

Article

Environmental Attitudes and Desired Social-Psychological Benefits of Off-Highway Vehicle Users

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Abstract: This research analyzes the relationships between off-highway vehicle (OHV) riders' patterns of prior experience and the social-psychological benefits they desire from the activity; it also examines the relationships between patterns of prior experience and environmental attitudes. The sample consists of 600 OHV riders in Utah drawn from the entire population of OHV owners within the state. The sample was segmented into experience use history groups based upon respondents' number of OHV trips within the past 12 months and the total number of years they have been riding OHVs. Results show that patterns of prior experience are related to certain desired social-psychological benefits. Personal achievement benefits were significantly more important for more frequent riders when compared to those who rode less often. The analysis also reveals no relationship between patterns of prior experience and general environmental attitudes.

Keywords: off-highway vehicle; unmanaged recreation; new ecological paradigm

1. Introduction

Over the past four decades off-highway vehicle (OHV) use has become one of the most rapidly growing outdoor recreation activities in the US [1]. The vast increase in participation has placed federal land managers and other recreation planners in a dire need for information on how to meet recreationists' demands while simultaneously minimizing resource degradation. Frequently, resource

planners and managers need to accommodate the growing ranks of motorized recreationists within the same settings as more “traditional” non-motorized recreationists. A greater understanding of the types of benefits desired by OHV riders could lead to previously unrecognized management strategies that capitalize on desired benefits sought by both OHV riders and non-motorized recreationists. Similarly, resource planners and managers must address concerns over their mandate to provide satisfying recreational experiences to individuals who, many believe, participate in an activity with little forethought regarding its environmental or aesthetic impacts [2]. Recreation research is also in need of a foundational understanding of the unique nature of OHV use relative to other recreational activities. This paper begins to address these needs by examining how OHV owners’ desired social-psychological benefits from OHV riding as well as their environmental attitudes relate to patterns of prior experience within the activity.

To a large extent, the provision of high quality recreation experiences depends upon managers and planners being aware of how recreationists differ, what experiences they seek, and how they perceive their environment. Consequently, identifying within activity differences has long been a goal of both researchers and managers. The study of prior experience is one approach to identifying within activity differences that is not only easily understood by managers but is also useful to researchers. For social scientists, prior experience is a particularly useful analytical approach because it is grounded in cognitive development theory and represents a link between external behavior and internal cognitive states that comprise attitudes, feelings, and motivations. Given prior experience’s dual benefit to both managers and researchers, this study will employ it as a means of exploring within activity differences among OHV users. The objectives of this paper are two-fold. The first objective is to examine the relationship between prior experience and the desired social-psychological benefits that come from OHV riding. The second objective is to examine the relationship between prior experience and environmental attitudes.

2. Literature Review

2.1. Existing Knowledge of Off-Highway Vehicle Users

As the popularity of OHV use has grown, so too has the understanding of it as a distinct recreational activity. The majority of research conducted on OHV recreationists has been completed by federal or state resource management agencies and has focused primarily on quantifying the number of individuals engaging in the activity and providing summary statistics regarding their preferences for management [3-5]. However, a growing body of recreation research has focused on the group as a unique type of recreationist. OHV research has tended to focus on one of four areas: the economic impact of the activity or of proposed route/area closures [6-9], within group conflict or consensus among OHV riders [10-13], the management preferences of riders [14,15], and the desired experiences of riders [16-18]. In the review of previous research concerning the relationships between experience use history (EUH), desired social-psychological benefits, and environmental attitudes below, we draw upon this OHV-specific literature as well as findings concerning other recreational activities from which inference can be drawn.

2.2. Experience Use History

Prior experience is defined as the sum of accumulated life experiences a recreationist has within a particular activity [19]. Prior experience is therefore important to understanding the social-psychological benefits individuals desire as well as their environmental attitudes because it theoretically informs perceptions of recreation experiences. Prior experience is particularly useful for recreation research because it represents similar cognitive structures created through recreationists' amount, type, and diversity of participation [20].

Prior experience either at a particular site or with a particular activity has frequently been employed as a method for segmenting recreationists. Typically, prior experience is utilized as a tool by which within activity differences can be analyzed regarding a variety of dependent variables such as site choice [21,22] or place attachment [23,24]. Segmenting users according to prior experience is usually completed based upon recreationists' total number of previous visits to an area, total length of time visiting an area, and/or their frequency of visitation to an area or similar areas [15,25,26].

The process of identifying experience use history groups has been useful in exploring variability within specific groups of recreationists. For example, individuals with similar patterns of prior experience have been shown to have similar management preferences [15,25], similar perceptions toward recreation conflict [24], similar perceptions of crowding [27], and similar views toward depreciative behavior [26].

Another strand of related literature frequently utilizes individuals' prior experience with an activity as method of segmenting groups and understanding within-activity differences—recreation specialization. Specialization is a three-dimensional construct comprised of individuals' prior behavior, their skill level and their psychological commitment to a particular activity [28]. Theoretically, individuals are believed to transition from being “generalists” who have low levels of experience with an activity, a low level of skill/knowledge development, and low levels of psychological commitment, to being “highly specialized” where they have high levels on each of these dimensions. Lee and Scott [29] found the three dimensions of specialization to be highly correlated, which might suggest the findings from research using experience use history to segment recreation groups (such as this research), might hold for the other two dimensions of specialization as well. Reciprocally, previous research focused on the specialization construct can be used to guide hypothesis development concerning recreationists' experience use history and its relationship to preferences and attitudes. Given this, we draw upon previous research examining both prior experience and the broader construct of specialization in our literature review and hypothesis development.

2.3. Prior Experience and Desired Benefits

The social-psychological benefits that individuals desire from OHV participation may also be directly related to prior levels of experience. As recreation is purposeful and goal-directed, the desired social-psychological benefits of recreationists represent needs that can be fulfilled through participation [30]. Different patterns of behavior, as measured through experience use history, therefore, may represent different reasons for participation.

Literature directly related to the first objective of this study suggests different patterns of behavior are related to differences in desired social-psychological benefits. In a national study of river recreationists, significant differences were found in the desired benefits of unique experience use history groups [31]. Recreationists were segmented into six distinct groups based upon total river trips, total number of rivers run, and total number of trips on a specific river. Between these groups, desired social-psychological benefits from river use were significantly different. For example, the “novice”, “beginner”, and “visitor” groups identified *escape* as their primary desired benefit while the “collector” and “local” groups identified *challenge* as their primary desired benefit. Results of this study also suggest that more experienced users desire more social-psychological benefits than less experienced users.

