

## Past Experience and Behavioral Choice Among Wilderness Users

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The amount of past experience in a recreation activity or setting has been associated with setting preferences, but has not been a good predictor of site choices. Research suggests that other factors such as social influences and constraints (Kuentzel & Heberlein, 1992) might have more influence than past experience or setting preferences on site choice. This study examined the association between recreational choice behavior, past wilderness experience, setting preferences, social factors, and constraints among a sample of wilderness users in Nopiming Provincial Park, Manitoba, Canada. Data were collected from self registrations and a mail questionnaire. In contrast to other studies, past experience was associated with site choices. Experienced users chose more difficult, less managed routes. However, the routes chosen were not consistent with stated user preferences. Of the social and constraint variables considered, only awareness of park routes was associated with choices. Socioeconomic variables and social group of participation were not associated with choices.

**KEYWORDS:** *Wilderness recreation, behavioral choice, constraints, past experience, setting preferences.*

### Introduction

Research in recreation choice behavior has provided insight into the experiences people seek from recreation, setting attributes that are important to recreation experiences, and factors that influence choice behavior (Stankey & McCool, 1985). In wilderness recreation, understanding the factors that influence site choice is important in redistributing use, in maintaining the isolation and solitude characteristics of the wilderness experience, and reducing user conflicts and congestion (Lucas, 1990). The amount of experience in a recreational activity or setting has been cited as one factor influencing site choice (e.g, Bryan, 1977; Virden & Schreyer, 1988; Williams & Huffman, 1986).

Bryan's (1977) theory of recreation specialization, of which past experience is one component, suggests that as individuals gain experience in an

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activity they progress through stages of development accompanied by changes in setting preferences, social group affiliation, and attitudes. This developmental approach assumes that individuals choose recreational settings that are consistent with their preferences and attitudes. However, constraints such as site availability, distance to substitute sites, costs, social pressures, and socioeconomic factors may intervene and limit the congruency between individual preference and actual site choice (Kuentzel & Heberlein, 1992; Watson, Roggenbuck, & Williams, 1991). While studies have examined the association between past experience and preferred recreational settings, little research examines whether differences in preferences translate into different recreation site choices (Kuentzel & Heberlein, 1992) and how site choice changes with experience.

This paper extends the literature by assessing the influence of past experience on actual site choice. Specifically, we use a conceptual model of recreation choice behavior to examine the association between recreation site choice behavior, past experience, setting preferences, social factors, and constraints among wilderness users.

#### *Past Experience and Setting Preferences*

A common tenet in recreation site choice is that individuals engage in recreational activities at sites where the preferred combination of physical, social, and managerial settings are available to produce satisfying experiences (Driver & Brown, 1978). However, several factors can affect preferences or intervene to affect site choice. One factor associated with setting preferences is the amount of experience an individual has in an activity or setting. Experience has been included as a component in various concepts including recreation specialization (e.g., Bryan, 1977), experience use history (e.g., Schreyer, Lime, & Williams, 1984), and indices of past experience (e.g., Hammit & McDonald, 1983; Watson & Niccollucci, 1992).

Bryan (1977) proposed the concept of recreation specialization to explain differences in observed behaviors among anglers. Specialization is usually considered as a multidimensional construct with behavioral and affective aspects of which past experience is a strong component. Bryan hypothesized that the amount of experience with and commitment to an activity follows a sequence with some individuals progressing through sequential stages of development. As individuals progress along this continuum they become specialized in their behaviors and their attitudes and preferences change. Thus, more experienced users prefer more natural types of conditions and less management intervention. In his study of anglers, Bryan observed that as participants became specialized they joined a leisure social world of fellow anglers who held similar beliefs and attitudes and engaged in similar behaviors. Furthermore, attitudes shifted from a consumptive orientation to preservation and the setting of the activity became more important. He concluded that anglers at different stages of specialization choose different settings in which to fish and that these settings can be predicted by knowing

the level of specialization. Bryan (1979) proposed similar processes for other recreational activities, although the association between specialization, preferences, and site choice was not examined empirically.

Studies confirm that differences occur in the physical, management, and social setting preferences among experience levels. For example, using a composite index of past experience in water-based recreation, Hammitt and McDonald (1983) found that experienced river users were more sensitive to resource disturbance and were opposed to management regulations. Kauffman and Graefe (1984) found that as canoeing specialization increased, preference for difficult and challenging rivers increased. In wilderness recreation, Williams and Huffman (1986) found backpacking specialization to be associated with trail preferences. Experienced users preferred trails that were to the high country, long, above treeline, and with mountain views. Less experienced users preferred easily accessible trail heads, trails without risk or danger, and trails with other people. Virden and Schreyer (1988) found specialized wilderness hikers preferred open meadows, the presence of bears, and desert canyons; and were more tolerant of party size limits and revegetation programs. Experienced users placed less importance on availability of firewood and well-maintained trails and were less tolerant of seeing other recreationists on trails, hearing loud recreationists, and the presence of logging, mining, and livestock. Although not tested explicitly, all of these studies assumed that site choice followed from preferences and that recreationists chose sites consistent with preferences.

