possible split half reliabilities, and (2) beta, which is the worst possible split half reliability of a test. A cluster of items is identified when the joining of items to a cluster no longer increases either the alpha or beta. Means for a cluster were computed by summing and averaging each respondent's cluster mean. A subject was treated as having missing data for a cluster only if he had no valid scores for items in a cluster.

In a second stage of analysis, groups of subjects rating the experience outcome clusters similarly were identified by NORMIX object cluster analysis (Wolfe 1978; 1970). These groups are subsequently called *experience groups*. NORMIX seeks maximum likelihood estimates of the parameters of a mixture of multivariate normal distributions. The likelihood equations are solved iteratively through the estimation of the probability of an object's membership in each cluster until the likelihood reaches a relative maximum. Each object in the sample is assigned a probability of membership in each cluster. After groupings are assigned, data are tested for the number of significantly different groups in the sample using a ratio of maximum likelihood estimates for two different hypotheses concerning the number of groups in the sample. This ratio provides a significance test for rejecting the null hypothesis of the smaller number of types against the alternative of the larger number (Wolfe 1970). Further tests were conducted using one-way analysis of variance and Student-Neuman-Keuls test for mean differences to identify the specific outcome clusters on which groups differed.

In the third stage of analysis, the experience groups were examined for differences in their rating of setting attributes, potential management actions, and activities. Chi-square was used to test for differences among activities, while analysis of variance and the Student-Newman-Keuls test were used to test for differences among other variables.

### *Results*

Of the 434 questionnaires distributed, 307 were returned. Ten were marked return to sender leaving a response rate of 74 percent. Response rates of 79 percent ( $N = 135$ ), 75 percent ( $N = 77$ ), and 59 percent ( $N = 95$ ) were obtained from the Bridger, Fitzpatrick and Popo Agie users, respectively.

Given the close geographic proximity of the study areas and the similarities of their environments, respondents were pooled for analysis. Tests for differences between the areas on the experience group variable were not significant ( $p \leq .05$ ).

### **Outcome Setting and Management Clusters**

The variable cluster analyses produced 13 psychological outcome, 16 setting attribute, and 14 management action preference clusters. The assignment

of items to clusters, titles assigned to each cluster and alpha statistics are shown in Table 4. All clusters but one, Resource Restoration, had alpha values greater than 0.50, which is Revelle's (1977) suggested criterion for indication that a cluster is internally consistent. The decision was made, however, to retain this cluster, because its alpha (.48) was quite close to the .50 criterion. Overall means on the psychological outcome clusters are shown in the second column of Table 1 while means on the setting and management scales are in the second column of Table 2. The remainder of both tables show experience group means which are discussed in the next two sections.

The first column of numbers in Table 1 shows the overall relative importance of the 13 wilderness-related psychological outcomes to the users of the three study areas. Those scores show that, on the average, all the experiences, with the possible exception of meeting and observing new people ( $\bar{x}$  of 0.2), would add to the satisfaction that would be expected from a future similar trip to the area. In fact, the first four clusters, which indicate satisfaction related to nature enjoyment, solitude-tranquility, exercise and learning added strongly to most strongly ( $\bar{x}$  scores of 3.0 to 3.5). The next four including escaping pressure, gaining autonomy, being with similar people, and achievement-self realization added moderately to strongly ( $\bar{x}$  scores 2.7 to 2.8). Therefore, these eight outcomes were, on the average, quite important to the users and include those which are commonly associated with the concept of wilderness recreation. The remaining five were positive, but less so, and their sizable standard deviations indicate a wider range of importance to users. Given the study sample, wilderness recreationists, it is not surprising that meeting and observing new people had the lowest means and standard deviations.

The second column of numbers in Table 2 shows means on the setting attribute and management action preference clusters. The highest scored setting attribute was resource characteristics such as wildlife, streams, and wide views ( $\bar{x}$  of 3.1) which added strongly to satisfaction. Additionally, rugged terrain, fish, and water without access, were rated as adding moderately to strongly to satisfaction ( $\bar{x}$  range from 2.4 to 2.9). Information and easy travel were also positive but only slightly so ( $\bar{x}$  of 1.9 and 1.6).

The remaining setting attributes, crowding (seeing others, contacting others, presence of outfitters), impact of others (on structures, trails, soil, vegetation; violation of wildland ethics), domestic animals and pets, and absence of regulations, were perceived to detract slightly to strongly from a user's experience.

Of the 14 clusters pertaining to potential management action, users perceived 11 to be positive (Table 2). As might be expected, the most positive response was elicited by items with the least coercive impact on non-commercial users and concerned mitigation of problems relating to domestic animals, ability to obtain information, restrictions on outfitter and commercial groups, and limitations on party sizes. Of the three management actions eliciting negative responses, two pertained to restrictions on travel in the wilderness and one to development in the area. Overall the standard deviations were much higher for this set of items than for the experience or setting attribute items.