Another similar study also shows support for the idea that recreationists with different levels of experience participate in the activity for different reasons [20]. Using the same dataset of river recreationists described above, six distinct experience use history groups were created. Between these six groups, 18 different desired benefits from participation differed significantly. “Novices” consistently ranked the meanings associated with *social interaction* or *new experiences* higher than other experience use history groups. “Veterans” on the other hand consistently ranked the *achievement* and *autonomy* desired benefits higher. The findings of both of these studies suggest that desired benefits differ significantly across experience use history groups, implying recreationists at different experience levels mentally organize and structure their recreational experiences in different ways. Given this, we hypothesize that experience use history groups will differ significantly in the importance they place on specific desired benefits.

Because OHV use is becoming an increasingly prevalent recreational activity, researchers and managers need to be more informed regarding why these recreationists are engaging in the activity. Exploring the relationship between prior experience and desired benefits is a prudent first step. The analysis of this relationship among Utah’s OHV owners can deepen the understanding of how unique patterns of participation represent recreationists’ different needs and desired social-psychological outcomes.

2.4. Prior Experience and Environmental Attitudes

The relationship between outdoor recreation and environmental attitudes has been explored at varying levels of interest. At the most general level, the question of whether individuals who participate in outdoor recreation activities are more environmentally conscious than those who don’t has been addressed [32,33]. At a more specific level, differences between specific types of recreational activities (*i.e.*, consumptive *vs.* appreciative *vs.* motorized) have been examined [34-37]. At the most finely tuned level is the question of whether significant differences exist within specific activity types or within specific activities. This research begins to address this question by using varying patterns of previous experience as an analytic framework.

The connection between distinct patterns of prior experience and levels of environmental concern is not unfounded. Typically, environmental attitudes, concern, or behaviors have been analyzed against the broad construct of recreation specialization [38]. The specialization construct is measured, in part, through assessing the length of time individuals have participated in a particular activity. Results for

studies examining the relationship between specialization and environmental attitudes, concerns, or behaviors have generally shown a positive relationship. Within the context of recreational fishing, a positive relationship was found between conservation attitudes and specialization level [38], a similar relationship was shown among SCUBA divers [39]. Within both the recreational fishing study and the SCUBA diving study, conservation attitudes and behaviors were activity specific. For example respondents were asked about “catch-and-release practices” or specific measures they have taken to avoid damaging coral. The construct of specialization has also been used to analyze differences in attitudes toward low-impact practices and general environmental concern among members of a US mountaineering organization [40]. More specialized mountaineers were shown to favor low-impact practices. However, no significant differences in general environmental attitudes were found between specialization groups. The recreation specialization literature engages experience use history indirectly, as a recreationist’s prior behavior is part of the specialization construct; as a result, direct inferences cannot be made. At least tangentially this previous literature suggests there is a relationship between environmental attitudes and patterns of prior experience. Now, we approach the relationship between environmental attitudes and patterns of previous experience from literature directly dealing with experience use history.

Prior experience theoretically informs perceptions of recreation experiences. Subsequently, recreationists’ perceptions of environmental impacts have been tied directly to their level of prior experience [24,25]. In a study of visitors to the Table Rock Wilderness in Oregon, prior visitation to the area was significantly and positively related to perceptions of environmental problems in the area [24]. Specifically those environmental problems included water pollution, trampling or the removal of vegetation, stream bank disturbance, and the erosion of trails. In a similar vein, a positive relationship has been shown between prior experience and increased perceptions of several environmental disturbances along three rivers in the southeastern US [25]. Recreationists along the three rivers sampled were segmented into three experience groups, “low”, “moderate”, and “high” based upon two criteria, years and frequency of river use. Findings show a significant relationship between experience and perceptions of vandalism, excessive litter on the river banks, and the trampling of natural vegetation.

The findings from both of these studies suggest that increased experience is related to a heightened level of sensitivity toward resource degradation. Given these findings we explore the relationship between patterns of prior experience and general environmental attitudes. Admittedly the theoretical link is not as strong as the connection between prior experience and perceptions of environmental impacts, however, the exploratory nature of this hypothesis will add a finer grain of understanding to the relationship between outdoor recreation participation and environmental attitudes. This analysis can help in answering the question of whether more experienced users have not only heightened perceptions of environmental impacts, but also have higher levels of environmental concern in general.

3. Methods

3.1. Data Collection

The State of Utah requires that all OHVs be registered with the Utah Department of Motor Vehicles. OHVs are defined as any non-street-legal recreational vehicle such as all-terrain vehicles, dune-buggies, rock-crawlers, and off-highway motorcycles. While over-snow machines are often included in under the broad umbrella term OHV, they were not included in this study. This list of registrations is theoretically a census of all the OHVs within the State. A random sample of 1,500 owners was drawn from the list. This list was refined, making probability of selection equal regardless of the number of vehicles an individual owns. A mail survey was developed and sent to the random sample by mail. The survey was administered according to a modified Dillman Method [41]. A total of three waves of surveys were sent with reminder postcards sent in between mailings. Of the 1,500 surveys sent, 84 were returned either because the respondent had moved or because they had died since they last registered their OHV. In total, 1,416 Utah OHV owners received surveys, 600 of which were returned completed; this tabulates out to a 42.4% response rate.

3.2. Experience Use History Groups

Despite the simplicity of the experience use history concept, different methodological approaches have been used to segregate recreationists based upon their prior experience. Most approaches conceptualize the concept as multidimensional consisting of both length and frequency components. Beyond this, there is little agreement on appropriate operationalization of the concept. Experience use history research addressing experiences or perceptions of specific recreation settings have segregated groups based on experience indexes created from researcher defined high, medium, and low categories of both the length and frequency variables [25]. Other setting specific approaches include simple segregation based on whether or not a recreationist has visited the area before differentiated further based upon general experience with the activity [42]. The most common method has been to split recreationists into high/low frequency and length categories based on either researcher defined cut-points [31] or median splits [23,43]. Other methods include independent analysis of the length and frequency measures [22,44], and a one-dimensional operationalization comprised solely of the number of years a recreationist has visited an area [24].