### *Cognitive Development and Past Experience*

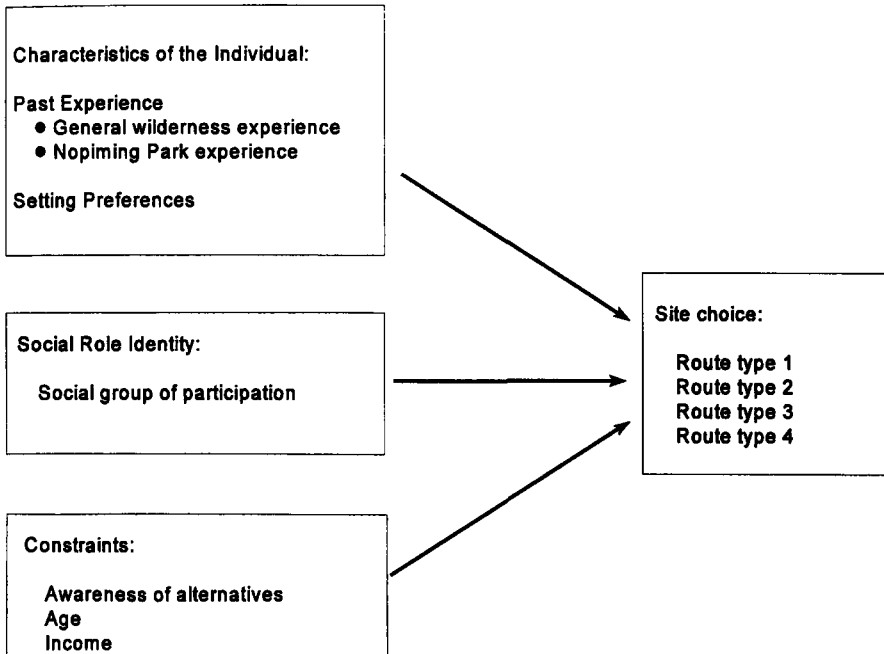
Cognitive development theory can describe how past experience in recreational activities or settings influences preferences and recreation choice behavior (Williams, 1985; Williams, Schreyer, & Knopf, 1990). Past experience reflects the amount and type of information available to an individual when making choices and may reflect the cognitive development level of an individual. Developmental theory suggests that as recreationists gain experience they also gain knowledge about given settings or activities and their internal cognitive representations of the setting become more complex (e.g., Hammitt, Knauf, & Noe, 1989; Williams, 1985; Williams, Schreyer, & Knopf, 1990). For example, respondents with high levels of experience and commitment use more attributes to describe site choice decisions and they describe site attributes with more specificity than less experienced users (Schreyer & Beaulieu, 1986). Experienced users also show greater specificity of desired outcomes (Schreyer, 1982), greater differentiation and integration of motivational domains (Williams, Schreyer, & Knopf, 1990), and have increased differentiation on various types of situation attributes (Williams, 1985). It is assumed that individuals with more numerous and complex representations respond to external stimuli in different ways (Watson, Roggenbuck, & Williams, 1991) by choosing particular settings in which to recreate. Although studies suggest cognitive changes with increased experience, the

relationship between experience and actual choice behavior has received much less attention.

Despite the identified link between preferences and cognitive level, little work has been done in the experience literature on the association of past experience and actual site choice. Kuentzel and Heberlein (1992) were among the first to examine the association between past experience and site choice. Their findings indicate that several specialization dimensions (including past experience) were not associated with different site choices. They conclude that choice may be a function of constraints beyond the control of the individual.

Kuentzel and Heberlein (1992) suggested three factors that may influence site choice; social role identity, resource availability, and institutional constraints. Social role identity refers to the different social roles that individuals assume under different social situations (Kuentzel & Heberlein, 1992). For example, people on family outings choose different sites when playing the parent or teacher role than they would if participating with peers. Choices may also be constrained by the availability of time and financial resources. In this case, individuals with family, career obligations, or those earning low incomes may not have the resources to invest in longer, more remote wilderness trips. Therefore, they are constrained to using sites closer to home which may also be shorter and less remote than what they actually prefer. Availability of recreational opportunities and awareness of these opportunities may also constrain choice. If opportunities do not exist, or an individual is not aware of all available opportunities, then their choice is limited to what is available or known. Thus, the more sites an individual is aware of, the better their ability to match their preferences with what is available. Purdue (1987) found evidence for this in recreational boating when the number of sites an individual was aware of improved the predictability of site choice.

