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Evaluating Household-Level Relationships between Environmental Views and Outdoor Recreation: The Teton Valley Case

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Outdoor recreation may foster positive environmental views among participants and their nonparticipating household members, but little research has addressed this hypothesis at the household level. We address this gap with a case study evaluating both the individual- and household-level relationship between outdoor recreation and environmental views using the new ecological paradigm scale (NEP). Results suggest NEP relates positively to appreciative outdoor recreation participation and negatively to nonappreciative outdoor recreation participation for participants and their household members. Future research should focus on how household dynamics mediate the relationship between environmental views and outdoor recreation.

Keywords attitudes, ATV, environmentalism, environmental view, hunting, Idaho, NEP, outdoor recreation

Current levels of human consumption of natural resources threaten the function of most ecological systems and the biodiversity they support (Mathews & Hammond, 1999). Pragmatic solutions to this problem are rare because consumption is central to Western culture (Schnaiberg & Gould, 1994). Outdoor recreation, particularly those forms considered to be more appreciative in content, provides a form of consumption that may ameliorate environmental problems by promoting pro-environmental views and behaviors (Dunlap & Heffernan, 1975). As a central, growing, and dynamic part of American culture (Cordell, Betz, & Green, 2002), outdoor recreation has potential to change destructive relationships between society and the environment (Diamond, 2005).

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Scholars have responded with detailed studies on the relationship between participation in outdoor recreation and environmental beliefs, values, attitudes and behaviors. They generally divide outdoor recreation activities into three types: appreciative (e.g., hiking, camping, and bird watching), consumptive (e.g., fishing and hunting) and motorized (e.g., riding all terrain vehicles; ATVs). Most studies have hypothesized a positive relationship between environmental concern and participation in outdoor recreation activities of any kind due to direct and personal experiences with the natural environment (Dunlap & Heffernan, 1975; Tarrant & Green, 1999). These studies also hypothesized a stronger positive relationship between environmental concern and appreciative outdoor recreation activities than between environmental concern and motorized or consumptive activities. This hypothesized relationship assumed appreciative activities, which leave the environment relatively untouched correspond to a "preservationist" ideology (Dunlap & Heffernan, 1975; Tarrant & Green, 1999).

Some studies provided evidence to support these hypotheses with weak correlations for motorized and consumptive activities (i.e., correlation coefficients < 0.1) and stronger correlations for appreciative activities (i.e., 0.15–0.3; Dunlap & Heffernan, 1975; Jackson, 1986; Van Liere & Noe, 1981). Other studies did not find strong correlations between environmental concern and any type of outdoor recreation activity (Geisler, Martinson, & Wilkening, 1977; Nord, Luloff, & Bridger, 1998; Pinhey & Grimes, 1979). Finally, Bright and Porter's (2001) findings suggested the meaning of wildlife-related recreation fully mediates the participation/environmental concern relationship. In other words, the relationship may not consistently hold because the meanings people associate with the activity rather than the actual activity articulates with environmental concern.

The differences among these findings could also reflect different measures of environmental concern. Geisler *et al.* (1977) used support for environmentally related public action as a measure of environmental concern. Pinhey and Grimes (1979) based their determination of environmental concern on two questions about land use. Nord *et al.* (1998) used the problem of quality of the environment (PQENV) scale; Van Liere and Noe (1981), Jackson (1986), and Bright and Porter (2001) used the New Environmental Paradigm scale (a previous version of the New Ecological Paradigm scale). In addition, Dunlap and Heffernan (1975) used a series of questions regarding concern for specific environmental entities. Future research using a common measure such as the New Ecological Paradigm scale (NEP; Dunlap *et al.*, 2000) rather than one devised for the specific study would facilitate comparisons with both past and future studies. We use the NEP scale in this study not only because it is currently one of the most widely used measures of environmental worldview but also in the hope that our research can be more readily replicated and that future results can be compared using a consistent measure of environmental views.

Household-level effects are probably the biggest gap in scholarship addressing linkages between outdoor recreation and environmental views. Household-level effects refer to how outdoor recreation participation of one household member relates to the environmental views of other potentially non-participating household members. For instance, an avid birder may influence the environmental views of non-birder household members by expressing his or her views, telling stories and bringing environmental literature and media into the home. Similarly, hiking could promote pro-environmental views for both the hiker and the hiker's nonhiking household members as the hiker is likely to share information about plants, animals and scenery viewed on their hikes. Little if any previous research on the relationship between environmental views and outdoor recreation has addressed household-level effects. Household-level effects, however, could play a major role in the influence of outdoor recreation on the environment because households represent a fundamental unit in economics (Wheelock & Oughton, 1996) and natural resource use (Liu *et al.*, 2003).