Because this study is not site-specific, segregation based upon visitation to specific OHV riding areas or to the diversity of OHV riding areas would be misplaced. We believe conceptualizing the concept as a product of both length and frequency of past experience is important in identifying unique patterns of participation and therefore the most heterogeneous groups. A two-dimensional approach is also more directly tied to the cognitive development theory that grounds experience use history research. Based upon these criteria, the experience use history of an OHV rider was determined by (1) the total number of years they have been riding; and (2) the total number of times they went riding over the previous 12 months. Data for both of these variables were standardized, with the most heterogeneous groups being identified through a K-means cluster analysis procedure. Four distinct means were specified for the purposes of interpretation and consistency with prior research (*i.e.*, to retain the quadrant structure of prior experience patterns [34,43]). The cluster analysis procedure

eliminates problems of dealing with two variables of different scales, it also enables the most heterogeneous groups to be identified working around problems of splitting variables at their medians. Continuous measures of both experience levels can also still be explored through Pearson correlation coefficients to lend support to the findings.

3.3. Measuring Desired Benefits

To measure desired social-psychological benefits for OHV participation, 21 items were selected from the frequently used recreation experience preference scales [30]. The recreation experience preference scales are grounded in the theory that individuals recreate to attain certain psychological and physical goals [30]. The scales consist of specific items grouped with other theoretically and empirically related items into unique domains [45]. Respondents indicate how important each desired benefit item is to their recreation experience based upon a 5-point Likert scale where 1 = not important at all and 5 = extremely important. The 21 items selected for this study, represent a wide range of domains that we conceptualized might influence OHV behavior. In total the 21 items represent 7 of the 19 pre-defined domains. Only 21 items were included because of space limitations on the survey instrument.

3.4. Measuring Environmental Attitudes

To measure environmental attitudes we employed another frequently used and cited psychometric scale, the New Ecological Paradigm scale [46]. The original new environmental paradigm scale [47] was developed in the late 1970s as a tool to assess changing attitudes and opinions regarding pressing environmental issues and humanity's role in them. The scale is grounded in several theories that came to scientific and public prominence during the 1970s concerning the consequences of unchecked population growth, the role of technology in solving environmental problems, the intrinsic rights of other species, and the ability of human activities to affect the balance of nature. The scale quickly became adopted as not only a tool to assess changing national paradigms but also as a tool to assess different environmental attitudes across groups. Perhaps no other instrument has become so widely used to evaluate environmental attitudes. Upon repeat application of the scale in a variety of contexts, it was revised and renamed the New Ecological Paradigm [46]; it is this newer version that we incorporated into our study. Respondents were asked to indicate their level of agreement with 15 statements on a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree. The purpose of this paper is not to describe scale construction or criticisms that have been levied against it as we are employing it in an exploratory analysis of general environmental concern. Several other papers cover the topic more extensively [32,37,46-48].

4. Results

4.1. Group Identification and Characteristics

The K-means cluster analysis was specified to determine the four most homogenous groups based upon the two prior experience variables. These groups were subsequently identified according to their patterns of prior experience as casual newcomers, casual veterans, frequent riders, and occasional riders (Table 1). The groups were significantly different in the number of years they have been riding

($F_{3,539} = 281.61, p < 0.001$), and in their frequency of trips over the previous 12 months ($F_{3,539} = 575.16, p < 0.001$). The casual newcomers were identified by their relatively short length of involvement in the activity, as well as the relatively low number of trips they take per year. The casual veterans were identified by their relatively long length of activity involvement and the relatively few trips they took over the past year. The frequent riders were identified as such because they take a vastly larger number of trips per year than the other groups. Finally, occasional riders are those who participate in the activity more often than both of the casual groups, yet far fewer than the frequent riders. The socio-demographic characteristics of the four groups are provided in Table 2. OHV owners within the entire sample were predominantly white (98.4%), married (86.0%), and identified themselves as politically conservative (59.5%). The frequency distributions of respondents' age across experience use history groups were significantly different than expected ($\chi^2 = 39.70, df = 15, p = 0.001$). The obvious deviation came from the fact frequent riders tended to be younger and when compared to the other groups. No significant patterns were found however between experience use history group membership and income ($\chi^2 = 17.82, df = 18, p = 0.468$) or group membership and education ($\chi^2 = 14.82, df = 15, p = 0.464$).

Table 1. Comparison of experience use history (EUH) groups.

	Group Identification				F (sig.)
	Casual Veterans	Casual Newcomers	Frequent Riders	Occasional Riders	
	(n = 217) M (SD)	(n = 181) M (SD)	(n = 21) M (SD)	(n = 124) M (SD)	
Years riding	30.09 (8.816)	6.97 (3.969)	18.52 (10.870)	22.60 (9.983)	281.614 ***
No. of times riding in last 12 months	5.14 (3.180)	6.00 (4.402)	60.60 (23.749)	17.77 (6.015)	575.162 ***

Table 2. Socio-demographic characteristics of off-highway vehicle owners by EUH group.

	Experience Use History Group				Entire Sample	
	Casual Veterans	Casual Newcomers	Frequent Riders	Occasional Riders		
Age						
Under 30		1.5	6.0	20.0	14.3	6.6
30–39		18.0	18.6	40.0	24.1	20.4
40–49		34.0	29.3	10.0	28.6	30.3
50–59		25.5	22.2	20.0	19.6	22.8
60–69		13.5	16.8	10.0	8.0	13.2
70 and over		7.5	7.2	0.0	5.4	6.6
Education						
High school degree, GED, or less		26.1	21.4	10.0	20.5	22.7
Some college or a community college		30.4	31.0	40.0	32.5	31.4
2 year technical or associate degree		18.4	16.1	25.0	17.1	17.6
4 year college degree (BA, BS)		15.0	24.4	25.0	22.2	20.1
Advanced degree (MS, PhD, etc.)		10.1	7.1	0.0	7.7	8.2

Table 2. Cont.