Lucas (1981) developed a conceptual model of choice behavior for wilderness trails and campsites that incorporates a cognitive development framework. The model assumes that users differ in their preferences and desired experiences and choose sites to fulfill these experiences. Because sites vary in their setting characteristics they also vary in their ability to provide these experiences. This model incorporates the characteristics of the individual making the choice, including their cognitive state (ie., past experience), personal preferences, awareness of alternative sites, and other influences such as the preferences, social pressures of companions, and constraints. In this study, we examine the relationship between recreation choice behavior, past experience, setting preferences, social factors, and constraints. Further, we use Kuentzel and Heberlein's (1992) findings and develop a conceptual framework for cognitive development and site choice to guide the analysis (Figure 1). We examine the following issues: 1. Is site choice associated with past experience?; 2. Is site choice associated with setting preferences?; 3. Is site choice associated with social role identity?; and 4. Is site choice associated with constraints?



*Figure 1.* Conceptual model of recreation site choice at Nopiming Provincial Park, Manitoba.

### *Hypotheses*

Based on Bryan's (1977) specialization theory and Kuentzel and Heberlein's (1992) findings, we selected potential representative variables of the broad issues stated above and tested four hypotheses. First, experienced wilderness users choose sites with more natural type conditions than less experienced users. Second, wilderness users who choose sites with natural wilderness conditions prefer more natural setting attributes than those choosing sites that are less remote and more developed. Third, wilderness users whose social role identity is a parent or teacher role choose sites that are less remote and more developed than those assuming other social roles. Fourth, wilderness users who are constrained in their choices by being older, having lower incomes, and the least knowledge of sites choose sites that are less remote and more developed.

### Methods

Data were collected from a voluntary wilderness registration system and a mail survey of wilderness users at Nopiming Provincial Park in Manitoba, Canada. The park consists of 1,440 square kilometres situated in the Precam-

brian Shield along the Manitoba-Ontario border. The landscape is a mosaic of lakes with connecting rivers. The park is used primarily by wilderness recreationists interested in canoeing and kayaking. Other uses involve camping at three developed vehicle-based campgrounds, some restricted recreational cottage developments, motor boating, and fishing. Although motor boating occurs in the park, it is confined primarily to the more developed cottage areas and few motor boaters take overnight wilderness trips. The terrain does not permit wilderness hiking. During this study no fees were charged for entering the park or for use of wilderness areas. A variety of wilderness recreational opportunities are available ranging from short, overnight stays requiring little wilderness experience to long, remote river routes that take several days to complete and require a high level of wilderness experience (Watson, Peters, Boxall, Englin, & Chakraborty, 1994).

Registration data were collected from May to September in 1993 and 1994. Because wilderness use is limited to water craft, 17 wilderness registration stations were located at boat launches and other less developed waterway entry points. Group leaders were asked to complete registration forms on-site and deposit them in registration boxes. The form collected the name and address of the group leader, number of people in the group, the type of group, number of days of the trip, the number of times they had visited the route in the last 10 years, and an outline of their expected route on a map. A total of 661 forms were completed; 389 in 1993 and 272 in 1994.

Efforts to encourage registration included well marked stations with information about the study, field staff encouraging people to complete the forms, newsletters about the project disseminated by the Manitoba Recreational Canoe Association, and promotion of participation in the study by campground attendants and park personnel. Compliance with the voluntary registration was monitored by field staff observing the number of wilderness users completing forms at the entry points. After 160 hours of monitoring, compliance was estimated at 50% (Watson, Peters, Boxall, Englin, & Chakraborty, 1994). This compliance rate is similar to those obtained in other studies using voluntary registration systems (Lucas, 1983).

We were concerned that only certain types of wilderness users were registering, resulting in a homogeneous sample. Because the purpose of this study was to examine the relationship among variables it was important that a range of past experience variables be represented. Most researchers that examine relationships among such variables use nonprobability sample methods to ensure that a *range* of levels of experience is represented rather than a *representative* sample of all people engaged in the activity or setting (e.g., Williams & Huffman, 1986; Wellman, Roggenbuck, & Smith, 1982; Schreyer & Beaulieu, 1986). The standard deviations and ranges of variables used to measure past experience in this study suggest that the sample represents a range of past experience and therefore, is not homogeneous (Table 1).