We hypothesize environmental views may be influenced by outdoor recreation at the household level in addition to the individual level (i.e., the person participating). This hypothesis suggests outdoor recreation's impact on environmental views extends beyond the participant to nonparticipating household members. While this hypothesis has not been directly addressed, studies finding household-level impacts of individual behaviors (e.g., parental participation in work programs) on beliefs, attitudes and behaviors of nonparticipating household members are common (Huston et al., 2001). Further, worldviews (i.e., the set of narrative symbols humans use to explain the nature of their environment) evolve largely from interactions with parents and other family members (Greeley, 1993).

In this paper we use interview data from a study conducted in Teton Valley to test four interrelated specific hypotheses addressing individual- and household-level interactions between outdoor recreation and environmental views measured with the NEP:

- (a) environmentally oriented views are positively related to participation in appreciative outdoor recreation,
- (b) environmentally oriented views are negatively related to participation in nonappreciative outdoor recreation,
- (c) environmentally oriented views of nonrecreating respondents are positively related to participation in appreciative outdoor recreation by other household members, and
- (d) environmentally oriented views of nonrecreating respondents are negatively related to participation in nonappreciative outdoor recreation by other household members.

Methods

We obtained data for this study from an interview survey conducted in Teton Valley. The study area included the portion of Teton County, Wyoming, west of the Teton Mountain Range, and Teton County, Idaho. Immigration motivated largely by outdoor recreation opportunities led to a 74% jump in population (3,439 to 5,999) and 85% jump in household numbers (1,123 to 2,078) during the 1990s (Peterson, Mertig, & Liu, 2006; Smith & Kranich, 2000). The population reached approximately 7,200 in 2004 when this study was conducted. The centrality of outdoor recreation and environmental amenities, particularly as drivers of immigration, make the relationship between outdoor recreation and environmental views of particular relevance in this study area.

Sampling and Implementation

We used an in-person interview protocol to assess relationships between household and individual-level participation in outdoor recreation and environmental views. We chose personal interviews because they promised higher response rates (Dillman, 2000). We purchased a representative sample ($n = 550$) of telephone listings, which included physical addresses from Survey Sampling, Incorporated (Fairfield, Conn., USA). Logistic constraints dictated sample size. We pretested the questionnaire with residents of Victor, Idaho, which was within the study area ($n = 23$), and Lansing, Michigan ($n = 18$). During July–August 2004, we visited each respondent during four time intervals, morning and evening on a weekend day and on a week day. We made initial contact via telephone when visits failed or we could not locate a physical address. An interpreter was enlisted for Spanish interviews. Interviewers defined acronyms, but answered other questionnaire related queries by reading directly from the questionnaire, explaining questionnaire format, or stating “whatever it means to you” (Groves, 1989).

Variable Measurement

We measured environmental views with the NEP scale (Dunlap et al., 2000). The scale was designed to address five theoretical dimensions with three questions for each: endorsement of limits to growth, anti-anthropocentrism, belief in future ecocrisis, belief in fragile and balanced nature and rejection of human exemptionalism (i.e., the notion that humans are free to do as they please because they are exempt from the laws of nature). Each item used a 5-category Likert response format ranging from “strongly disagree” to “strongly agree.” The NEP taps a lay person’s view of human relationships with the environment (Johnson, Bowker, & Cordell, 2004). Respondents embracing the views of modern environmentalist groups consistently score higher than other groups (Dunlap & Michelson, 2002; Dunlap & Van Liere, 1978; Dunlap et al., 2000; Mertig, Dunlap, & Morrison, 2002).

We assessed outdoor recreation participation of individuals by asking respondents “about how often in a typical year” do you participate in bird watching, hiking, camping, boating, fishing, hunting and riding off-road vehicles. We assessed outdoor recreation participation of other household members by asking the same question, but replacing “you” with “someone in your household (other than yourself).” Possible responses ranged from frequently to never (i.e., 4 = frequently, 3 = sometimes, 2 = rarely, 1 = never). Asking one member of a household to judge outdoor recreation participation of other household members could create biases if participation in some activities was systematically over or under estimated by respondents. Interviewing all household members could identify any biases associated with asking one respondent to report on outdoor recreation activities of other household members but was not logistically possible in this study.

We also measured several important demographic variables. We used standard survey questions to collect data for education (1 = less than high school to 7 = graduate or professional degree), previous year’s annual income ($1 \leq 14,999$ to $9 \geq 200,000$), age and gender (Dillman, 2000). Using an open-ended question, we asked respondents for their political affiliation and received six answers: Conservative, Republican, Independent, Democrat, Liberal and nonvoting, which was excluded from analysis. Follow up questions indicated that all of the Conservatives considered themselves Republicans and all of the Liberals considered themselves Democrats so we grouped Conservative and Republican and Liberal and Democrat during coding of political affiliation (i.e., 1 = Republican, 2 = Independent, and 3 = Democrat).