	Experience Use History Group				Entire Sample
	Casual Veterans	Casual Newcomers	Frequent Riders	Occasional Riders	
Income					
Under \$49,999	13.2	20.8	19.0	18.3	17.1
\$50,000–\$74,999	27.9	25.0	23.8	23.5	25.8
\$75,000–\$99,999	28.4	20.8	28.6	19.1	23.8
\$100,000–\$149,999	16.7	14.3	23.8	20.9	17.1
\$150,000–\$200,000	5.4	3.6	0.0	5.2	4.5
Over \$200,000	2.5	6.5	0.0	5.2	4.5
Don't know/Refuse	5.9	8.9	4.8	7.8	7.3
Marital Status					
Single	4.4	7.1	23.8	13.8	8.3
Married	87.7	86.9	76.2	83.6	86.0
Separated/Divorced	7.9	3.0	0.0	2.6	4.7
Widowed	0.0	3.0	0.0	0.0	1.0

4.2. Prior Experience and Desired Benefits

While previous research suggests retaining individual benefit items within specific domains [30], we explored the structure of responses to the 21 desired benefits through an exploratory factor analysis procedure. Varimax rotation was employed to assist in defining the most distinct factors. Six factors emerged with eigenvalues greater than 1.0. These factors were identified as: *personal achievement*, *meet/teach/lead others*, *stress relief*, *independence*, *aesthetics and place*, and *sharing similar values* (Table 3). Results show strong support for individual items to load highly onto their “intended” domains. The several items that did wander from their intended domains were still theoretically linked to other items loading highly on the same factor. For example, the “enjoy natural scenery”, “enjoy a place that is special to me”, and the “learn more about the natural history of an area” items are not typically placed within the same domain, however theoretically they can all be placed under the rubric of aesthetics and place. This approach more accurately represents the patterns within the data and does not affect the comparison of desired benefits between groups as shown later. After factors were identified, a single factor score was computed for each respondent and each factor.

Analysis of variance tests were used to analyze differences in group means on each of the six desired benefit factor scores. The desired personal achievement benefit was the only factor to yield significant differences across groups ($F_{3,501} = 4.71, p = 0.003$). Fishers LSD post-hoc tests were subsequently employed to analyze between group differences. The personal achievement factor yielded four significant differences between groups.

Table 3. Factor loadings of recreation experience preferences.

Desired Benefits Factor and Strongest Desired Benefit Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Personal achievement (Cronbach's = 0.89)						
Do something challenging	0.816	0.157	0.101	0.106	0.073	0.135
Experience excitement	0.816	0.102	0.172	0.124	0.182	0.102
Develop my skills and abilities	0.784	0.274	0.151	0.171	0.075	0.171
Test the capabilities of my vehicle	0.753	0.297	0.146	0.222	-0.099	0.066
Experience new and different things	0.637	0.139	0.048	0.221	0.37	0.15
Meet/Teach/Lead Others (Cronbach's = 0.88)						
Help others develop their skills	0.2	0.592	0.047	0.466	0.124	0.35
Share what I have learned with others	0.157	0.596	0.064	0.417	0.182	0.356
Lead other people	0.251	0.686	0.047	0.317	0.132	0.246
Talk to new and varied people	0.235	0.845	0.095	-0.016	0.133	0.048
Observe other people in the area	0.166	0.85	0.091	-0.062	0.052	0.058
Stress relief (Cronbach's = 0.83)						
Get away from the demands of life	0.129	0.018	0.76	0.104	0.22	0.217
Experience personal freedom	0.243	0.032	0.791	0.114	0.124	0.11
Experience solitude	-0.007	0.077	0.744	0.127	0.301	0.027
Release or reduce built-up tension	0.18	0.163	0.772	0.193	-0.047	0.049
Independence (Cronbach's = 0.87)						
Do things my own way	0.281	0.087	0.249	0.788	0.066	0.015
Be in control of things that happen	0.249	0.093	0.245	0.809	0.131	0.063
Aesthetics & place (Cronbach's = 0.66)						
Enjoy natural scenery	-0.061	0.005	0.426	-0.019	0.657	0.16
Enjoy a place that is special to me	0.302	0.089	0.297	0.117	0.646	0.079
Learn more about the natural history of an area	0.161	0.305	0.048	0.147	0.757	0.056
Share similar values (Cronbach's = 0.82)						
Be with others who enjoy similar activities	0.239	0.231	0.146	0.044	0.118	0.807
Be with members of my group	0.148	0.146	0.181	0.07	0.091	0.847

Note: Means are based on a 5-point Likert scale where 1 = *not important at all* and 5 = *very important*; 73.2% of variance explained.

Results show a significant cleavage among respondents in the importance of obtaining *personal achievement* benefits based upon their distinct pattern of prior experience. Frequent OHV riders were more motivated by a strong desire for personal achievement through their riding when compared to either casual veterans ($p = 0.007$) or casual newcomers ($p = 0.004$). The desired benefits defining frequent owners and their strong desire for personal achievement include high levels of importance for “doing something challenging”, “experiencing excitement”, “developing their skills and abilities”, “testing the capabilities of their OHV”, and “experiencing new and different things”. Occasional OHV riders, those individuals who on average participated in OHV activity 18 times over the previous 12 months, also identified the benefit of personal achievement as significantly more important to their experience when compared to the casual newcomers ($p = 0.021$). No significant differences were noticed when comparing the frequent riders with the occasional riders ($p = 0.133$). The correlation between number of trips within the past 12 months and the personal achievement factor score was significant and positive ($r = 0.169$, $p < 0.01$). Those OHV riders who have participated more frequently in the activity over the previous 12 months (the frequent and occasional riders) placed a higher level of importance upon personal achievement than did either of the less frequent groups (the casual veterans and the casual newcomers). No significant differences were noticed between experience use history groups for any of the remaining desired social-psychological outcomes: stress relief, independence, aesthetics and place, and sharing similar values.

A more detailed set of ANOVAs was subsequently calculated for each potential desired benefit; the results along with descriptive statistics for each experience use history group are reported in Table 4. As might be expected, significant differences across experience use history groups were noticed within desired benefit statement items measuring *personal achievement*. Four of the five *personal achievement* benefits differed significantly across groups. Frequent riders desire to “do something challenging”, “experience excitement”, “develop their skills and abilities”, and “experience new and different things” significantly more than other riders who do not participate in the activity as often. Interestingly however, the strongest desired benefit among frequent riders was not related to *personal achievement*. The benefits of “enjoying natural scenery” ($M = 4.75$) and “experiencing personal freedom” ($M = 4.60$) both ranked higher for frequent riders than any of the personal achievement benefits. These findings highlight that while achievement benefits are significantly correlated with frequency of participation, they are not the only outcomes desired by frequent riders.

