

The Association of Outdoor Recreation and Environmental Concern: Reexamining the Dunlap-Heffernan Thesis¹

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ABSTRACT Building upon earlier studies, two hypotheses concerning the association between participation in outdoor recreational activities and pro-environmental behavior are tested using data collected in a general population survey from a random sample of individuals in four communities in Pennsylvania. The first hypothesis, that there is a positive association between outdoor recreational participation and pro-environmental behavior, received substantial support. In contrast to previous research, the results did not support the second hypothesis which stated that there will be differences between/among different types of outdoor activities with respect to their impact on pro-environmental behaviors. Clarifications are made with respect to previous classifications of outdoor recreation activities.

Introduction

More than two decades ago, Dunlap and Heffernan (1975) explored the issue of whether involvement in outdoor recreation activities increased environmental concern among the general public. Since their initial analysis, several other researchers (e.g., Geisler et al. 1977; Jackson 1986; Pinhey and Grimes 1979; Van Liere and Noe 1981) have examined the associations between participation in outdoor recreational activities and attitudes toward the environment. The overall findings of these studies have been far from consistent. The purpose of this paper is to review this literature and report results from a study of the association between participation in outdoor recreational activities and a stronger measure of environmental concern—*pro-environmental behavior*.

In previous studies of outdoor recreation and environmental issues, concern for the environment was measured by attitudinal indicators. However, research has consistently shown that the links between environmental attitudes and behavior are, at best, weak (Hines et al. 1987; Oskamp et al. 1991; Scott and Willits 1994; Weigel et al. 1974; also see Guagnano et al. 1995; Vogel 1996). It may be the case that participation in outdoor recreational activities leads to pro-environmental behaviors regardless of whether or not it leads to measurable pro-environmental attitudes.

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Review of the literature

Utilizing data collected in 1970 from a Washington survey, Dunlap and Heffernan (1975) explored the issue of whether involvement in outdoor recreation activities increased environmental concern among the general public. Dunlap and Heffernan tested three hypotheses. First, they hypothesized that involvement in outdoor recreation was positively associated with environmental concern. Second, they hypothesized that involvement in appreciative activities (i.e., hiking, camping, and visiting state parks and scenic areas) was more strongly associated with environmental concern than was involvement in consumptive activities (i.e., hunting and fishing). Third, they hypothesized that the association between outdoor recreation involvement and protecting those aspects of the environment necessary for pursuing such activities was stronger than the association between outdoor recreation and other environmental issues such as air and water pollution.

Dunlap and Heffernan's results indicated mixed and generally weak support for their first hypothesis, modest support for their second hypothesis, and somewhat stronger support for their third hypothesis. In order to check if their results were spurious, Dunlap and Heffernan examined the relationships while controlling for five demographic variables—age, gender, residence, education, and income. Although their correlations were slightly weakened, Dunlap and Heffernan found no loss of significance. Hence, they concluded that "there is a nonspurious relationship between involvement in outdoor recreational activities (especially appreciative activities) and environmental concern" (25). Although they noted that the association between outdoor recreation participation and environmental concern needed further investigation, they argued, based on their results, that outdoor recreationists constituted a potential constituency for environmental activists.

Geisler et al. (1977) replicated and expanded Dunlap and Heffernan's (1975) research. Utilizing data from a 1974 quality of life survey in northwest Wisconsin, Geisler et al. examined the first and second hypotheses proposed by Dunlap and Heffernan. Unlike Dunlap and Heffernan, the authors found considerable support for the first hypothesis and somewhat mixed support for the second. Furthermore, when the effects of age, gender, education, family income, and size of place were controlled, the number of significant associations between outdoor recreation and environmental concern declined markedly. From these findings, Geisler et al. concluded that individual characteristics accounted for most of the variation in environmental concern.