Analysis

We explored the relationship between environmental views and participation in outdoor recreation by calculating Pearson correlation coefficients for the relationship between NEP score and frequency of participation in each of the outdoor recreation activities. We grouped participants into individuals within multi-person households and individuals who lived alone. The first group was analyzed with respect to both activities of the individuals and activities of their household members. For those individuals who identified themselves as sharing a household with others, we computed correlations between the frequency that respondents participated in each of the activities and the frequency that their household members participated in the activity.

As performed by Jackson (1986) and Theodori, Luloff, & Willits (1998), we conducted a principal components analysis to ascertain larger groupings for participation in outdoor recreation activities such as appreciative and nonappreciative outdoor recreation activities. We performed principal components analysis with varimax rotation to obtain orthogonal factors that accounted for the greatest proportion of the variance. We retained all factors with

eigenvalues greater than one for analysis. We also conducted principal components analysis on the NEP scale to examine the dimensionality of the scale. We calculated Cronbach's alpha on groups of items (i.e., the NEP scale items and sub-groupings of outdoor recreation activities based on principal components analysis results) to measure their internal consistency.

To control for education, income, political affiliation, age and gender, Dunlap and Heffernan (1975), Van Liere and Noe (1981), Jackson (1986) and Theodori et al. (1998) suggested calculating partial correlation coefficients for the relationship between NEP score and each of the outdoor recreation activities. Partial correlation coefficients were obtained from regressing NEP score against each of the outdoor recreation activities with all demographic variables included in each of the regression models as controls (Cohen & Cohen, 1983).

We evaluated differences in: a) the correlations between a respondent's NEP score and their own participation in outdoor recreation activities; and b) the correlations between a respondent's NEP score and participation in outdoor recreation activities by other household members. We used a modified *t*-test for comparing partial correlations among dependent variables from the same sample (Cohen & Cohen, 1983). We used a Fisher's *r*-to-*z* transformation when comparing the partial correlations between NEP score and outdoor recreation activities across the two independent samples of individuals who identified themselves as living alone and those belonging to multi-person households (Cohen & Cohen, 1983).

To evaluate the relationship between an individual's environmental views and the outdoor recreation activities of other household members, we divided the dataset into two groups: those individuals who did not participate in the activity and those who did participate. We then divided each of these groups into subgroups according to whether the activities of the respondent's household members matched or did not match their own participation in the activity. We performed two-sample *t*-tests on the NEP scores of individuals who had household members that matched their participation in the activity and individuals without household members sharing activity participation.

To analyze the relationship between an individual's environmental views and the outdoor recreation activities of other household members while controlling for demographic parameters, we created a dummy variable to represent whether the activities of the respondent's household members matched (i.e., 0) or did not match (i.e., 1) their own activities (a value of 1 reflected any level of participation). We computed the partial correlation coefficients between NEP scale and the dummy variable for each type of participation and nonparticipation while controlling for the aforementioned demographic parameters. All statistical analyses were performed using the R package (R Development Core Team, 2005). With the exception of NEP scale items, respondents who failed to answer a relevant question were excluded from the analysis.

Results

Only 484 of the initial 550 household listings were usable. Several of the individuals were no longer at the listed address. Of the remaining, we were able to contact 436 households, and 20 refused to participate in the study. Therefore, the final cooperation rate (i.e., the proportion of those we were able to contact who agreed to be interviewed) was 95% (416 of 436; sampling error $\pm 4.9\%$). Due to incomplete questionnaires, ten additional cases had to be excluded prior to analysis. Most of the respondents ($n = 312$) shared a household with at least one other person, and 94 lived alone. Item nonresponse was $\leq 1\%$ for age, gender and education as well as for participation in the outdoor recreation activities. Item

nonresponse was 7% for income and 14% for political affiliation. Fifteen individuals did not answer either 1 or 2 of the 15 NEP questions. Therefore, we substituted mean values for these item nonresponses.

Our sample matched U.S. Census data for the study area, with 46% of respondents being female, 90% Anglo and 6% Hispanic. Because 90% of respondents were Anglo, ethnicity was not used in other analyses. The median yearly household income fell within the \$35,000–49,999 range, the majority of the respondents (90%) had annual family incomes below \$100,000 and only 6.5% of respondents had annual family incomes below \$15,000. Nearly 40% of respondents had 4-year college degrees or higher, 30% completed school with some form of vocational training, 25% completed school at the high school level and 5% did not complete high school. Mean age of respondents was 46. Regarding political affiliation, 41% of the respondents identified themselves as being Independent, while 34% of respondents were Republicans and 25% were Democrats.