## User Groups

User groups were identified using object cluster analysis. Since there was no expectation that experience groups should differ on every desired experience outcome, and because of limitations within NORMIX, only 5 of the 13 outcome clusters were used in forming groups. These were security, autonomy, achievement, leadership, and risk taking. In the absence of pre-existing information as to exactly which clusters to use, judgments were made in selecting these clusters. These decisions were guided by managers' perceptions of the types of recreationists at the study areas and inferences concerning the experience outcomes which may be differentially important to recreationists. As a check against this choice of clusters, additional analyses were conducted using other combinations of clusters. The initial analysis produced results giving the most distinct user groups and is reported here.

Of the 307 questionnaires, 48 had missing data and could not be used in object cluster analysis, and 14 were unique and not classified. A chi-square test (Wolfe 1970) of the hypothesis that there were three instead of two groups was significant ( $p < 0.05$ ,  $\chi^2 = 88.2$ , 40 d.f.). The test for four instead of three groups was not significant ( $p < 0.05$ ,  $\chi^2 = 37.65$ , 40 d.f.). Of those classified, 21 percent were in Group I, 19 percent in Group II, and 60 percent in Group III.

To identify specific statistically significant differences between group means, an analysis of variance and a Student-Newman-Keuls test were conducted on each experience outcome cluster. Table 1 shows results of this analysis as well as the mean for each group across all outcome clusters. Analysis of variance revealed that group means differed on all clusters except one, family togetherness. However, Group III had means not significantly different from Group I on being with similar people, security and meeting other people and means not significantly different from Group II for exercise, learning and escape pressure. Additionally, Group II had a mean not significantly different from Group I on nature.

The most notable distinctions of Group I are (1) its 2-point separation from Group III and more than 3-point separation from Group II on risk taking and (2) its .5 to 1.5 scale point separation from Groups II and III on autonomy, achievement, escape pressure, and leadership. It is not surprising that those are the clusters on which the greatest separation was found since all but one were used in the object analyses.

Though Group II differed from others on most of the clusters, it is most distinguishable in having the lowest means on risk-taking, security (being near helpful people), and meeting new people. This group had the lowest (and only negative) mean in its rating of meeting and observing new people, which was two points lower than the ratings by Groups I and III. Additionally, the Group II mean for risk taking is more than two points lower than those of Groups I and III and the Group II mean for security is more than one point lower than those for Groups I and III.

Group III had no mean as extreme as either Group I or II. It did rate escaping physical pressure, nature and autonomy lowest among all groups. In

TABLE 1  
Overall Means and Standard Deviations for the Psychological Outcome Clusters and Statistically Significant Different Means on Those Scales by the Three Experience Groups.<sup>1</sup>

Psychological Outcome Cluster	Entire Sample (n = 307)			Experience Group Means		
	Mean	Standard Deviation	Anova F-Test	I(n = 51)	II(n = 48)	III(n = 146)
Relationships with Nature	3.5	0.6	10.5*	3.8a <sup>2</sup>	3.6a	3.4b
Solitude—Tranquility	3.5	0.6	17.4*	3.8a	3.6b	3.3c
Exercise—Physical Fitness	3.3	0.8	5.7*	3.7a	3.3b	3.2b
General Learning	3.0	0.9	13.1*	3.5a	3.1b	2.8b
Escaping Personal and Social Pressure	2.8	1.0	13.3*	3.3a	2.8b	2.5b
Autonomy <sup>3</sup>	2.8	0.9	57.9*	3.6a	3.0b	2.3c
Being With Similar People	2.7	1.1	7.6*	2.7a	2.2b	2.9a
Achievement-Self Realization <sup>3</sup>	2.7	0.8	42.7*	3.5a	2.5b	2.5b
Family Togetherness	2.3	1.7	0.4	2.3	2.4	2.2
Security <sup>3</sup>	1.9	1.4	23.7*	2.0a	0.9b	2.3a
Risk Taking <sup>3</sup>	1.6	1.6	117.1*	3.5a	0.1b	1.5c
Leadership <sup>3</sup>	1.6	1.7	18.3*	2.3a	1.0b	1.6c
Meeting and Observing New People	0.2	1.7	40.6*	0.8a	-1.5b	0.6a

<sup>1</sup>Cluster scores were computed as the mean of valid scores on items within a cluster. See Table 4 for items composing each cluster. The response formats for items ranged from Most Strongly Adds (+ 4) through Neither Adds nor Detracts (0) to Most Strongly Detracts (- 4) to/from Satisfaction.

<sup>2</sup>Means with different subscripts are those which differed significantly ( $p < .05$ ) using Student-Neuman-Keuls test for mean differences.

<sup>3</sup>These scales were used in the NORMIX object cluster analysis which resulted in determining the three experience preference groups.

\*These tests were statistically significant ( $p < .05$ ).