Group leaders who registered for a canoe or kayak wilderness trip formed the sample for the mail survey. The original sample of 661 was reduced to 587 by eliminating multiple registrations by the same individual

*TABLE 1*  
*Distribution and Factor Analysis of Past Experience Variables for Wilderness Recreation in Nopiming Provincial Park, Manitoba*

Variable	Distribution			Factor Loadings	
				Factor 1	Factor 2
	<i>M</i>	<i>SD</i>	Range	Nopiming Park Experience	General Wilderness Experience
Years of wilderness experience in Nopiming	9.46	7.74	1-50	0.77	0.15
Number of wilderness trips to Nopiming in last 10 years	9.63	16.38	1-160	0.68	-0.04
Mean wilderness trips to Nopiming in last 3 years	1.75	2.92	1-45	0.62	-0.05
Years of wilderness experience in Eastern Manitoba	13.22	8.96	1-45	0.59	0.21
Number of wilderness routes visited in Nopiming in last 10 years	2.67	1.74	0-8	0.44	0.29
Number of wilderness trips to other parks in the region in last 10 years	9.22	14.53	0-100	0.11	0.78
Mean wilderness trips to other parks in the region in last 3 years	1.33	2.07	0-14	0.05	0.78
Number of other wilderness parks visited in the region in last 10 years	1.48	1.23	0-6	0.04	0.51
Eigenvalues				2.32	1.32
Percentage of variance				60.73	34.59
Cronbach's alpha				0.75	0.76

and any registrant whose address was incomplete. For individuals who had registered more than once, the most recent registration was used in the analysis. Mail questionnaires were sent in March 1995 and collected information on general canoeing or kayaking experience, awareness and use of water routes in Nopiming Provincial Park, setting preferences, and socioeconomic data. Two weeks after the initial mailing a reminder postcard was sent to those who had not responded and five weeks after the initial mailing a replacement questionnaire was sent to nonrespondents. A total of 431 useable questionnaires were returned. Adjusting for undelivered questionnaires, this represented an 81% response rate.

Actual behavior or site choice was determined by the wilderness routes traced on the registration permits. Although it was not possible to confirm that the expected route was the actual route, it is unlikely that respondents

**TABLE 2**  
*Distribution (%) of Setting Attributes Among Route Clusters*

Attribute	Route Cluster			
	Cluster 1 $n^a = 2$	Cluster 2 $n = 6$	Cluster 3 $n = 8$	Cluster 4 $n = 4$
Vehicle-based camping near entry point	100	50	0	0
Boat launch at entry point	100	100	63	0
Road access to entry point	100	100	100	25
Parking lot at entry point	100	100	75	75
Supply store near entry point	100	0	0	0
Manmade features such as bridges, power lines along route	0	100	100	100
Privately owned cottages along route	50	50	38	0
Indications of logging along route	50	0	13	0
Campsites located near each other	50	17	38	75
Toilets at campsites	50	0	0	0
Water route is predominately river	50	100	13	0

<sup>a</sup>Number of wilderness routes in a cluster.

**TABLE 3**  
*Means of Setting Attributes Among Route Clusters*

Attribute	Route Cluster			
	Cluster 1 $n^a = 2$	Cluster 2 $n = 6$	Cluster 3 $n = 8$	Cluster 4 $n = 4$
Length of route (km)	48.0	64.2	22.1	21.5
Number of portages	2.5	26.5	4.0	2.8
Total portage distance (m)	607.5	498.3	116.9	1072.5
Tent capacity of the route	32.5	41.0	28.0	14.3
Percentage of routes with evidence of forest fires	2.2	23.6	23.8	42.1
Distance (m) of campsites from the natural route	0.0	0.0	10.6	73.8
Length of gravel road (km) from park entrance to entry point	35.0	87.0	51.1	66.3

<sup>a</sup>Number of wilderness routes in a cluster.



changed their route once they registered. Most routes were linear in nature with few possibilities of deviating from the route indicated.

Twenty water course segments were identified as routes by wilderness users. Field staff canoed each of these and collected information on physical, social, and management attributes (Tables 2 & 3). To reduce the number of routes to a manageable level in the analysis a cluster analysis was performed using these attributes. Route attributes were standardized to a mean of zero and standard deviation of one. A disjoint cluster analysis (FASTCLUS procedure, SAS Institute Inc. 1989) was performed on these standardized variables for the 20 routes. FASTCLUS uses an iterative clustering method which produces discrete clusters that are not nested or overlapping (Aldenderfer & Blashfield, 1984). Initial partition is based on cluster seeds which are estimates of the cluster means. Observations are assigned to clusters by minimizing the squared Euclidean distances between the observation and the cluster means. After the initial partition, cluster means are recalculated and observations are reassigned to the nearest cluster until no new assignments occur. Specification of the number of clusters was determined using the maximum value of the cubic clustering criterion (Milligan & Cooper, 1985). The cluster containing the route used by a respondent was considered to be the respondent's site choice. Route clusters were treated as the dependent variable in the analysis described below.