Cronbach's alpha for the NEP scale items was 0.87 reflecting a high degree of consistency. As was the case for Dunlap et al. (2000), principal components analysis revealed more than one dimension. Despite this, the scale's authors (Dunlap et al.) strongly suggest using the NEP as a single measure. Hence, we used the NEP scale as a single measure to represent environmental views. Political affiliation was a significant predictor of NEP for both individuals belonging to multi-person households (MPH; $p < 0.001$) and those living alone (LA; $p < 0.001$). Democrats had higher NEP scores ($\bar{X}_{MPH} = 61.27$, $\bar{X}_{LA} = 60.97$) than both Independents ($\bar{X}_{MPH} = 51.56$, $\bar{X}_{LA} = 52.06$, $p < 0.01$) and Republicans ($\bar{X}_{MPH} = 43.51$, $\bar{X}_{LA} = 45.5$; $p < 0.01$), and the NEP scores of Independents were significantly higher than those of Republicans ($p < 0.01$). NEP scores were significantly positively related to education level for individuals living alone ($p < 0.05$), but not for individuals living in multi-person households ($p = 0.06$). Surprisingly, given past research on environmental concern (Jones & Dunlap, 1992), neither gender nor age contributed significantly to explaining NEP scores. NEP scores were also unrelated to income.

Outdoor Recreation

Camping and hiking were the most common outdoor recreation activities performed by individuals participating in the study. About 73% of people said they sometimes or frequently participated in both. A majority of respondents participated in bird watching (62%) and fishing (57%) sometimes or frequently. Boating and riding all-terrain vehicles (ATVs) were less common (52% and 56%, respectively, never or rarely participated in each). Respondents participated in hunting the least often (51% never hunted and 15% rarely hunted).

Most respondents had household members who sometimes or frequently hiked (75%) and camped (77%). The majority of respondents also indicated bird watching (56%) and fishing (61%) were sometimes or frequently performed by household members. Slightly more than half of the respondents indicated household members sometimes or frequently boated (51%) or rode ATVs (53%). Hunting was least often performed by household members (47% never hunted and 13% rarely hunted). Household members of respondents participated in outdoor recreation activities at similar rates to respondents. The strongest correlations between respondents' participation in outdoor recreation and participation by other household members were for bird watching ($r = 0.84$) and boating ($r = 0.82$), followed by riding ATVs ($r = 0.78$), camping ($r = 0.78$), and hiking ($r = 0.74$). The weakest correlations were for fishing ($r = 0.66$) and hunting ($r = 0.55$).

Principal components analyses on outdoor recreation activities differed depending on the group (i.e., multi-person household respondent, other household member, or single-person householder; see Table 1). For respondents living in multi-person households, the

TABLE 1 Factor Loadings for Outdoor Recreation Activities Performed by Respondents who Lived with Others, Their Associated Household Members and Respondents who Lived Alone

| Activity | Respondents with household members | | Household members | | Respondents living alone |
|-----------------------------|------------------------------------|--------------|-------------------|--------------|--------------------------|
| | Factor 1 | Factor 2 | Factor 1 | Factor 2 | Factor 1 |
| Bird watching | 0.120 | -0.310 | -0.088 | 0.292 | 0.024 |
| Hiking | 0.602 | -0.318 | 0.042 | 0.849 | 0.329 |
| Camping | 0.751 | 0.080 | 0.459 | 0.565 | 0.665 |
| Boating | 0.633 | 0.237 | 0.560 | 0.354 | 0.768 |
| Fishing | 0.491 | 0.537 | 0.724 | 0.088 | 0.760 |
| Hunting | 0.355 | 0.616 | 0.745 | -0.128 | 0.606 |
| Riding ATVs | 0.067 | 0.613 | 0.522 | -0.074 | 0.594 |
| Eigenvalue | 1.713 | 1.304 | 1.885 | 1.280 | 2.437 |
| % variance explained | 24.5 | 18.6 | 26.9 | 18.3 | 34.8 |

appreciative activities of camping, hiking and boating (i.e., most “boating” in Teton Valley is nonmotorized) loaded heavily on the first factor (Cronbach’s alpha = 0.67). The nonappreciative activities of fishing, hunting and riding ATVs loaded positively on the second factor (Cronbach’s alpha = 0.69). For activities performed by household members other than the respondent, boating grouped with the nonappreciative activities on the first factor (Cronbach’s alpha = 0.71), while camping and hiking loaded on the second factor (Cronbach’s alpha = 0.67). For respondents who lived alone, camping, boating, fishing, hunting and riding ATVs grouped together on a single factor (Cronbach’s alpha = 0.79). Considering the lack of consistency present in how activities loaded on factors, particularly in the group of appreciative activities, and because some activities fell into different groupings across the three categories of individuals, we analyzed each outdoor recreation activity separately rather than combining them to form composite measures.