Extending this line of analysis a little further allows us to see some patterns for all EUH groups with regard to the social-psychological benefits that are being sought. Two noticeable patterns can be seen from the descriptive statistics in Table 4. First, for all four groups, “enjoying natural scenery” is the most important desired outcome of riding. Regardless of how long an OHV rider has been participating in the activity or how frequent they ride, their primary motivation is to experience beautiful landscapes and natural features. The second noticeable pattern is that *stress relief* is a fundamental reason for participating in the activity. For each EUH group, the mean scores for each desired benefit related to *stress relief* was above 4.25. This finding suggests that on average, OHV riders believe “getting away from the demands of life”, “experiencing personal freedom”, “experiencing solitude”, and “releasing or reducing built-up stress” are either *important* or *very important*. We now turn our attention to the relationship between patterns of prior experience and environmental attitudes.

4.3. Prior Experience and Environmental Attitudes

The new ecological paradigm scale has been analyzed as both a measure of multidimensional attitudes toward the environment (analyzed through exploratory factor analysis) or as a solitary and comprehensive measure of environmental attitudes (requiring reliability analysis and either the creation of a summative item index or a solitary factor score) [46]. Given this research's exploratory nature of examining the possible connections between patterns of prior experience and environmental attitudes, we analyze the scale as a single measure. Response distributions to each of the 15 scale items are shown in Table 5. Every other item in the scale was reverse coded prior to analysis as per the scale's design. Subsequently, data were analyzed with principal components analysis, with one factor specified to evaluate item-scale relationships (*i.e.*, factor loadings). Fourteen of the fifteen items loaded above the critical value of 0.40 (Table 5) [49]. The item that loaded poorly corresponded to the statement "the earth has a finite amount of room and resources"; it was subsequently removed from further analysis. The coefficient of internal reliability was more than sufficient (Cronbach's $\alpha = 0.86$) among the remaining 14 items to warrant the use of a single "environmental attitude" variable. This single variable was created for each respondent in the identical manner described for the desired benefits factor scores above.

A simple analysis of variance was utilized to test for differences in group means on the environmental attitude variable. No significant patterns were observed across groups ($F_{3, 507} = 2.380$, $p = 0.069$). Dissecting the experience use history construct into its two component parts for analysis against the environmental attitude factor score did not yield significant results either. While previous research has shown that individuals with higher levels of prior experience are more perceptive to resource impacts, the findings of our analysis suggest the relationship does not extend to differences in general environmental attitudes.

5. Discussion

This study found a distinct set of social-psychological benefits concerning *personal achievement* desired by OHV riders differed significantly depending upon the recreationists' patterns of past experience. OHV riders' length of involvement in the activity, as well as their frequency of participation, related to significant differences in the *personal achievement* benefits they desired from the activity. These findings support the theory of a connection between accumulated experiences within a particular activity and desires for certain outcomes.

When compared to previous research concerning the connection between prior experience and desired benefits, the findings of this study suggest personal achievement benefits are persistently different within activity groups across a wide range of recreational activities. For example, Schreyer and Lime [27] found desired "personal achievement" benefits were significantly higher for river floaters with more experience. Similarly, Williams, Schreyer, and Knopf [31] found river floaters with high levels of experience (either on the river sampled or on all rivers in general) identified "personal challenge" as their primary desired outcome. This comparison suggests that within-group differences in "personal achievement" may be persistent across different recreational activities.

Table 4. Descriptive Statistics of recreation experience preferences by EUH group.

Desired Benefits Factor and Measurement Items	Experience Use History Groups				Entire Sample <i>M (SD)</i>
	Casual Veterans <i>M (SD)</i>	Casual Newcomers <i>M (SD)</i>	Frequent Riders <i>M (SD)</i>	Occasional Riders <i>M (SD)</i>	
Personal achievement					
Do something challenging	3.77 (0.97)	3.62 (1.02)	4.35 (0.67)	4.05 (0.99)	3.78 (1.01) ^a
Experience excitement	4.01 (0.95)	3.99 (0.95)	4.55 (0.60)	4.20 (0.94)	4.02 (0.98) ^a
Develop my skills and abilities	3.77 (1.01)	3.78 (1.00)	4.30 (0.98)	3.99 (1.04)	3.80 (1.05) ^a
Test the capabilities of my vehicle	3.32 (1.15)	3.09 (1.16)	3.60 (1.23)	3.40 (1.24)	3.25 (1.19)
Experience new and different things	3.99 (0.84)	4.02 (0.92)	4.35 (0.67)	4.25 (0.87)	4.04 (0.91) ^a
Meet/Teach/Lead Others					
Help others develop their skills	3.73 (0.89)	3.58 (1.00)	3.95 (0.83)	3.83 (0.96)	3.69 (0.96)
Share what I have learned with others	3.86 (0.87)	3.70 (1.00)	4.05 (0.83)	3.97 (0.87)	3.82 (0.93)
Lead other people	3.40 (1.00)	3.26 (1.01)	3.50 (1.00)	3.42 (1.08)	3.35 (1.02)
Talk to new and varied people	3.31 (1.03)	3.21 (1.06)	3.50 (1.05)	3.48 (1.06)	3.31 (1.06)
Observe other people in the area	3.13 (1.14)	2.95 (1.12)	3.00 (1.30)	3.11 (1.20)	3.06 (1.15)
Stress relief					
Get away from the demands of life	4.66 (0.55)	4.59 (0.71)	4.45 (1.00)	4.71 (0.57)	4.61 (0.67)
Experience personal freedom	4.51 (0.70)	4.46 (0.81)	4.60 (0.75)	4.63 (0.60)	4.48 (0.76)
Experience solitude	4.29 (0.84)	4.32 (0.87)	4.30 (1.08)	4.42 (0.78)	4.30 (0.86)
Release or reduce built-up stress	4.25 (0.91)	4.26 (0.89)	4.30 (0.85)	4.31 (0.90)	4.23 (0.92)
Independence					
Do things my own way	3.78 (0.97)	3.67 (1.01)	4.00 (1.21)	3.74 (1.07)	3.70 (1.03)
Be in control of things that happen	3.95 (0.94)	3.95 (0.97)	4.05 (1.28)	3.90 (0.99)	3.90 (1.01)
Aesthetics & place					
Enjoy natural scenery	4.69 (0.59)	4.66 (0.71)	4.75 (0.64)	4.69 (0.62)	4.68 (0.64)
Enjoy a place that is special to me	4.34 (0.76)	4.24 (0.85)	4.35 (0.88)	4.52 (0.64)	4.30 (0.84) ^a
Learn more about the natural history of an area	3.99 (0.85)	3.89 (1.00)	3.70 (1.03)	4.11 (0.94)	3.95 (0.94)
Share similar values					
Be with others who enjoy similar activities	4.26 (0.84)	4.29 (0.93)	4.25 (0.97)	4.38 (0.89)	4.26 (0.92)
Be with members of my group	4.26 (0.86)	4.38 (0.85)	4.15 (1.09)	4.40 (0.90)	4.28 (0.91)