TABLE 2  
 Overall Means and Standard Deviations<sup>1</sup> for the Setting Attribute and Management Clusters and Statistically Significant Different Means on Those Scales by the Three Experience Groups.

Attribute Clusters	Entire Sample		Experience Groups <sup>1</sup>			
	Mean	Standard Deviation	Anova F-Test	I (n = 51)	II (n = 48)	III (n = 146)
<i>Setting Attribute</i>						
Resource Characteristics (wildlife, wide views, etc.)	3.1	0.8	11.08*	3.5a <sup>2</sup>	3.3a	2.9b
Rugged Terrain	2.9	1.1	10.17*	3.5a	3.0b	2.7b
Fish	2.5	1.5	3.78	—	—	—
Water Without Access	2.4	1.3	13.00*	3.0a	2.9a	2.1b
Information	1.9	1.4	0.19	—	—	—
Easy Travel	1.6	1.2	1.91	—	—	—
Crowding-Seeing Others	-1.6	1.2	14.50*	-1.8a	-2.2a	-1.2b
Structures	-1.9	1.3	6.11*	-2.4a	-2.1a,b	-1.7b
Trail Impacts	-2.0	1.3	.14	—	—	—
Absence of Regulations	-2.1	1.1	4.42*	-2.5a	-1.9b	-2.0b
Dogs	-2.1	1.3	0.41	—	—	—
Outfitters	-2.1	1.3	0.61	—	—	—
Domestic Animals	-2.1	1.3	4.90	—	—	—
Soil-Vegetation Impacts	-2.2	1.0	2.86	—	—	—
Crowding-Contacting Others	-2.7	1.0	3.69	—	—	—
Violations of Wildland Ethics	-2.7	0.8	16.59*	-3.1a	-2.9a	-2.5b

<i>Management Action</i>						
Restrictions on Domestic Livestock	2.3	1.7	2.39	—	—	—
General Information	2.3	1.4	1.09	—	—	—
Restrictions on Outfitters and Commercial Groups	2.2	1.5	5.04*	2.7a	2.3a,b	1.9b
Restrictions Based on Size of Group	1.9	1.7	5.85*	2.5a	1.9a,b	1.6b
Resource Restoration	1.8	1.4	2.11	—	—	—
High Enforcement of Regulations	1.4	1.7	3.45*	1.9a	1.0b	1.3a,b
Provision of Information-Reduction of Uncertainty	1.3	1.4	2.45	—	—	—
Fish Stocking	1.0	1.7	2.29	—	—	—
Restrictions on Pets in Backcountry	0.9	2.1	0.70	—	—	—
Special Fishing Regulations	0.5	1.6	1.29	—	—	—
No Restrictions on Camp Area	0.2	1.6	0.47	—	—	—
Development Related Actions	-0.2	1.1	5.57*	-0.4a	-0.6a	0.0b
Restrictions on the Course of the Trip	-0.2	1.8	1.87	—	—	—
High Restriction on Public Use	-0.4	1.7	0.50	—	—	—

\*Cluster scores were computed as the mean of valid scores on items within a cluster. See Table 4 for items composing each cluster. The response format for items ranged from Most Strongly Adds (+ 4) through Neither Adds nor Detracts (0) to Most Strongly Detracts (- 4) from Satisfaction.

\*Means with different subscripts are those which differed significantly ( $p \leq .05$ ) using Student-Neuman-Keuls test for differences between means.

\*These tests were statistically significant ( $p \leq .05$ ).

addition, this group has means more positive than Group II on being with similar people, meeting new people and security.

### User Group Differences on Activities, Settings and Potential Management Actions

The percentages of each experience group which had engaged in seven recreation activities during the trip on which they were interviewed is shown in Table 3. A chi-square test showed that activity participation did not differ significantly ( $p < .05$ ) among the groups for those activities which showed high rates of use (fishing, hiking, photography, and camping) or low rates of use (horseback riding). However, participation in those two activities (mountain climbing and nature study) which had more moderate rates of use was significantly different. It is interesting that Group I which was distinguished by its very high score on the risk-taking cluster had a considerably higher percentage of users who reported they had engaged in mountain climbing and nature study.

Experience groups differed significantly on 7 of the 16 setting-attribute clusters and 4 of the 15 management action clusters (Table 2). Though statistically significant differences were found, the magnitude of the differences is not as great as those found for experience outcomes. The greatest separation, .90, was found for the setting attribute cluster, water without access, and the management action clusters, restrictions on outfitter and commercial groups and restrictions based on group size.

Group I differed from Group II and III in its higher mean for rugged terrain and lower mean for absence of regulations. Consistent with its low ratings on absence of regulations, Group I had a higher mean for the management action, enforcement of regulations, than did Group II. Group I's high mean for rugged terrain might be expected given its high-risk orientation and greater participation in mountain climbing.