Hypothesis 1: NEP and Appreciative Outdoor Recreation Activities

We found a positive relationship between the NEP scale and frequency of participating in appreciative outdoor recreation activities (Table 2). This relationship carried across all three categories of participants: respondents who lived in multi-person households, their associated household members, and individuals who lived alone. NEP score had the strongest zero-order correlation with participation in hiking for respondents living in multi-person households when this activity was conducted either by the respondent or another member of the household. For respondents living in single-person households, NEP score had the strongest zero-order correlation with participation in bird watching. NEP score had the weakest zero-order correlation with participation in boating for respondents of both single-person and multi-person households. For respondents in multi-person households, respondents’ NEP score had the weakest correlation with participation in camping by other household members. We found appreciable differences among the zero-order and partial correlations between NEP score and outdoor recreation activities (Table 2). The largest declines in partial correlation coefficients occurred for hiking performed by household members of respondents from multi-person households (0.12) and bird watching performed by individuals who lived alone (0.19); all other changes were < 0.1.

TABLE 2 Zero-order and Partial Correlations Between the New Ecological Paradigm (NEP) Score of Respondents and Outdoor Recreation Activities Performed by: Respondents who Lived with Others in the Same Household, Their Associated Household Members, and Respondents who Lived Alone. (Zero-order correlations consider only the outdoor recreation variable and partial correlations account for: education, income, political affiliation, gender, and age.)

| Activity | Respondents in multi-person households ($n = 312$) | | | Household members of respondents ($n = 312$) | | | Respondents living alone ($n = 94$) | | | | | |
|---------------|--|-------|---------|--|--------|---------|---------------------------------------|-------|---------|-------|--------|-------|
| | Zero-order | | Partial | Zero-order | | Partial | Zero-order | | Partial | | | |
| | r | p | r | r | p | r | r | p | r | p | | |
| Bird watching | 0.249 | 0.000 | 0.203 | 0.001 | 0.253 | 0.000 | 0.183 | 0.004 | 0.417 | 0.000 | 0.223 | 0.068 |
| Hiking | 0.325 | 0.000 | 0.241 | 0.000 | 0.304 | 0.000 | 0.183 | 0.004 | 0.392 | 0.000 | 0.378 | 0.001 |
| Camping | 0.181 | 0.001 | 0.164 | 0.010 | 0.106 | 0.061 | 0.104 | 0.109 | 0.273 | 0.008 | 0.248 | 0.063 |
| Boating | 0.110 | 0.053 | 0.052 | 0.052 | 0.115 | 0.043 | 0.091 | 0.152 | 0.126 | 0.229 | 0.208 | 0.099 |
| Fishing | -0.151 | 0.007 | -0.106 | 0.102 | -0.176 | 0.002 | -0.106 | 0.099 | -0.058 | 0.581 | -0.012 | 0.923 |
| Hunting | -0.205 | 0.000 | -0.096 | 0.133 | -0.257 | 0.000 | -0.183 | 0.004 | -0.118 | 0.257 | 0.064 | 0.606 |
| Riding ATVs | -0.404 | 0.000 | -0.300 | 0.000 | -0.419 | 0.000 | -0.284 | 0.000 | -0.195 | 0.059 | -0.071 | 0.566 |

Hypothesis 2: NEP and Nonappreciative Outdoor Recreation Activities

A significant negative relationship existed between NEP scores and the frequency of participating in all nonappreciative outdoor recreation activities for respondents in multi-person households and their household members but not for respondents living alone (Table 2). The strongest zero-order correlation was between NEP score and frequency of riding ATVs and the weakest for frequency of participation in fishing. As in the case of the appreciative activities, differences were found between the zero-order correlations and partial correlations. The largest declines between zero-order and partial correlation coefficients occurred for ATV riding respondents in multi-person households (0.10), ATV riding household members of respondents (0.14) and hunting respondents in multi-person households (0.10). Declines in correlation coefficients when including control variables were < 0.1 for all other activities.

Hypotheses 3 and 4: NEP and Household-level Outdoor Recreation Activities

With the exception of hunting, the correlation between NEP score and outdoor recreation participation did not differ significantly when the activity was performed by the respondents themselves or nonrespondents within the household (Table 2). For hunting, NEP score was significantly more related to participation of the respondent's household members than their own participation ($t = 5.62, p < 0.001$). The relationship between NEP score and outdoor recreation activities also depended on whether activities were performed by individuals who lived with others or individuals who lived alone. Individuals who lived alone had stronger correlations between NEP scores and the appreciative outdoor recreation activities and weaker correlations between NEP scores and the nonappreciative outdoor recreation activities, than individuals who lived with others (Table 2).

For birding, hunting and ATV use, respondent's NEP scores were correlated with whether or not their outdoor recreation activities matched those of their household members (Table 3). Respondents who did not hunt had significantly higher NEP scores if their household members also did not hunt than nonhunters with household members who did hunt. The same was true for ATV users. In addition, respondents who rode ATVs had significantly lower NEP scores if their household members also rode ATVs than if their household members did not. Respondents who did not bird watch had significantly higher NEP scores if their household members bird watched than if their household members did not bird watch. No significant household effects were found for outdoor recreation activities other than bird watching, ATV use and hunting. These results, however, should be interpreted with caution given the small sample sizes of some subgroups in which the participation of the individual did not match the participation of household members. Further, after controlling for demographic variables, the only significant effect was for non-ATV users ($r = -0.22, p < 0.05$). As in the case of the two-sample t test, non-ATV users had significantly higher NEP scores if their household members did not ride ATVs than if their household members did.