Note: ^a ANOVA across groups significant at <0.05.

Table 5. Descriptive Statistics and factor loadings of recreation experience preferences.

Statement	Strongly Agree %	Somewhat Agree %	Neutral/ Unsure %	Somewhat Disagree %	Strongly Disagree %	M (SD)	Factor Loadings
We are approaching the limit of the number of people the Earth can support	9.1	19.1	25.8	20.3	25.6	2.66 (1.291)	0.64
Humans have the right to modify the natural environment to suit their needs	6.7	26	13.4	32.8	21	2.65 (1.255)	0.64
When humans interfere with nature, it often produces disastrous consequences	21.2	30.9	15.2	23	9.7	3.31 (1.297)	0.68
Human ingenuity will insure that we do not make the Earth unlivable	10.1	30.5	30.8	19.7	8.9	3.13 (1.117)	0.48
Humans are severely abusing the environment	14.4	36.1	12.8	24.4	12.3	3.16 (1.284)	0.73
The earth has plenty of natural resources if we just learn how to develop them	29.2	42.2	12.8	11.8	4.1	3.81 (1.106)	0.37
Plants and animals have as much right as humans to exist	37.4	30	14.8	10.4	7.3	3.80 (1.249)	0.58
The balance of nature is strong enough to cope with the impacts of modern nations	5	18.8	26.5	34.9	14.8	2.64 (1.097)	0.6
Despite our special attributes, humans are still subject to the laws of nature	40.4	45.7	11.4	1.4	1.2	4.23 (.793)	0.4
The so-called “ecological crisis” facing humankind has been greatly exaggerated	18.2	29.6	26.3	18.9	7	3.33 (1.178)	0.74
The Earth has a finite amount of room and resources	14.7	26.9	22.8	22.1	13.5	3.07 (1.272)	— ^a
Humans were meant to rule over the rest of nature	15.1	22	20.7	20.5	21.7	2.88 (1.374)	0.64
The balance of nature is delicate and easily upset	22.5	36	18.4	18.6	4.4	3.54 (1.157)	0.69
Humans will eventually learn enough about how nature works to be able to control it	3.1	17.8	25.7	30.4	23	2.48 (1.120)	0.35
If things continue on their present course, there will be a major ecological disaster	9.2	24.3	28	20.9	17.6	2.87 (1.229)	0.75

Note: Grand mean = 3.19; Cronbach's α = 0.863; Variance Explained = 36.76%; ^a Item excluded from creation of factor score because of low factor loading.

This study also found several patterns in the desired social-psychological benefits of all OHV owners, regardless of their patterns of prior experience within the activity. Specifically, we found that “enjoying natural scenery” was the most important benefit desired across all experience use history groups. We also found social-psychological benefits related to stress relief were consistent and high across all experience use history groups. “Getting away from the demands of life”, “experiencing personal freedom”, “experiencing solitude”, and “releasing or reducing built-up stress was ranked as at least “important” to the majority of OHV riders sampled. This finding, while not profound given enjoying natural scenery and reducing stress are key motivations for most outdoor recreationists, does provide some insight into the drivers of OHV riders’ behavior. Regardless of how long a rider had been participating in the activity, or how frequently they ride, by and large the most important benefits they would like to obtain come from being in and appreciating natural landscapes. This piece of evidence seems to counter popular or constructed perceptions of OHV riders as an out-of-control recreation group whose recreational experience is completely detached from the aesthetic quality of the environment upon which it depends.

For recreation planners and managers, our findings hold several implications related to the ongoing efforts to provide desired experiences to OHV riders. First, planners and managers should strive to provide a broad array of settings that enable specific types of riders to realize desired benefits. Specifically, large open areas (e.g., sand dunes) and settings or trails with dramatic slopes are likely to be favored by riders similar to the “frequent” group identified within our sample. These individuals are more likely to participate in the activity for the challenge and excitement of it. The specific types of settings that enable OHV riders the ability to realize these *achievement*-related outcomes should be provided when and where they are feasible. In a similar vein, riders similar to the “occasional” and “casual veterans” identified within our sample are more likely to desire settings where OHV riding can serve primarily a social function and allow them to meet, teach, and lead others. Providing a diverse array of OHV settings that facilitate the achievement of specific desired outcomes is undoubtedly a challenge for planners and managers given many settings can produce a variety of desired outcomes. The key challenge will be to know which type of OHV rider exhibits the largest effect on recreation demand. If the majority of participation in a specific setting is coming from riders who ride their frequently, our data would suggest management focus on ensuring those settings have opportunities for riders to be challenged and experience new and different things. Contrarily, if the majority of participation in a specific setting comes from casual riders who visit the site infrequently, our data suggest those areas should focus on providing opportunities for social engagement and observation.