Wilderness experience was measured using variables representing the past experience dimensions for wilderness recreation proposed by Watson and Niccolucci (1992). Eight variables were used to represent past experience in Nopiming Park and general wilderness experience (Table 1). Variables were standardized to a mean of zero and standard deviation of one and principal factor analysis with varimax rotation was used to identify factors. Factors were extracted until the eigenvalue fell below one. A minimum loading of 0.35 was used to identify items belonging to a factor. Reliability of the factors was examined using Cronbach's alpha. Past experience indexes were created for each factor by summing the standardized variables that loaded on each factor. Because each factor may affect preferences and behavior differently, each was treated as a separate variable in the analysis (Kuentzel & Heberlein, 1992; Kuentzel & McDonald, 1992; Schreyer & Beau-lieu, 1986; Watson & Niccolucci, 1992).

Preferences for setting attributes of wilderness areas were measured by respondents rating 16 social, physical, and management items on how enjoyable each would be on a water-based wilderness trip using a 5 point Likert scale ranging from 1 = "not at all enjoyable" to 5 = "very enjoyable."

Social role identity was measured by asking respondents the type of social group comprising their canoeing party. Three categories were used for social group: family, school or youth groups; friends or alone; and groups consisting of both family and friends.

Although there are many potential factors that can constrain site choice we used three variables to represent constraints. Respondents age was used to represent physical ability constraint, household income to represent fi-

nancial constraint, and awareness of wilderness sites to represent knowledge of available opportunities. Awareness was measured by asking respondents if they were aware of individual water routes designated as official routes by park management. The number of routes indicated was used as an awareness score.

## Results

The cluster analysis of the physical, management, and social attributes of the 20 route segments yielded four route types (Tables 2 & 3). Routes in cluster 2 represented the most difficult routes. On average, the 6 routes in cluster 2 were longer than routes in the other clusters, the routes in this cluster were all predominantly river routes, the entry points were located the furthest from the park entrance, and the cluster had the lowest proportion of routes with campsites located close together. These routes had more portages and more portages per kilometre of route (0.41 portages/km) than routes in the other clusters. In terms of development along the routes, all routes in cluster 2 had manmade features, 50% had cottage developments, and none had evidence of logging. These routes had a high level of development at the entry points with boat launches, road access, and parking lots at all entry points and 50% of the entry points had a vehicle-based campground nearby. Beyond the entry points, routes in cluster 2 represented the more remote, difficult routes requiring the most wilderness experience.

Although routes in cluster 1 were not the shortest routes, they had the fewest number of portages, the fewest portages per kilometre (0.05 portages/km), and entry points were located closest to the park entrance. These routes had the most developed entry points with boat launches, road access, and parking lots and supply stores and vehicle-based campgrounds nearby. Along the routes, 50% had cottage developments. This cluster had the highest proportion of routes with evidence of logging, the lowest percentage of routes with evidence of forest fires, the only routes with toilets at some campsites, and half of the campsites were located near each other. None of the routes had manmade features and only half the routes were predominantly river routes. These results suggest that cluster 1 routes represent the most accessible routes with the most management intervention, requiring the least wilderness experience.

Routes in clusters 3 and 4 appear to be between clusters 1 and 2 in terms of the level of wilderness experience required. Although routes in cluster 4 had the longest portages, they had among the lowest number of portages per kilometre (0.13) and were among the shortest routes. None of these routes were predominantly river routes. This cluster had the highest proportion of routes with forest fires. There were no indications of logging or cottage developments along the routes. Campsites were located the farthest off the routes reflecting the fact that these are lake routes and camping is available only on islands or shoreline located off the natural route. Routes in cluster 4 had the least development at the launch sites. There were no

vehicle-based campgrounds, boat launches, or supply stores, and only 25% had road access to the launch area. This lack of road access is reflected in the long portage distance where users had to portage from their vehicles to the launch area.

Considering development at the launch sites, routes in cluster 3 were between the more developed areas in clusters 1 and 2 and the least developed cluster 4 routes. Compared with routes in cluster 4, this cluster had a larger proportion of routes with cottages and indications of logging, and were closer to the park entrance. More of cluster 3 routes were predominantly river routes, fewer routes had evidence of forest fires, and there were fewer routes with campsites located near each other. These routes had the shortest total portage distance and the highest tent capacity (1.3 tents/km) than any of the other clusters. Based on these results we ordered the route clusters from those requiring the most wilderness experience to the least as cluster 2, cluster 4, cluster 3, and cluster 1.

The factor analysis of the eight wilderness experience items yielded two factors: factor 1 contained items relating to experience in Nopiming Provincial Park and factor 2 contained items relating to General Wilderness Experience (Table 1). These correspond with Watson and Niccolucci's (1992) Past Experience to the Specific Site and General Wilderness Experience dimensions for wilderness recreation. In their factor solution, previous visits to a specific wilderness area, years since the first visit to the wilderness area, and the typical number of visits per year to the area loaded on the factor Past Experience to the Specific Site. Total number of other wilderness areas visited, years since first visit to a wilderness area, and the typical number of visits per year to any wilderness loaded on the General Wilderness Experience dimension. These congruent findings suggest that these dimensions may be consistent measures of wilderness experience across geographical regions (i.e., USA and Canada) and recreational activities (i.e., hiking and canoeing or kayaking).