TABLE 3  
Number and Percentage of Participants in Wilderness Activities  
in Each Experience Group

Activity	Experience Groups		
	I (n = 51)	II (n = 48)	III (n = 146)
Mountain Climbing <sup>1</sup>	22(43%)	5(10%)	36(25%)
Fishing	38(75%)	33(70%)	85(58%)
Horseback Riding	0(0%)	1(2%)	6(4%)
Hiking	49(96%)	48(100%)	139(95%)
Nature Study <sup>1</sup>	25(49%)	14(29%)	38(26%)
Photography	45(88%)	39(81%)	124(84%)
Camping	49(96%)	47(98%)	134(92%)

<sup>1</sup>These activities showed significant differences ( $p < .05$ ) between groups using a Chi-square test.



**TABLE 4**

**Questionnaire Items Groups on the Basis of I-Clust Variable Cluster Analysis.**

<i>Psychological Outcome Clusters</i>	
Relationships with Nature (Alpha <sup>1</sup> = 0.62)	Applying your skills
Enjoying the sights and sounds of nature	Developing your skills and abilities
Learning more about nature	Learning what you are capable of
	Developing a sense of self pride
	Gaining a sense of accomplishment
Escaping Physical Pressure (Alpha = 0.73)	Family Togetherness
Experiencing the peace and calm	Doing something with your family
Experiencing tranquility	
Experiencing solitude	Security (Alpha = 0.58)
Getting away from crowded situations for awhile	Being near considerate people
Being away from crowds of people	Being near others who could help you if you needed them
Exercise-Physical Fitness (Alpha = 0.81)	Risk Taking (Alpha = 0.67)
Getting exercise	Taking risks
Keeping physically fit	Chancing dangerous situations
	Experiencing the risks involved
General Learning (Alpha = 0.82)	Leadership (Alpha = 0.84)
Discovering something new	Sharing your outdoor skills with others
Exploring the area	Teaching your outdoor skills to others
Getting to know the lay of the land	Sharing your knowledge with others
Learning about the topography of the land	Helping direct the activities of others
Escaping Personal and Social Pressure (Alpha = 0.51)	Meeting-Observing New People (Alpha = 0.81)
Avoiding everyday responsibility for awhile	Talking to other people in the area
Releasing or reducing built-up tension	Meeting other people in the area
	<i>Setting Attribute Clusters</i>
Autonomy (Alpha = 0.83)	Resource Characteristics (Alpha = 0.73)
Do things your own way	Elk
Being free to make your own choices	Bighorn sheep
Being in control of things that happen	Petrified wood
Feeling free from society's restrictions	Meandering streams
Getting away from the demands of other people	Wide views
Getting away from the usual demands of life	A variety of birds
	Wildflowers
Being with Other People (Alpha = 0.53)	Rugged Terrain (Alpha = 0.82)
Being with members of your group	Rugged terrain
Being with others who enjoy doing the same things as you	Barren rocky peaks
	Steep rugged trails which tax your endurance
	Steep terrain
Achievement-Self Realization (Alpha = 0.86)	Fish (Alpha = 0.91)
Learning more about yourself	Catchable golden trout
Thinking about your personal values	Catchable cutthroat trout
Doing something not done by everyone	Good fishing lakes
Challenging nature with your skills	Good fishing streams
Feeling your independence	

TABLE 4—Continued

Setting Attribute Clusters—Continued

- Water Without Access (Alpha = 0.77)  
 Lakes with no trails to them  
 Long stretches of stream with no trails to them  
 Beaver ponds with no access  
 Isolated lakes
- Information (Alpha = 0.62)  
 Availability of information describing recreation use levels  
 Availability of information describing the natural history of the area  
 Availability of information describing recreation opportunities in the area
- Easy Travel (Alpha = 0.75)  
 Trails with switchbacks which make it easier to climb steep grades  
 Directional signs with mileages to destinations  
 Footbridges over boggy areas  
 Well-maintained trails free of obstacles  
 Well-maintained footpaths
- Crowding-Seeing Others (Alpha = 0.67)  
 Large organized climbing groups  
 Large groups (ten and up)  
 Other recreationists on trail  
 Seeing others near your campsite
- Structures (Alpha = 0.62)  
 Structures such as lean-tos at campsites  
 Hitching rails at campsites  
 Man-made fences
- Trail Impacts (Alpha = 0.76)  
 Hikers making shortcuts  
 Shortcuts which cut across trails with switchbacks  
 Horseriders making shortcuts
- Absence of Regulations (Alpha = 0.69)  
 Enforcement of regulations  
 Absence of regulations  
 Regulations requiring people to pack out trash  
 Unobeyed regulations  
 Equitable regulations for horseriders  
 Equitable regulations for outfitters
- Dogs (Alpha = 0.72)  
 Dogs chasing wildlife  
 Dog droppings on trail  
 Dogs with other recreationists
- Outfitters (Alpha = 0.70)  
 Outfitter tents left standing while not being used  
 Horseriders that inconvenience you
- Domestic Animals (Alpha = 0.85)  
 Horse droppings on trail  
 Hikers and horseriders using the same trail  
 Domestic livestock grazing in the areas you hike through  
 Domestic livestock grazing in areas you would like to camp  
 Signs of domestic livestock having been near your campsite
- Soil-Vegetation Impacts (Alpha = 0.72)  
 Worn vegetation around lakes  
 Deeply eroded trails  
 Soil erosion around campsites
- Crowding-Contacting Others (Alpha = 0.71)  
 Campsites too close together  
 Camping in overcrowded surroundings  
 Hikers who inconvenience you  
 Commercial groups who inconvenience you
- Violations of Wildland Ethics (Alpha = 0.89)  
 Loud recreationists  
 Signs of improper disposal of human waste  
 Unclear water  
 Litter around campsites  
 Others using water improperly  
 Areas stripped of firewood  
 Tents visible  
 Evidence of numerous campfires