Discussion

Our results support the hypothesized positive relationship between environmentally oriented views and appreciative outdoor recreation and negative relationship between environmentally oriented views and nonappreciative outdoor recreation. The latter relationship, however, was only evident for people living in multi-person households. Fishing, ATV use and hunting did not negatively influence environmental views of individuals who lived alone. While larger sample sizes might detect a significant negative relationship for these activities, the correlations were among the lowest we found. This finding suggests the activity is not as important as the structure of social relationships that promulgates human

TABLE 3 Comparison of Mean NEP Scores Between Respondents who Share Each Type of Outdoor Recreation Participation, or Nonparticipation, with Another Household Member, and Respondents that do not Share Each Type of Outdoor Recreation Participation, or Nonparticipation, with Another Household Member

| Type of outdoor recreation participation or nonparticipation | <i>n</i> ^a | <i>n</i> ^b | \bar{X} ^a | \bar{X} ^b | <i>t</i> | <i>P</i> |
|--|-----------------------|-----------------------|------------------------|------------------------|----------|----------|
| Bird watchers | 246 | 12 | 52.872 | 51.083 | 0.578 | 0.573 |
| Nonbird watchers | 46 | 7 | 45.657 | 52.857 | -2.342 | 0.042 |
| Hikers | 268 | 14 | 52.517 | 50.357 | 1.014 | 0.325 |
| Non-hikers | 19 | 11 | 44.327 | 46.636 | -0.655 | 0.519 |
| Campers | 275 | 9 | 51.992 | 49.333 | 1.110 | 0.294 |
| Noncampers | 17 | 10 | 51.235 | 47.585 | 1.265 | 0.219 |
| Boaters | 216 | 13 | 53.203 | 48.846 | 1.331 | 0.205 |
| Nonboaters | 66 | 17 | 47.924 | 49.706 | -0.586 | 0.564 |
| Fishers | 217 | 22 | 50.456 | 51.318 | -0.324 | 0.749 |
| Nonfishers | 42 | 31 | 56.451 | 54.382 | 0.73 | 0.468 |
| Hunters | 119 | 35 | 49.163 | 53.114 | -1.728 | 0.090 |
| Nonhunters | 112 | 45 | 54.932 | 49.533 | 2.892 | 0.005 |
| ATV-users | 166 | 11 | 47.492 | 52.091 | -2.185 | 0.046 |
| Non-ATV-users | 111 | 23 | 57.875 | 52.522 | 2.657 | 0.011 |

^acases where recreation activities of respondents and non-respondent household members match

^bcases where recreation activities of respondents and non-respondent household members do not match

exemptionalism among participants in non-appreciative outdoor recreation. The activity has a different impact on environmental views in different social groupings (e.g., two participants, two nonparticipants or a mixture).

Unlike earlier studies (e.g., Dunlap & Heffernan, 1975; Jackson, 1986; Theodori et al., 1998; Van Liere & Noe, 1981), we found appreciable differences among the zero-order and partial correlations between environmental views and outdoor recreation activities. The larger differences probably reflected higher zero-order correlation coefficients than earlier studies. Previous studies could not find larger declines in partial correlation coefficients relative to zero-order coefficients because zero-order coefficients rarely surpassed 0.1. For instance, Jackson (1986) reported higher coefficients than usual, but only 12% of zero order coefficients were > 0.2 compared to 48% in this study. The stronger than average correlations between environmental views and culturally important variables (e.g., education, political affiliation) seems intuitive in communities where culture is defined and divided by environmental issues (Peterson et al., 2002). In such areas (e.g., ski towns, fishing towns, beach towns or mountain biking towns) the environment may have stronger ties to cultural identity (Peterson, Mertig, & Liu, 2006; Smith & Krannich, 2000).

This idea may also explain the relatively strong negative correlations between environmentally oriented views and nonappreciative outdoor recreation. Hunting had high negative correlations with nonhunting household members' environmental views compared to other activities but had the lowest correlation between respondent and household member participation ($r = 0.55$). This finding may reflect the highly gendered nature of hunting participation (i.e., in Teton Valley 62% of males hunted and 32% of females hunted). Even though individuals were not highly likely to hunt when their other household members hunted, respondents were likely to have more negative environmental views if their household members hunted. Hunting also provided a notable exception to respondent's and

household members' participation in outdoor recreation being interchangeable with regard to environmental views. Hunting participation of nonrespondent householders predicted respondent environmental views better than the respondent's own participation. While this result is difficult to interpret, it may suggest social interactions associated with hunting (e.g., discussions, story telling, hunting related media) may have stronger negative ties to environmentally oriented views than participation in hunting itself. The hunter recruitment problems suggested by low household member participation and decreasing trends in hunter recruitment numbers, imply any negative impact of hunting on environmentally oriented views will decline along with one of the largest sources of income for many state wildlife and parks departments (Enck, Decker, & Brown, 2000; Peterson, 2004; United States Department of the Interior and United States Department of Commerce, 2002).