To test the hypothesis that experienced wilderness users choose sites with more natural type conditions, the past experience dimension scores of individuals visiting the route types were compared. Individuals choosing a route in cluster 2 had the highest scores on both past experience dimensions (Table 4). Those choosing routes in cluster 4 had the second highest scores, those choosing routes in cluster 1 had the lowest Nopiming Park Experience scores and those choosing routes in cluster 3 had the lowest General Wilderness Experience scores. Mean Nopiming Park Experience scores and General Wilderness Experience scores were significantly different across the route clusters. Individuals choosing a route in cluster 1 differed from those choosing a cluster 2 route on the Nopiming Park Experience scores and they differed on General Wilderness Experience from those choosing a cluster 2 or cluster 3 route supporting the hypothesis. Thus, the route choices of individuals appear to be consistent with their past wilderness experience. The most experienced users chose the more remote, difficult routes with the least management intervention (i.e., routes in clusters 2 or 4) and those with the

**TABLE 4**  
*Distribution of Past Experience Scores, Social, and Constraint Variables of Respondents Visiting Wilderness Routes*

Variable	Route Clusters				Statistics		Total Sample
	Cluster 1 <i>n</i> <sup>a</sup> = 164	Cluster 2 <i>n</i> = 60	Cluster 3 <i>n</i> = 71	Cluster 4 <i>n</i> = 61	<i>F</i> / $\chi^2$ Value	<i>p</i>	
Past experience dimensions:							
Mean Nopiming Park Experience <sup>b,c</sup>	-0.453 <sup>d</sup>	1.000 <sup>e</sup>	-0.035 <sup>d,e</sup>	0.226 <sup>d,e</sup>	2.63	.049	-0.008
Mean General Wilderness Experience <sup>b,c</sup>	-0.099 <sup>d</sup>	0.765 <sup>e</sup>	-0.512 <sup>f</sup>	0.111 <sup>d,e,f</sup>	3.14	.025	0.000
Social role identity:							
% participating with family, school, or youth groups	47.9	44.1	45.1	40.3	9.23	0.161	45.4
Constraints:							
Mean number of wilderness routes respondents were aware of <sup>c</sup>	4.80 <sup>d</sup>	5.27 <sup>d</sup>	5.00 <sup>d</sup>	6.35 <sup>e</sup>	6.90	.002	5.18
Mean age	36.6	37.2	37.3	35.8	0.29	.829	36.7
Household income (% >\$60,000)	33.1	43.3	28.2	27.4	4.53	0.21	32.9

<sup>a</sup>Number of respondents visiting a route belonging to the cluster.

<sup>b</sup>Means are based on standardized Z-scores.

<sup>c</sup>Any two means that do not share a superscript are significantly different at  $p < .05$  using Tukey's HSD test.

least experience chose easier, more accessible, developed routes (ie., routes in clusters 1 or 3).

Of the 16 setting attribute items respondents rated seeing planted logged areas, gravel parking lots, areas not accessible by motor boats, short and easy portages, metal fire rings at camp sites, seeing moose, aboriginal rock paintings, and encountering white water as being enjoyable (mean > 3.0) on a wilderness trip (Table 5). While users did not enjoy (mean < 3.0) meeting other people in motor boats, most enjoyed meeting other paddlers along the route. Other items rated not enjoyable were presence of logging equipment, garbage, bridges over the route, cottage developments, and burned forested areas. Road access to new water routes was rated about neutral (mean = 3.0).

To test the hypothesis that wilderness users choosing sites with more natural wilderness conditions prefer more natural setting attributes the scores of the 16 attribute items of individuals visiting the route types were examined. We expected respondents choosing routes in clusters 1 or 3 to rate the management and social setting items as more enjoyable and the physical setting items as less enjoyable than respondents choosing routes in clusters 2 or 4. The mean scores on the setting attributes indicated that 8 of the items differed ( $p < .10$ ) across the route clusters but the differences were as expected on only 6 items, providing only weak support for the hypothesis (Table 5). Those choosing routes in cluster 3 rated gravel parking lots at entry points as more enjoyable than individuals choosing cluster 2 routes; metal fire rings at camp sites more enjoyable than those choosing clusters 2 or 4 routes; short and easy portages as more enjoyable than those choosing cluster 4 or 1 routes; seeing or hearing logging equipment and encountering people in motorboats more enjoyable than cluster 1 respondents; and burned areas along the route as less enjoyable than those choosing cluster 4 routes. Those choosing routes in cluster 2 rated white water as more enjoyable than those choosing cluster 3 or 4 routes. Those choosing routes in cluster 1 rated seeing cottages along the route as more enjoyable than respondents choosing cluster 4 routes.