TABLE 4—Continued

*Management Action Clusters*

<p>Restriction on Domestic Livestock (Alpha = 0.83)</p> <ul style="list-style-type: none"> <li>Prohibit domestic livestock on highly used trails</li> <li>Prohibit domestic livestock from grazing near high use camping areas</li> </ul>	<ul style="list-style-type: none"> <li>fishing opportunities can be found</li> <li>Make easily obtainable maps which show campsites according to how heavily they are used</li> <li>Make easily obtainable detailed maps on the wilderness</li> <li>Ensure well-maintained trails free of obstacles</li> <li>Ensure well-maintained and accurate directional signs</li> </ul>
<p>General Information (Alpha = 0.67)</p> <ul style="list-style-type: none"> <li>Make information packet on natural history, flora and fauna of area</li> <li>Make available information on regulations</li> </ul>	
<p>Restrictions on Outfitters and Commercial Groups (Alpha = 0.8)</p> <ul style="list-style-type: none"> <li>Disallow outfitters in high use areas</li> <li>Restrict where commercial groups may camp</li> <li>Disallow commercial groups to use high use areas</li> <li>Prohibit more than 10 horses per party</li> <li>Allow horseriders and pack animals at only central campsites</li> <li>Restrict horseriders and pack animals to certain trails</li> </ul>	<p>Fish Stocking (Alpha = 0.81)</p> <ul style="list-style-type: none"> <li>Discontinue fish stocking in high use areas<sup>2</sup></li> <li>Discontinue fish stocking in backcountry<sup>2</sup></li> <li>Increase fish stocking in the backcountry</li> </ul>
<p>Restrictions Based on Size of Group (Alpha = 0.78)</p> <ul style="list-style-type: none"> <li>Allow large groups only in certain areas</li> <li>Create regulations restricting party size to 10 or less</li> <li>Require permits for large groups</li> </ul>	<p>Restrictions on Pets in Backcountry (Alpha = 0.84)</p> <ul style="list-style-type: none"> <li>Create regulations stating that pets be kept on a leash in backcountry</li> <li>Create regulations prohibiting pets in high use areas</li> <li>Prohibit pets in the backcountry</li> </ul>
<p>Resource Restoration (Alpha = 0.48)</p> <ul style="list-style-type: none"> <li>Fill and harden eroded trails</li> <li>Revegetate areas made bare by campers</li> </ul>	<p>Special Fishing Regulations (Alpha = 0.54)</p> <ul style="list-style-type: none"> <li>Create regulations which restrict some lakes and streams to fly fishing only</li> <li>Place special creel limits which limit the number of fish kept in wilderness</li> </ul>
<p>High Enforcement of Regulations (Alpha = 0.61)</p> <ul style="list-style-type: none"> <li>Increase the number of backcountry rangers for stronger enforcement of regulations</li> <li>Place heavy fines (over \$50) for violation of wilderness regulations</li> </ul>	<p>No Restrictions on Camp Area (Alpha = 0.74)</p> <ul style="list-style-type: none"> <li>Prohibit camping within 100 feet of lakeshores<sup>2</sup></li> <li>Create areas where no overnight camping is permitted<sup>2</sup></li> <li>Prohibit campfires in the backcountry<sup>2</sup></li> <li>Designate lakes where campfires are allowed<sup>2</sup></li> <li>Make no restrictions on where you could camp</li> <li>Make no restrictions on where campfires could be made</li> <li>Restrict the number of designated campsites near heavily used lakes</li> </ul>
<p>Provision of Information-Reduction of Uncertainty (Alpha = 0.77)</p> <ul style="list-style-type: none"> <li>Make an easily obtainable information packet which describes where good</li> </ul>	