Due to high correlation between respondent and household member participation ($r = 0.78$) and apparently strong transmission of the human exemptionalism views within households, ATV use presents a serious conservation challenge. While some research suggested social evolution toward pro-environmental views and economic constraints would lead to appreciable declines in ATV use (Jackson, 1986), the opposite trend has occurred. Between 1999 and 2003 the proportion of people 16 years and older participating in ATV outdoor recreation in the United States increased from 16.8% to 23.8%, and participation rates doubled within the fastest growing demographic group in the United States, Hispanics (Cordell et al., 2005). Individuals living alone, however, did not demonstrate negative correlations between environmentally oriented views and ATV use. Many explanations for this phenomenon are possible. Not having fellow household members to discuss ATV use with could dampen the negative effects of ATV use on environmental concern. The ATV users who lived alone may either participate in nonenvironmentally damaging versions of the activity, be unaware of the damage they caused, or consciously make ATV use an exception to their environmental views. In any case human exemptionalism and ATV use may not represent an unbreakable positive feedback loop.

The unusually strong negative correlations and negative household effects of nonappreciative outdoor recreation on environmental views may relate to the political polarization of recent decades (Layman & Carsey, 2002). Political affiliation predicted environmental views better than any other demographic variable in this study. If cultural groups representing various outdoor recreation activities follow the political trend of polarization, environmental value based divisions may grow larger in the future. This potential problem can be addressed in part by deconstructing stereotypes of political and recreational linkages (e.g., not all ATV users and hunters are Republican) and promoting ideological diversity within recreation groups. While this suggestion may seem far fetched, the successful campaigns of pro-gun Democratic candidates in the 2006 midterm elections (e.g., Senators Jon Tester-MT and Jim Webb-VA) demonstrate such decoupling is both possible and a politically successful strategy.

Conclusion

Our results suggest outdoor recreation participation has a larger impact on environmental views than previously thought both because we found larger correlation coefficients than previous studies and because some correlations permeated to non-participating household members. These findings support Bright and Porter's (2001) call for research addressing the social factors influencing and mediating the outdoor recreation and environmental concern relationship. As the first social unit beyond the individual, households provide a logical place to begin this effort. Future research should address how household dynamics (e.g., changing household size and family structure) mediate the relationship between outdoor recreation and environmental views. Our results suggest a specific need to understand why

the relationship between environmental views and outdoor recreation differs in multi-person and single-person households.

Since single-person households are increasing in prevalence and household size is decreasing globally (Liu et al., 2003), the differences between multi-person and single-person households will become more important for conservation efforts. For instance, answering why ATV use and hunting in multi-person households correlated with less environmentally oriented views, but the same activities had no effect on environmental views in single-person households would represent the beginning of efforts to make these sectors of outdoor recreation more environmentally oriented. Ideological changes will not make all forms of outdoor recreation environmentally benign, but increasing the number of environmentally oriented participants should decrease the prevalence of environmentally damaging forms of recreation.

Future qualitative research could help illuminate how social dynamics in households mediate the relationship between environmental worldviews and outdoor recreation. Specifically, participant observation and in depth interviews could document how recreation activities of one household member influence other household members, and the extent to which nonparticipating household members feel their own environmental views are influenced by outdoor recreation of other household members. This approach could evaluate the role of gender, media, cultural stereotypes and story telling in explaining why nonhunters in hunting households held less environmentally oriented views than the hunters in their own homes.

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References

- Bright, A. D. & Porter R. (2001). Wildlife-related recreation, meaning, and environmental concern. *Human Dimensions of Wildlife*, 6(4), 259–276.
- Cohen, J. & Cohen, P. (1983). *Applied multiple regression/correlation for the behavioral sciences 2nd ed.* London: Lawrence Erlbaum Associates.
- Cordell, H. K., Betz, C. J., Green, G., & Owens, M. (2005). *Off-highway vehicle recreation in the United States: A national report from the National Survey on Recreation and the Environment.* Asheville, NC: U.S. Forest Service Southern Research Station.
- Cordell, H. K., Betz, C. J., & Green, G. T. (2002). Recreation and the environment as cultural dimensions in contemporary American society. *Leisure Sciences*, 24(1), 13–41.
- Diamond, J. (2005). *Collapse: How societies choose to fail or succeed.* New York: Penguin.
- Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method.* New York: Wiley.
- Dunlap, R. E. & Heffernan, R. B. (1975). Outdoor recreation and environmental concern: An empirical examination. *Rural Sociology*, 40, 18–30.
- Dunlap, R. E. & Michelson, W. (Eds.). (2002). *Handbook of environmental sociology.* Westport, CT: Greenwood.
- Dunlap, R. E. & Van Liere, K. D. (1978). The “New Environmental Paradigm”: A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, 9, 10–19.
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425–442.