To test the hypothesis that wilderness users whose social role identity is a parent or teacher will choose sites less remote and more developed than those assuming other social roles, the social group of participation was compared among individuals visiting the four route clusters. We assumed that those participating in groups consisting of family, school, or youth groups were more likely to be in a parent or teacher role than those participating with other groups. There were no differences across the route clusters of those participating with family, school, or youth groups nor among those participating in other groups indicating that social role identity did not influence site choice. Overall, 45% participated with family, school, or youth groups, 47% with friends, and 8% with a combination of family and friends.

To test the hypothesis that wilderness users who are constrained in their choices by being older, having lower incomes, and the least knowledge of sites choose sites that are less remote and more developed age, income, and

TABLE 5  
*Distribution of Mean<sup>a</sup> Setting Attribute Preference Scores of Respondents Visiting Wilderness Routes*

Setting Type: Attribute	Route Clusters				ANOVA		Total Sample
	Cluster 1 <i>n</i> <sup>b</sup> = 164	Cluster 2 <i>n</i> = 60	Cluster 3 <i>n</i> = 71	Cluster 4 <i>n</i> = 61	<i>F</i> Value	<i>p</i>	
Management setting:							
road access to new water routes	2.94	2.88	2.94	2.95	0.04	.990	2.93
seeing or hearing logging equipment	1.24 <sup>c</sup>	1.35 <sup>c,d</sup>	1.53 <sup>d</sup>	1.35 <sup>c,d</sup>	2.60	.052	1.33
finding garbage at wilderness campsites	1.12	1.08	1.21	1.08	1.17	.323	1.12
seeing a previously logged area replanted with seedlings or saplings	3.52	3.37	3.72	3.37	0.96	.410	3.52
seeing a small bridge over a narrow portion of a water route	2.69	2.76	2.93	2.82	0.80	.494	2.77
having a gravel parking lot at the entry point to a route	3.80 <sup>c,d</sup>	3.53 <sup>a</sup>	4.03 <sup>d</sup>	3.74 <sup>c,d</sup>	2.62	.051	3.79
seeing cottages along routes	2.20 <sup>c</sup>	2.14 <sup>c,d</sup>	2.13 <sup>c,d</sup>	1.73 <sup>d</sup>	3.36	.019	2.09
being in areas not accessible by motor boats	4.77	4.52	4.76	4.66	1.77	.153	4.71
short and easy portages	3.73 <sup>c</sup>	3.88 <sup>c,d,e</sup>	4.17 <sup>d</sup>	3.77 <sup>c,e</sup>	4.22	.006	3.85
having metal fire rings at camp sites	3.73 <sup>c</sup>	3.47 <sup>c,d</sup>	4.07 <sup>c,e</sup>	3.42 <sup>c,d</sup>	4.57	.004	3.70
Social setting:							
encountering other people in motor boats	1.62 <sup>c</sup>	1.81 <sup>c,d</sup>	1.99 <sup>d</sup>	1.61 <sup>c,d</sup>	2.85	.037	1.72
meeting other paddlers on the route	3.84	3.63	3.79	3.82	0.76	.520	3.79
Physical setting:							
seeing moose along the water routes	4.89	4.80	4.76	4.92	1.41	.239	4.85
finding aboriginal rock paintings on rock outcrops	4.60	4.55	4.46	4.50	0.57	.634	4.55
presence of burned forested areas along the route	2.28 <sup>c,d</sup>	2.48 <sup>c,d</sup>	2.13 <sup>c</sup>	2.55 <sup>d</sup>	2.50	.059	2.33
presence of white water along the route	4.01 <sup>c,d,e</sup>	4.18 <sup>c,d</sup>	3.77 <sup>c,e</sup>	3.73 <sup>c,e</sup>	3.23	.023	3.94

<sup>a</sup>Rated on a scale where 1 = "not at all enjoyable" and 5 = "very enjoyable." Any two means that do not share a superscript are significantly different at  $p < .10$  using Tukey's HSD test.

<sup>b</sup>Number of respondents choosing a route belonging to the cluster.

awareness of routes were compared among individuals visiting the four route clusters. Only one variable was associated with route choice; awareness of routes in Nopiming Park (Table 4). On average, respondents were aware of 5.18 routes. Those choosing routes in clusters 1 and 3 had the lowest awareness scores and those choosing routes in clusters 2 and 4 were the most aware of alternative routes. Individuals choosing a route in cluster 4 had significantly higher awareness scores than those choosing routes in the other clusters. Household income and age did not differ across route types indicating that these socioeconomic variables were not constraining site choice. Overall, 33% had an annual household income greater than \$60,000 and the mean age was 37.