TABLE 4—Continued

*Management Action Clusters—Continued*

<p>Development-Related Actions (Alpha = 0.60)</p> <ul style="list-style-type: none"> <li>Place large stones instead of bridges at water crossings</li> <li>Remove all man-made structures</li> <li>Construct outhouse-type toilets at popular campsites</li> <li>Harden or reinforce highly used campsites</li> <li>Construct new trails to unaccessible lakes</li> <li>Construct more access points into the area</li> </ul> <p>Restrictions on the Course of the Trip (Alpha = 0.54)</p> <ul style="list-style-type: none"> <li>Limit length of stay in the area</li> <li>Prohibit use of highly used trails</li> </ul>	<p>High Restriction on Public Use (Alpha = 0.83)</p> <ul style="list-style-type: none"> <li>Disallow public users in high use areas</li> <li>Require a fee (\$5-10) to gain entrance to the wilderness</li> <li>Require a permit for entrance into the area which states where you may camp</li> <li>Establish a permit system that regulates the number of campers in heavily used areas</li> <li>Have trail quotas on weekends and holidays</li> <li>Place a daily limit on the number of recreationists that can enter a given trail</li> <li>Set restrictive quotas for entrance to an area which may deny you entrance</li> </ul>
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<sup>1</sup>Cronbach's Alpha is an internal consistency measure of reliability.

<sup>2</sup>Scoring reversed in forming clusters.

With the exception of differences on rugged terrain and regulations, Group II had quite similar setting preference and management preference means to Group I. However, Group III was found to have several differences with one or both of the other Groups. The setting attributes, resource characteristics and water without access, were found to add less to the satisfaction of Group III and crowding (seeing others) and violations of wildland ethics detracted less from their satisfaction than they did for both other groups. Further, Group III did not rate man-made structures as negatively as did Group I and for the management actions dealing with structures, Group III had a neutral mean (0) while the other two groups had negative means. In addition, Group III rated group size restrictions and restrictions on outfitters and commercial groups lower than did Group I. From these differences we conclude that Group III places less importance on a highly natural environment than do the other groups.

### *Discussion*

Data from this study have implications of both an applied and conceptual nature. Given that the conceptual implications raise practical questions, they preface an explanation of how these data may be used in experience based setting management.

## Concept Development

This study hypothesized that wilderness recreationists could be segmented into experience groups and that the groups would differ on the activities and attributes of the settings they prefer. Results of the study indicate we can accept each hypothesis. The confirmation of these hypotheses drawn from the Driver and Brown model of recreation choice gives support to the model. Our supposition was that if, as the model proposes, recreationists choose settings and activities on the basis of how they are expected to meet valued experience outcomes, then we would anticipate that users with different experience preferences would have different setting and activity preferences. It is emphasized that only limited support is provided for the model. In this study only a limited set of conclusions drawn from the model were tested. No tests were made of directionality or causality among the model components nor of the nature of relationships between specific activities, attributes and experiences. These are all areas that need research.

Also, while accepting the hypotheses of this study we give caution regarding an important issue in the use of psychometric survey instruments. This issue asks whether or not responses on rating scales, such as those asking for evaluation of an attribute's effect on satisfaction, actually give an indication of how recreationists will behave in choosing locations to recreate and in reacting to management (Heberlein 1973). Further specification of this question asks how many attribute or experience preference differences should be found and what should the magnitude of those differences be before differences in observable behavior can be expected?

In this study we did not find large mean differences between groups on their ratings of settings and management attributes. Yet, recognizing the limitations in questionnaire construction and interpretation, and other forms of potential bias, statistically significant differences should be predictive of behavioral choices of recreation settings and activities made by recreationists. We have taken this position in part because the study population is a relatively homogeneous group, wilderness recreationists, and large mean differences among them simply should not be expected. With this group, small differences in their preference structure may result in differences in the locations they recreate within a wilderness, which themselves are not likely to be tremendously different.

However, we also take the position that the validity of this approach needs to be established. Questions of construct validity (are we measuring the concepts we are intending?), predictive validity (can we actually predict an individual's choice of environment from information specified in this model?) and content validity (have we measured all the salient and discriminating attributes for a group of recreationists?) must be addressed in future research.

## Applications of Data

Recognizing these limitations we might still make recommendations about how the study data can be useful in experience based setting manage-



ment. To help facilitate discussion of the practical applications of the study findings, the three experience groups will be given names which reflect the most discriminating experience preferences of those groups. Group I was distinguished particularly by its higher ratings on the risk-taking and achievement-self realization clusters, so it will be called the *High Risk/Achievement Group*. Because Group II scored considerably lower on the security, risk-taking, and meeting and observing new people clusters, it will be called the *Low Risk/Social Interaction Group*. Group III will be called the *Norm* because it represented the largest proportion of the users and overall tended to show the least difference from the other segments.