In their sample of Louisiana residents, Pinhey and Grimes (1979) reexamined the Dunlap and Heffernan thesis using slightly differ-

ent measures of both outdoor recreational activities and environmental concern. Applying a chi-square analytic framework, they found very little statistical support for Dunlap and Heffernan's first hypothesis and none for the second. Like others before them, Pinhey and Grimes compared the level of recreational participation with sociodemographic variables. When they included age, education, gender, income, occupation, and residence in their model, they found that involvement in recreational activities was one of the least efficient predictors of environmental concern. Echoing Geisler et al., Pinhey and Grimes (1979:9) concluded that individual characteristics "were more important than levels and types of recreational activity in influencing environmental concern."

Van Liere and Noe (1981:506) further examined two hypotheses developed by Dunlap and Heffernan (1975), although they allegedly used "*stronger measures of outdoor recreation and environmental attitudes*" [emphasis added]. Van Liere and Noe (1981) used environmental orientation, measured by Dunlap and Van Liere's (1978) 12-item "New Environmental Paradigm" (NEP) scale, as a reflection of environmental concern. The authors' initial expectation was that the use of the NEP scale and different measures of outdoor recreation would produce coefficients that would vary systematically from previous studies. The results failed to confirm their expectations. The pattern of associations did not support the first hypothesis and only somewhat supported the second hypothesis.

More recently, Jackson (1986) utilized survey data collected on residents of Edmonton and Calgary, Alberta, Canada, to test slight variations of Dunlap and Heffernan's (1975) second and third hypotheses. The results supported both hypotheses. When the effects of age, education, gender, and income were held constant, the magnitudes and the significance levels of the associations remained comparable to the zero-order correlation coefficients.

Overall, the findings of these studies have been inconsistent. The present research is a further examination of the association between participation in outdoor recreational activities and environmental concern. Building upon previous studies, the following two hypotheses were tested. First, it was hypothesized that there is a positive association between outdoor recreational participation and pro-environmental behavior. The second hypothesis was that there will be differences between/among different types of activities with respect to their impact on pro-environmental behaviors. Clarifications are then made regarding previous classifications of outdoor recreation activities.

Data and measurement

Data were collected in a general population survey from a random sample of individuals in four agricultural communities at the rural-

urban interface in Pennsylvania. Study sites were selected based on an empirical classification of every municipality in the Commonwealth with respect to the level of agricultural presence, rurality, and growth. Each municipality was ranked according to its population size, population growth (1980–1990), migration rate (1980–1990), percent of housing unit change (1980–1990), percent of land in agriculture, percent urban population, and proportion employed in agricultural occupations. From these statistical rankings, four sites were selected to represent a typology of increasing levels of urban presence and pressure in agricultural areas.² The sites chosen for in-depth study included an aggregate of minor civil divisions from each of the following four counties: Lancaster, Crawford, Snyder, and Bedford.³

Based on major issues identified in key and action informant interviews in each study site, a questionnaire was developed which addressed land use, agricultural, development, and natural resource issues, in addition to social issues including community attachment, community ties, community participation, community leadership,

² Four sites were selected to represent a typology of increasing levels of urban presence and pressure in agricultural areas: agricultural presence with no urban presence or pressure; agricultural presence with urban presence but no pressure; agricultural presence with limited urban presence and no urban pressure; and agricultural presence with both urban presence and pressure. See Bourke et al. (1996) and Luloff et al. (1995) for a more detailed description of the typology and site selections.

³ Each site consisted of several contiguous municipalities. The Lancaster site (agricultural presence with both urban presence and pressure) consisted of East Lampeter, Upper Leacock, West Earl, Earl, East Earl, Leacock, Paradise, and Salisbury Townships. The Crawford site (agricultural presence with urban presence but no pressure) included Meadville City, Saegertown Borough, and Hayfield, Woodcock, East Mead, West Mead, Union, and Vernon Townships. The Snyder site (agricultural presence with no urban presence or pressure) included Spring, Beaver, and Franklin Townships, and Beavertown and Middleburg Boroughs. The Bedford site (agricultural presence with limited urban presence and no urban pressure) included Bedford, Schellsburg, New Paris, Manns Choice, Rainsburg, and St. Clairsville Boroughs, and Bedford, Napier, Harrison, Colerain, Sanke Spring, South Woodbury, King, and East St. Clair Townships.