### Discussion

This study found that past experience was associated with site choice among wilderness users in Manitoba. This suggests a developmental approach to recreation site choice which follows Bryan's (1977) proposition that as individuals gain experience they choose different settings in which to carry out their activities. This provides further evidence that those with more complex cognitive structures resulting from gaining information in a given setting or activity respond to external stimuli by choosing different settings in which to carry out their recreational activity. Although the development level of the site visited was consistent with level of past experience, it was weakly associated with setting preferences. This suggests that past experience dimensions might influence preferences and behavioral choice differently. For example, an individual could be an experienced wilderness user, but new to a particular park. Therefore, they may lack information about the park necessary to match their preferences with existing site attributes. To illustrate this notion, in this study individuals choosing routes in cluster 1 had the lowest Nopiming Park Experience score, but not the lowest General Wilderness Experience score. For these individuals, General Wilderness Experience could be influencing their preferences, while their lack of experience in Nopiming Park could be limiting their choice to routes that are conspicuous or well known. These results suggest that those with experience in a particular park are better able to match what they prefer with what is available in that park because they have more knowledge and awareness of available sites. While it seems obvious that users can not choose sites they are not aware of, it once again illustrates the importance of awareness in influencing behavior and suggests that managers can influence choice behavior by providing appropriate information.

This study raises some important theoretical and management points. First, our analysis replicated the two factor past experience dimensions of wilderness recreation proposed by Watson and Niccolucci (1992) and examined their association with setting preferences, constraints, and site choice. These dimensions appear to be reliable measures of wilderness experience because they are stable across geographic locations (the Cohutta

Wilderness, USA and Nopiming Provincial Park, Canada) and across land- and water-based use. These wilderness experience dimensions appear to be useful indicators of site choice.

Second, this study supports treating past experience and specialization dimensions as distinct variables that have differential effects on behavior (Kuentzel & McDonald, 1992; Kuentzel & Heberlein, 1992). These dimensions should not be combined into single indexes or ordinal measures (Watson & Niccolucci, 1992). Examining the association between the individual dimensions and behavior will provide insight into which dimensions are important in the recreation site choice process.

Third, if knowledge of available opportunities and site attributes is limiting site choices, then managers can influence the choice process by supplying information to improve the congruency between preferences and site choice (e.g., Lucas, 1981). Supplying information is a common management strategy to disperse users, reduce user conflicts, and maintain the solitude of the wilderness experience. This study confirms the importance of site awareness in the choice process. It suggests that by providing information on what is available, users will choose sites consistent with their level of experience which will reduce potential within-activity conflict between experienced and inexperienced users.

The lack of association between the social group of participation and choice may be a result of the fact that we sampled group leaders. Clark and Downing (1985) propose that site choice is a process of negotiation between members of the social group of participation and not necessarily under the control of individuals. However, some members of the group may have more influence over site choice than others. Those with the most experience may be considered leaders serving as role models, setting the standards of behavior for the group, and having more influence over site choice than other group members (Bryan, 1977). Therefore, the decision of site choice may be more indicative of the group leader's preferences and past experience than other members of the group. In this study, group dynamics may have more impact on site choice than social role identity.

The lack of association between social role identity and constraint variables and site choice in this study may also result because choice is context specific (Peterson, Dwyer, & Darragh, 1983). Recreation choice behavior may involve sequential or hierarchical decision frameworks where different explanators can be used in each level of the decision. To illustrate this, an individual may go through a series of decisions before reaching the level of site choice. The first decision could be whether or not to take a trip; then which park to visit; and finally the actual route within a park. Choices made at different levels in the decision hierarchy may be influenced by different variables. Factors such as social role identity, income, and age may have more influence on which park is chosen or whether to take a trip at all. However, once a trip is planned and a park chosen, past experience, preferences, awareness, and environmental features may influence actual route choice.



This study examined recreation choice at a low level of the decision framework (ie., route choice) and found no association with social role identity and constraints. Other studies (e.g., Kuentzel & Heberlein, 1992) have examined choice on higher levels of the decision hierarchy (e.g., at the hunting zone or park level) where social and constraining factors may have a greater influence.

Economists view recreation site choice as a nested (Morey, Rowe, & Watson, 1993) or a sequential (e.g., Adamowicz, Jennings, & Coyne, 1990) choice process. Explanators of choice behavior in these and other studies have largely involved environmental or recreation management features of the sites. For example, in an economic study using the same Nopiming Park data, Boxall, Watson, and Englin (1996) found that travel distance, forest types, and management features significantly influenced route choice. What is missing from the economic models of choice behavior is the formal integration of social psychological factors with the economic and environmental factors. Perhaps the social psychological factors operate on the definition or knowledge of the set of sites an individual is aware of or will consider on a given trip. Whatever the linkage, there appears to be fertile ground for future research in combining economic and social psychological approaches in examining recreation site choice behavior. We believe that dimensions of experience and specialization may yield a promising direction in this regard by incorporating cognitive and affective components with economic and environmental factors in choice behavior.

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