These group labels reflect the implications that group differences have for management. Experiential satisfaction for the Norm group appears to be less dependent on physical and social surroundings than it does for the other groups. Physical and social wilderness setting attribute standards may be less restrictive for this group than for the other two groups.

The preferences of the Low Risk/Social Interaction group are likely to be met at locations where there is a low probability of seeing other people and encountering dangerous situations. This group's lower scores on the crowding and rugged terrain setting attribute clusters and low proportion of mountain climbers help support this position. Additionally, this group responded more favorably than the others to restrictions on group size.

Rough, rugged areas seem most likely to meet the experience and activity preferences of the High Risk/Achievement Group. They had the highest proportion of members engaged in mountain climbing and nature study (Table 3) the latter of which corresponds to their slightly higher score on the relationships with nature and general learning experience outcome clusters. They also scored the rugged terrain setting attribute cluster the highest, corresponding to their most distinguishing experience preferences. No differences directly related to their distinguishing preference were found on the management action clusters (Table 2), though they do appear to be slightly more receptive than other groups to regulations and enforcement.

As has been suggested in related studies (e.g., Brown and Haas 1980; Haas et al. 1980) these experiential data can, with additional judgment, aid managers at several points in the planning process. For example, by focusing on the setting attributes valued differentially for these experiences, managers might develop criteria and standards for inventorying land for its ability to provide different recreation opportunities. The criteria would be formulated in terms of physical features (e.g., type of terrain), social characteristics (e.g., number of encounters) and managerial actions (e.g., restrictions on outfitters). Of the areas included in this study, the locations easily accessible to people, domestic animals, outfitters, or commercial groups are more acceptable to the Norm Group than to the other groups. Areas of moderate accessibility, little or no development, low probability of encounters, and natural surroundings are more acceptable to the Low Risk/Social Interaction Group. Areas with rough or undeveloped access, rugged terrain at destination sites, high naturalness, and low probability of encounter appeal to the High Risk/Achievement Group. When a decision is made that a given area is to provide a

specific type of experience opportunity, management actions can be selected which facilitate the type of experience desired. For instance, to help users have low risk/social interaction experiences, managers might establish relatively inaccessible zones where fewer small groups might travel. This would increase the probability of users realizing a higher degree of isolation. Management actions to accommodate higher numbers of the Norm Group might emphasize providing outhouses and hardening campsites. For the High Risk/Achievement Group, a do-nothing alternative might be preferable. Leaving isolated and remote areas untrailed may provide opportunities for their desired experiences.

### Conclusions

The general intent of this study was to provide a test of concepts inherent in experience based setting management for outdoor recreation areas. Study results offer some support for these concepts. Recognizing the limitations of the study we have offered an illustration of how its results might aid in implementing experience based setting management. The study points out, however, that there is a need for further research which will aid in validating and refining these concepts.

### References

- Ballman G.E., Knopp, T.B., and Merriam, L.C., Sr. 1981. Managing the environment for diverse recreation: cross country skiing in Minnesota. *Agr. Exp. Stn. Bull. 544, Forestry Series 39*, St. Paul, Minn.
- Brown, P.J. 1981. Psychological benefits of outdoor recreation. p. 13-17 in *social benefits of outdoor recreation*. J. R. Kelly (ed.) Leisure Behavior Research Lab. Univ. of Ill., Champaign, Ill.
- Brown, P.J., Driver, B.L., and McConnell, C. 1978. The opportunity spectrum concept and behavioral information in outdoor recreation resource supply inventories: background and application. p.73-84 in *Integrated inventories of renewable natural resources: proceedings of the workshop*. USDA Forest Service Gen. Tech. Rep. RM-55, Rocky Mtn. For. and Range Exp. Sta., Fort Collins, Colo.
- Brown, P.J., Dyer, A.A., and Whaley, R.S. 1973. Recreation research—so what? *Journal of Leisure Research* 5(1):16-24.
- Brown, P.J. and Haas, G.E. 1980. Wilderness recreation experience: the Rawah case. *Journal of Leisure Research* 12(3):229-241.
- Brown, P.J. and Ross, D.H. 1982. Recreation experience preferences as variables in recreation setting preference decisions. In press: Proceedings of the 1981 NRPA symposium forest and rivers session. Agr. Exp. Stn., Univ. of Minn.
- Buist, L.J. and Hoots, T.A. 1982. Recreation opportunity spectrum approach to resource planning. *Journal of Forestry* 30(2):84-86.
- Clark, R.N. and Stankey, G.H. 1979. The recreation opportunity spectrum: a framework for planning management and research. USDA Gen. Tech. Rep. PNW-98. Pac. Northwest For. and Range Exp. Stn., Seattle, Wash.
- Cronbach, L.J. 1951. Coefficient alpha and the internal structure of tests. *Psychometrika* (16)297-334.
- Driver, B.L. 1976. Quantification of outdoor recreationists' preferences. p. 165-187 in *Research camping and environmental education*. Betty van der Smissen (ed.) Penn State Series II, Univ. Park, Pa.