Census data indicated slight differences in sociodemographic and economic characteristics among the four sites. The percent of the population under 18 years of age was highest in Lancaster and lowest in Crawford, while the opposite was true for the percent of population over 64 years of age. Lancaster had the largest population, highest population density, and greatest population growth rate between 1980 and 1990. Crawford had the second largest population, and it was the only site to experience a negative population change in the 1980s. Bedford had the third largest population and the lowest population density, but it also experienced substantial population growth during the 1980s. Snyder had the smallest population and a relatively low population density, despite population growth during the 1980s. On the other hand, the sites were quite similar in regard to family size, gender, racial distribution, and average age. For further detailed descriptions of the sociodemographic and economic characteristics of the four study sites, see Luloff et al. (1995).

and stress. Following a modified Total Design Method (see Dillman 1978; Luloff and Ilvento 1981), data were gathered in the Snyder, Crawford, and Bedford sites using mail survey techniques. However, due to the presence of a substantial number of Old Order Amish and Mennonites in the Lancaster community, these data were collected via a questionnaire drop-off/pick-up procedure.⁴ Overall, a response rate of 51 percent was achieved, resulting in 1,491 completed questionnaires across the four sites.

Measuring pro-environmental behavior

Respondents were presented with a list of seven yes/no items which asked if, during the past year, they had engaged in any of the following behaviors: (1) contributed money or time to an environmental or wildlife conservation group; (2) stopped buying a product because it caused environmental problems; (3) attended a public hearing or meeting about the environment; (4) contacted a government agency to get information or complain about an environmental problem; (5) read a conservation or environmental magazine; (6) watched a television special on the environment; and (7) voted for or against a political candidate because of his/her position on the environment. Responses were scored as either 0 or 1, with 0 indicating that the individual had not performed the behavior and 1 indicating that the individual had performed the behavior. A composite score was calculated by summing the scores for the individual items. High scores reflected high levels of pro-environmental behavior; low scores indicated low levels of pro-environmental behavior. Results of a preliminary principal axis factor analysis with oblique rotation revealed that these measures of environmental behaviors were unidimensional.⁵ Cronbach's alpha for this pro-environmental behavior scale was 0.66.

Measuring outdoor recreational participation

Outdoor recreational participation was assessed using a list of nine outdoor recreation activities. Respondents were asked whether they engaged in (1) picnicking, (2) camping, (3) birdwatching, (4) hiking/backpacking, (5) mountain biking, (6) skiing (downhill or

⁴ No statistically significant differences in regard to the available sociodemographic characteristics of the respondents were found between the Lancaster sample and those from Snyder, Crawford, and Bedford. The percentages of Old Order Amish and Mennonites from the Lancaster site totaled 12 and 5, respectively. The analyses and reported findings include data on both groups. Removal of the Amish and Mennonites from the sample did not change the results reported here.

⁵ In principal, three of the items could indicate anti- rather than pro-environmental behavior. Respondents could have attended a meeting, contacted a government agency, or voted for a candidate to *prevent*, rather than to promote, environmental protection. However, the correlation of these variables with unambiguously pro-environmental behaviors indicated that such intentions were rare.

Table 1. Oblique rotated factor loadings for the outdoor recreational activities

Factors/items	Factor 1	Factor 2
Appreciative to slight resource-utilization activities		
Hiking/backpacking	0.65	0.06
Camping	0.57	-0.08
Skiing (cross-country or downhill)	0.42	0.05
Mountain biking	0.39	-0.04
Picnicking	0.36	-0.03
Birdwatching	0.28	-0.01
Moderate-to-intensive resource-utilization activities		
Hunting	-0.16	-0.94
Fishing	0.24	-0.43
Riding off-road vehicles	0.16	-0.30
Eigenvalue	2.56	1.18
% of cumulative variance	28.40	41.50

cross-country), (7) fishing, (8) hunting, and/or (9) riding off-road vehicles. The most popular outdoor activity was picnicking, while mountain biking tended to be the least popular. Approximately 88 percent of the respondents had picnicked within the previous year, while less than 10 percent had mountain biked. Each outdoor activity was dummy coded (where 1 = yes and 0 = no).