Our analysis found no relationship between patterns of prior experience and general environmental attitudes. Despite the lack of significant findings, the analysis may open a door onto the relationship between distinct subsets of recreation groups and their environmental attitudes and activity-specific behaviors. Previous research, along with the findings presented here, suggests general levels of environmental awareness do not vary by how behaviorally involved individuals are in particular outdoor recreation activities [18,40]. Similarly, outdoor recreationists by and large do not hold significantly stronger environmental attitudes than the general public [32,33]. Contrarily, activity specific environmental concerns such as damage to coral [39] or riparian areas [24] do differ within recreation groups. Future research should continue to explore how recreation behavior is related to environmental attitudes across a broad range of scales from global concerns such as those measured

with the New Ecological Paradigm scale to those that are highly activity and setting specific. This line of inquiry is particularly warranted in OHV research where the localized ecological impacts of participation are relatively high when compared to other outdoor recreation pursuits. Our data would support the proposition that OHV owners, like the majority of the adult US population [46], hold pro-environmental worldviews even if their engagement in OHV riding may suggest otherwise. Future research should more acutely focus on this apparent disconnect.

While our findings can inform both the cognitive theory behind desired leisure benefits as well as current management needs of understanding a diverse and rapidly growing user group, this research does have several limitations. First, the response rate to the mail back questionnaire is below the 60% typically suggested in public mail surveys [50]. Non-response bias however is expected to be minimal given that the target population represents a narrow slice of the general population. To this end, our findings are generalizable only to the population of OHV owners in Utah. Significant cultural and socio-demographic characteristics in other areas of the country are likely to influence both desired benefits from leisure participation and environmental attitudes. Secondly, our sample is drawn from a collective of OHV owners regardless of the type of vehicle that is used most often. For example, off-road motorcyclists and all terrain vehicle owners are included in the same sample. This is only a minimal limitation as different types of OHVs rely on the same resources and that many OHV owners own multiple types (e.g., they may own several all-terrain vehicles as well as a dune-buggy).

Through this analysis, we have demonstrated how understanding recreationists' patterns of prior experience, and its relationship to attitudes and preferences, can provide useful theoretical and managerial information. Regarding recreation theory, we have illustrated how prior experience can lead to new understandings of within-activity homogeneity. Specifically, we found preferences for desired OHV experiences varied relative to how long and how frequently an individual had been participating in the activity. Regarding management, we have suggested that OHV planning efforts can be more effective if they are cognizant of where specific segments of OHV riders are participating in the activity. Explicitly, we suggested specific settings should be managed for the achievement of specific desired experiences. Hopefully these findings can provide some insight that future recreation research and management efforts concerning OHV users can build upon.

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Conflict of Interest

The authors declare no conflict of interest.

References

1. Cordell, H.K.; Betz, C.J.; Green, G.; Owens, M. Off-highway vehicle recreation in the United States, regions, and states: A national report from the national survey on recreation and the environment (NSRE). Prepared for the Forest Service's National OHV Policy & Implementation Teams. USDA, Forest Service, Southern Research Station: Athens, GA, USA, 2005. Available online: http://www.fs.fed.us/recreation/programs/ohv/OHV_final_report.pdf (accessed on 24 January 2009).
2. Barringer, F.; Yardley, W. Surge in off-roading stirs dust and debate in West. *New York Times*, 30 December 2007. Available online: <http://www.nytimes.com/2007/12/30/us/30lands.html?scp=1&sq=off-highway%20vehicle&st=cse#> (accessed on 5 September 2011).
3. Burr, S.W.; Smith, J.W.; Reiter, D.K.; Jakus, P.; Keith, J. *Recreational Off-Highway Vehicle Use on Public Lands within Utah*; Institute for Outdoor Recreation and Tourism, Utah State University: Logan, UT, USA, 2008.
4. Lord, B.E.; Elmendorf, W.F.; Strauss, C.H. *Pennsylvania's ATV Riders and Their Needs*; Pennsylvania State University: University Park, PA, USA, 2004.
5. Fly, J.M.; Stephens, B.; Askins, L.; Hodges, D. *Tennessee OHV User Survey*; Human Dimensions Research Lab, University of Tennessee: Knoxville, TN, USA, 2002.
6. Deisenroth, D.; Loomis, J.; Bond, C. Non-market valuation of off-highway vehicle recreation in Larimer County, Colorado: Implications of trail closures. *J. Environ. Manage.* **2009**, *11*, 3490-3497.
7. Englin, J.; Holmes, T.; Niell, R. Alternative models of recreational off-highway vehicle site-demand. *Environ. Resour. Econ.* **2006**, *35*, 327-338.
8. Silberman, J.; Andereck, K.L. Economic value of off-highway vehicle recreation. *J. Leisure Res.* **2006**, *38*, 208-223.
9. Snyder, S.A.; Smail, R.A. Are all-terrain vehicle riders willing to pay trail user fees to ride on public lands in the USA? *Tourism Econ.* **2009**, *15*, 437-451.
10. Albritton, R.; Stein, T.V.; Thapa, B. Exploring conflict and tolerance between and within off-highway vehicle recreationists. *Journal of Park and Recreation Administration* **2009**, *27*, 54-72.
11. Albritton, R.; Stein, T.V. Integrating social and natural resource information to improve planning for motorized recreation. *Appl. Geogr.* **2011**, *31*, 85-97.
12. Mann, M.; Leahy, J.E. Connections: Integrated meanings of ATV riding among club members in Maine. *Leisure Sci.* **2009**, *31*, 384-396.
13. Mann, M.; Leahy, J.E. Social capital in an outdoor recreation context. *Environ. Manage.* **2010**, *45*, 363-376.
14. Kuehn, D.M.; D'Luhosch, P.D.; Luzadis, V.A.; Malmshemer, R.W.; Schuster, R.M. Attitudes and intentions of off-highway vehicle riders toward trail use: Implications for forest managers. *J. Forest.* **2011**, *109*, 281-287.
15. Smith, J.W.; Moore, R.L.; Burr, S.W. *Experience Use History and Its Relationship to Management Actions and Satisfaction*, USDA Forest Service General Technical Report NRS-P-66; Watts, C.E., Fisher, C.L., Eds.; USDA Forest Service, Northern Research Station: Newtown Square, PA, USA, 2009; pp. 82-87.