- Driver, B.L., and Brown, P.J. 1975. A socio-psychological definition of recreation demand, with implications for recreation resource planning. p. 64-88 in *Assessing demand for outdoor recreation*. National Academy of Sciences, Wash., D.C.
- Driver, B.L. and Brown, P.J. 1978. The opportunity spectrum concept and behavioral information in outdoor recreation resource supply inventories: a rationale. p. 24-31 in *Integrated inventories of renewable natural resources: proceedings of the workshop*. USDA Forest Service Gen. Tech. Rep. RM-55. Rocky Mtn. For. and Range Exp. Stn., Fort Collins, Colo.
- Driver, B.L. and Cookaey, R.W. 1978. Preferred psychological outcomes of recreational fishing. p.27-40 in *Catch and release fishing as a management tool: a national sport fishing symposium*. R.A. Barnhart and T.D. Roelofs (ed.). Humboldt State University, Arcata, Calif.
- Driver, B.L. and Rosenthal, D.H. 1982. Measuring and improving the effectiveness of public outdoor recreation programs. Report on a recreation output resources workshop Dec. 11-14, 1979, Harpers Ferry, W.V. Dept. of Human Kinetics and Leisure Studies, George Washington Univ., Wash., D.C.
- Driver, B.L., and Tocher, S.R. 1970. Toward a behavioral interpretation of recreation engagements, with implications for planning. p. 9-31 in *Elements of outdoor recreation planning*. B.L. Driver, (ed.). Univ. Microfilms Mich., Ann Arbor, Mich.
- Haas, G.E., Driver, B.L. and Brown, P.J. 1980. A study of ski touring experiences on the White River National Forest. p. 25-30 in *Proceedings of the North American symposium on dispersed winter recreation*. Office of Special Programs Educational Series 2-3, Agr. Ext. Ser., Univ. of Minn., St. Paul, Minn.
- Haas, G.E., Driver, B.L., Brown, P.J. 1981. Measuring wilderness recreation experiences. p.25-30 in *Proceedings of the wilderness psychology group annual conference*. L. Cannon (ed.). Dept. of Psychology, Univ. of N.H., Durham, N.H.
- Harris, C.C. 1981. Experiential outcomes as social benefits of outdoor recreation. p. 18-25 in *Social benefits of outdoor recreation*, J.R. Kelly (ed.). Leisure Behavior Research Lab, Univ. of Ill., Champaign, Ill.
- Hautaluoma, J. and Brown, P.J. 1978. Attributes of the deer hunting experience: a cluster analytic study. *Journal of Leisure Research* 10(4):271-287.
- Heberlein, T.A. 1973. Social psychological assumptions of user attitude surveys: the case of the wilderness scale. *Journal of Leisure Research* 5(3):18-33.
- Hendee, J.C. 1974. A multiple-satisfaction approach to game management. *Wildlife Society Bulletin* 2(3):104-113.
- Lawler, E.E. 1973. *Motivation in work organizations*. Monterey, Calif.: Brooks/Cole.
- Lucas, R.C., and Stankey, G.H. 1974. Social carrying capacity for backcountry recreation. p. 14-23 in *Outdoor recreation research: applying the results*. USDA Forest Service Gen. Tech. Rep. NC-9, North Cent. For. Exp. Stn., St. Paul, Minn.
- Manfredo, M.J., Brown, P.J., and Haas, G.E. 1980. Fishermen values in wilderness. *Proceedings of the Western Association of Fish and Wildlife Agencies*. 52:276-297.
- McLaughlin, W.J. and Paradice, W.E.J. 1980. Using visitor preference information to guide dispersed winter recreation management for cross country skiing and snowmobiling. p. 64-72 in *Proceedings of the North American symposium on dispersed winter recreation*. Office of Special Programs Educational Series 2-3, Agr. Ext. Ser., Univ. of Minn., St. Paul, Minn.
- Revelle, W. 1977. Hierarchical cluster analysis—computer program: Northwestern Univ., Evanston, Ill.
- Stankey, G.H. 1974. Criteria for the determination of recreational carrying capacity in the Colorado River Basin. In *Environmental management in the Colorado river basin*. A.B. Crawford and D.F. Peterson (eds.). Utah State Univ. Press, Logan, Utah.
- Wagar, J.A. 1964. The carrying capacity of wildlands for recreation. *Forest Science Monograph* 7.

- Wagar, J.A. 1974. Recreational carrying capacity reconsidered. *Journal of Forestry* 72(5):274-278.
- Wolfe, J.H. 1978. Comparative cluster analysis of patterns of vocational interest. *Multivariate Behavioral Research* 13(January):33-44.
- Wolfe, J.H. 1970. Pattern clustering by multivariate mixture analyses. *Multivariate Behavioral Research* 5(July)329-350.