A principal axis analysis of the outdoor recreation activities revealed that there were two factors. After oblique rotation to final solution (shown in Table 1), the outdoor recreational activities were organized into two conceptual categories: (1) appreciative to slight resource-utilization; and (2) moderate-to-intensive resource-utilization. Appreciative to slight resource-utilization activities included picnicking, camping, birdwatching, hiking/backpacking, mountain biking, and skiing. Fishing, hunting, and riding off-road vehicles comprised the moderate-to-intensive resource-utilization activities group.⁶

In the previous studies, several of the activities classified in the appreciative to slight resource-utilization category and at least two of the activities (fishing and hunting) classified in the moderate-to-intensive resource-utilization group were labeled as "appreciative" and "consumptive," respectively (Dunlap and Heffernan 1975; Geisler et al. 1977; Jackson 1986; Pinhey and Grimes 1979; Van Liere and Noe 1981). One methodological problem which previ-

⁶ While one should be cautious when interpreting the structure from the factor analysis of a set of nominally-scaled dichotomous variables, if the researcher's goal is to search for factor patterns, the use of factor analysis on such data is justifiable (see Kim and Mueller 1978).

ously was not addressed by these authors was the classification of activities associated with outdoor recreation. As noted below, the "appreciative-consumptive" typology may not be the most relevant conceptual framework for understanding the association between outdoor recreation activities and some other variable.

According to Dunlap and Heffernan (1975:19–20), appreciative activities "involve attempts to enjoy the natural environment without altering it," and these are more likely to be associated with a preservationist orientation toward the environment "which attempts to maintain the environment in its natural state." Are activities such as camping, hiking/backpacking, mountain biking, or picking berries or mushrooms (see Skogen and Wichstrøm 1996) purely *appreciative* activities? When these and related activities are classified as appreciative, researchers fail to acknowledge their impact on the natural resource base. Campers use forest products for campfires. Hiking/backpacking and mountain biking trails may contribute to the degradation of natural areas and, in some cases, such activities are not appropriate (Hardt 1995; Hopkin and Moore 1994; Kernan and Drogin 1994). Likewise, berry and mushroom pickers often destroy vegetation and disturb fauna.

Consumptive activities, on the other hand, "involve taking something from the environment and thus reflect a 'utilitarian' orientation toward it" (Dunlap and Heffernan 1975:19). However, such a grouping fails to take into account the degree of consumption associated with different activities. Clearly there are different degrees of consumption associated with hunting and fishing—the two activities most often used to typify the "consumptive" category. Hunting is a resource-intensive activity. However, the degree of consumption associated with fishing may vary, depending upon the attitudes and behaviors of fishermen. For example, in a study of trout fishermen, Bryan (1977) noted that attitudes and values of the sportsmen to nature and the resource fished changed as the level of angling specialization increased. More specialized fishermen placed less emphasis on fish consumption and more emphasis on resource preservation.

Results

As in previous research, the relationships between outdoor recreational activities and pro-environmental behavior were assessed using bivariate and multivariate correlation/regression. As noted in Table 2, there was considerable support at the zero-order level for the proposition that participation in outdoor recreational activities is associated with pro-environmental behavior. All nine bivariate relationships were positive and statistically significant at the 0.05 level; all but two were significant at the 0.001 level. The second hypothesis, that there are differences between/among different types of

Table 2. Zero-order and partial correlations between outdoor recreational participation and pro-environmental behavior^a

Outdoor activities	Pro-environmental behavior		
	N	Zero-order	Partial correlation
Appreciative to slight resource-utilization activities			
Picnicking	921	.130***	.111***
Camping	892	.185***	.174***
Birdwatching	884	.262***	.250***
Hiking/backpacking	881	.247***	.213***
Mountain biking	867	.152***	.113***
Skiing (downhill or cross-country)	867	.172***	.114***
Moderate-to-intensive resource-utilization activities			
Fishing	889	.183***	.190***
Hunting	880	.074*	.131***
Riding off-road vehicles	834	.079*	.102**

^a Partial correlations were computed controlling for age, education, gender, income, and political ideology; Ns vary due to frequency of participation.

* Significant at the .05 level.