16. Hallo, J.C.; Manning, R.E. Understanding and managing the off-road vehicle experience: Standards of quality. *Managing Leisure* **2009**, *14*, 269-285.
17. Hallo, J.C.; Manning, R.E. Understanding and managing the off-road vehicle experience: Indicators of quality. *Managing Leisure* **2009**, *14*, 195-209.
18. Smith, J.W.; Burr, S.W.; Reiter, D. Specialization among off-highway vehicle owners and its relationship to environmental worldviews and motivations. *Journal of Park and Recreation Administration* **2010**, *28*, 57-73.
19. Viriden, R.J. Integrating past experience into leisure marketing strategies. *Leisure Information Quarterly* **1992**, *16*, 6-8.
20. Schreyer, R.; Live, D.W.; Williams, D.R. Characterizing the influence of past experience on recreation behavior. *J. Leisure. Res.* **1984**, *16*, 34-50.
21. McFarland, B.L.; Boxall, P.C.; Watson, D.O. Past experience and behavioral choice among wilderness users. *J. Leisure. Res.* **1998**, *30*, 195-213.
22. Watson, A.E.; Roggenbuck, J.W.; Williams, D.R. The influence of past experience on wilderness choice. *J. Leisure. Res.* **1991**, *23*, 21-36.
23. Hammitt, W.E.; Backlund, E.A.; Bixler, R.D. Experience use history, place bonding and resource substitution of trout anglers during recreation engagements. *J. Leisure. Res.* **2004**, *36*, 356-378.
24. White, D.D.; Viriden, R.J.; van Riper, C.J. Effects of place identity, place dependence and experience use history on perceptions of recreation impacts in a natural setting. *Environ. Manage.* **2008**, *42*, 647-657.
25. Hammitt, W.E.; McDonald, C.D. Past on-site experience and its relationship to managing river recreation resources. *Forest. Sci.* **1983**, *29*, 262-266.
26. Ibitayo, O.O.; Viriden, R.J. Visitor and manager perceptions of depreciative behaviors in urban park settings. *Journal of Park and Recreation Administration* **1996**, *14*, 36-51.
27. Graefe, A.; Moore, R.L. *Monitoring the Visitor Experience at Buck Island Reef National Monument*, USDA Forest Service General Technical Report NE-160; USDA Forest Service, Northern Research Station: Newtown Square, PA, USA, 1992; pp. 55-58.
28. Scott, D.; Shafer, C.S. Recreation specialization: A critical look at the construct. *J. Leisure. Res.* **2001**, *33*, 319-343.
29. Lee, J.-H.; Scott, D. Measuring birding specialization: A confirmatory factor analysis. *Leisure Sci.* **2004**, *26*, 245-260.
30. Manfredi, M.J.; Driver, B.; Tarrant, M.A. Managing leisure motivations: A meta-analysis of the recreation experience preference scales. *J. Leisure. Res.* **1996**, *28*, 188-213.
31. Williams, D.R.; Schreyer, R.; Knopf, R.C. The effects of experience use history on the multidimensional structure of motivations to participate in leisure activities. *J. Leisure. Res.* **1990**, *22*, 36-54.
32. Dunlap, R.E.; Heffernan, R.B. Outdoor recreation and environmental concern: An empirical evaluation. *Rural Sociol.* **1975**, *40*, 19-30.
33. Theodori, G.L.; Luloff, A.E.; Willits, F.K. The association of outdoor recreation and environmental concern: Reexamining the Dunlap-Heffernan thesis. *Rural Sociol.* **1998**, *63*, 94-108.
34. Jackson, E.L. Outdoor recreation participation and views on resource development and preservation. *Leisure Sci.* **1987**, *9*, 235-250.

35. Nord, M.; Luloff, A.E.; Bridger, J.C. The association of forest recreation with environmentalism. *Environ. Behav.* **1998**, *30*, 235-246.
36. Schuett, M.A.; Ostergren, D. Environmental concern and involvement of individuals in selected voluntary associations. *J. Environ. Educ.* **2003**, *34*, 30–38.
37. Thapa, B.; Graefe, A.R. Forest recreation and environmentalism. *Journal of Park and Recreation Administration* **2003**, *21*, 75-103.
38. Oh, C.-O.; Ditton, R.B. Using recreation specialization to understand conservation support. *J. Leisure. Res.* **2008**, *40*, 556-573.
39. Thapa, B.; Graefe, A.R.; Meyer, L.A. Specialization and marine based environmental behaviors among SCUBA divers. *J. Leisure. Res.* **2006**, *38*, 601-615.
40. Dyck, C.; Schneider, I.; Thompson, M.; Virden, R. Specialization among mountaineers and its relationship to environmental attitudes. *Journal of Park and Recreation Administration* **2003**, *2*, 44-62.
41. Dillman, D.A. *Mail and Internet Surveys: The Tailored Design Method*, 2nd ed.; Wiley: New York, NY, USA, 2000.
42. Schreyer, R.; Lime, D.W. A novice isn't necessarily a novice—The influence of experience use history on subjective perceptions of recreation participation. *Leisure Sci.* **1984**, *6*, 131-149.
43. Backlund, E.A.; Hammitt, W.E.; Bixler, R.D. Experience use history and its relationship to the importance of substitute stream attributes. *Human Dimensions of Wildlife* **2006**, *11*, 411-422.
44. Budruk, M.; Wilhem Stanis, S.; Schneider, I.; Heisey, J. Crowding and experience-use history: A study of the moderating effect of place attachment among water-based recreationists. *Environ. Manage.* **2008**, *41*, 528-537.
45. Driver, B.L. *Master List of Items for Recreation Experience Preference Scales and Domains*; USDA Forest Service, Rocky Mountain Forest and Range Experiment Station: Flagstaff, AZ, USA, 1983; unpublished work.
46. Dunlap, R.E.; van Liere, K.D.; Mertig, A.G.; Emmet Jones, R. Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *J. Soc. Issues* **2000**, *56*, 425-442.
47. Dunlap, R.E.; van Liere, K.D. The “new environmental paradigm”: A proposed measuring instrument and preliminary results. *J. Environ. Educ.* **1978**, *9*, 10-19.
48. Thapa, B. The Association of Outdoor Recreation Activities and Environmental Attitudes on Behaviors among Forest Recreationists. Ph.D. Dissertation. The Pennsylvania State University, State College, PA, USA, 2000.
49. Knoke, D.; Bohrnstedt, G.W.; Mae, A.P. *Statistics for Social Data Analysis*, 4th ed.; Wadsworth/Thomson Learning: Belmont, CA, USA, 2002.
50. Salant, P.; Dillman, D.A. *How to Conduct Your Own Survey*; Wiley: New York, NY, USA, 1994.