- Enck, J. W., Decker, D. J., & Brown, T. L. (2000). Status of hunter recruitment and retention in the United States. *Wildlife Society Bulletin*, 28(4), 817–824.
- Geisler, C. C., Martinson, O. B., & Wilkening, E. A. (1977). Outdoor recreation and environmental concern – Restudy. *Rural Sociology*, 42(2), 241–249.
- Greeley, A. (1993). Religion and attitudes toward the environment. *Journal for the Scientific Study of Religion*, 32(1), 19–28.
- Groves, R. M. (1989). *Survey errors and survey costs*. New York: Wiley.
- Huston, A. C., Duncan, G. J., Granger, R., Bos, J., McLoyd, V., and Mistry, R. (2001). Work-based antipoverty programs for parents can enhance the school performance and social behavior of children. *Child Development*, 72(1), 318–336.
- Jackson, E. L. (1986). Outdoor recreation participation and attitudes toward the environment. *Leisure Studies*, 5, 1–23.
- Johnson, C. Y., Bowker, J. M., & Cordell, H. K. (2004). Ethnic variation in environmental belief and behavior: An examination of the new ecological paradigm in a social psychological context. *Environment and Behavior*, 36(2), 157–186.
- Jones, R. E. & Dunlap, R. E. (1992). The social bases of environmental concern – Have they changed over time. *Rural Sociology*, 57(1), 28–47.
- Layman, G. C. & Carsey, T. M. (2002). Party polarization and party structuring of policy attitudes: A comparison of three NES panel studies. *Political Behavior*, 24(3), 199–236.
- Liu, J. G., Daily, G. C., Ehrlich, P. R., & Luck, G. W. (2003). Effects of household dynamics on resource consumption and biodiversity. *Nature*, 421(6922), 530–533.
- Mathews, E. & Hammond, A. (1999). *Critical consumption trends and implications: degrading earth's ecosystems*. Washington, DC: World Resources Institute.
- Mertig, A. G., Dunlap, R. E., & Morrison, D. E. (2002). The environmental movement in the United States. In R. E. Dunlap & W. Michelson (Eds.), *Handbook of environmental sociology* (pp. 448–481). Westport, CT: Greenwood.
- Nord, M., Luloff, A. E., & Bridger, J. C. (1998). The association of forest recreation with environmentalism. *Environment and Behavior*, 30(2), 235–246.
- Peterson, M. N. (2004). An approach for demonstrating the social legitimacy of hunting. *Wildlife Society Bulletin*, 32(2), 310–321.
- Peterson, M. N., Mertig, A. G., & Liu, J. G. (2006). Effects of zoonotic disease attributes on public attitudes towards wildlife management. *Journal of Wildlife Management*, 70(6), 1746–1753.
- Peterson, M. N., Peterson, T. R., Peterson, M. J., Lopez, R. R., & Silvy, N. J. (2002). Cultural conflict and the endangered Florida Key deer. *Journal of Wildlife Management*, 66(4), 947–968.
- Pinhey, T. K. & Grimes, M. D. (1979). Outdoor recreation and environmental concern: A reexamination of the Dunlap-Heffernan thesis. *Leisure Sciences*, 2, (1–11).
- R Development Core Team. (2005). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org>
- Schnaiberg, A. & Gould, K. A. (1994). *Environment and society: The enduring conflict*. New York: St. Martin's Press.
- Smith, M. D. & Krannich, R. S. (2000). "Culture clash" revisited: newcomer and longer-term residents' attitudes towards land use, development, and environmental issues in rural communities in the Rocky Mountain west. *Rural Sociology*, 65(3), 396–421.
- Tarrant, M. A. & Green, G. T. (1999). Outdoor recreation and the predictive validity of environmental attitudes. *Leisure Sciences*, 21(1), 17–30.
- Theodori, G. L., Luloff, A. E., & Willits, F. K. (1998). The association of outdoor recreation and environmental concern: Reexamining the Dunlap-Heffernan thesis. *Rural Sociology*, 63(1), 94–108.
- U.S. Department of the Interior and U.S. Department of Commerce. (2002). *2001 national survey of fishing, hunting, and wildlife-associated recreation*. Washington, DC: United States Government Printing Office.
- Van Liere, K. D. & Noe, F. P. (1981). Outdoor recreation and environmental attitudes—Further examination of the Dunlap-Heffernan thesis. *Rural Sociology*, 46(3), 505–513.
- Wheelock, J. & Oughton, E. (1996). The household as a focus for research. *Journal of Economic Issues*, 30(1), 143–159.