** Significant at the .01 level.

*** Significant at the .001 level.

outdoor activities regarding their effect on pro-environmental behaviors, received mixed support at the zero-order level. With the exception of fishing, as noted in Table 2, the associations between the appreciative to slight resource-utilization activities and pro-environmental behaviors were consistently higher than those for hunting and riding off-road vehicles and pro-environmental behaviors. The association between fishing and pro-environmental behaviors was stronger than the associations between three appreciative to slight resource-utilization activities—picnicking, mountain biking, and skiing—and pro-environmental behaviors.

Although the bivariate relationships were positive and statistically significant, the r values were not strong. However, based on previous studies, low correlations were anticipated. Despite the somewhat weak associations, overall the correlation coefficients and their corresponding r^2 values were more consistent and stronger, respectively, than had been previously documented.

Controlling for spuriousness

Following these earlier studies, tests for spuriousness using partial correlations were also conducted. As in previous research, age, education, gender, and income were included as control factors. Political ideology, a measure that has shown consistent association with environmental concern (see Van Liere and Dunlap 1980), also was included as a control variable. Age was measured in years. Education was scored as follows: (1) less than high school, (2) high school

equivalent, (3) some college, (4) college degree, and (5) training beyond college. Gender was dummy coded, with 0 = males and 1 = females. Income was measured by the categories: (1) less than \$10,000, (2) \$10,000–\$14,999, (3) \$15,000–\$19,999, (4) \$20,000–\$24,999, (5) \$25,000–\$29,999, (6) \$30,000–\$39,999, (7) \$40,000–\$49,999, (8) \$50,000–\$59,999, and (9) \$60,000 and over. Political ideology was coded: (1) liberal, (2) moderate-liberal, (3) moderate, (4) moderate-conservative, and (5) conservative.

As noted in Table 2, the results indicate that controlling for these sociodemographic variables had very little effect on the size of the correlation coefficients. Indeed, holding constant the effects of age, education, gender, income, and political ideology, the variance explained by three moderate-to-intensive resource-utilization activities—fishing, hunting, and riding off-road vehicles—was slightly higher than in the bivariate case. Overall, the results provided support for Dunlap and Heffernan's (1975), Van Liere and Noe's (1981), and Jackson's (1986) assertion that the relationships between outdoor recreational participation and environmental concern are not spurious.⁷

Of the control variables, age, gender, and income consistently failed to reach statistical significance. Education was positively and significantly ($p < 0.001$) related to pro-environmental behavior for each of the outdoor activities. Higher educated persons were significantly more likely than lower educated persons to engage in environmental behaviors. Moreover, political ideology was significantly ($p < 0.001$) related to pro-environmental behavior for each of the outdoor activities when the effects of the other variables in the model were controlled. Politically liberal individuals were more likely than their politically conservative counterparts to engage in pro-environmental behaviors. With the exception of age failing to reach statistical significance, these findings were not surprising. In an examination of the social bases for environmental concern, Van Liere and Dunlap (1980) concluded that sociodemographic variables such as age, education, and political ideology were consis-

⁷ Respondents in the four sample sites differed somewhat in regard to their sociodemographic characteristics, environmental behaviors, and recreational participation. To check whether the study site had any additional effects on these relationships, community was dummy coded and entered into the multiple regression models described in Tables 2 and 3, along with the variables of age, education, gender, income, and political ideology. In no case was the net relationship of community to pro-environmental behavior statistically significant. To determine whether the effect of outdoor recreational participation on pro-environmental behavior differed for the four sample sites, the interactive effects of community and the participation variables were also checked for statistical significance (Aiken and West 1991). None were found to be significant. Thus, despite differences in respondent characteristics among the sample sites, there was no evidence that any of the partial relationships shown in Tables 2 and 3 varied by community.

tently related to environmental concern. After reviewing the literature, they noted that, in general, research suggested that younger, highly educated, and politically liberal persons tended to be more environmentally concerned than their older, less educated, and politically conservative counterparts. Furthermore, they noted that the evidence was less conclusive for other social and demographic variables, including income, residence, gender, political party identification, and occupational prestige. However, Van Liere and Dunlap's (1980) review was limited by at least two factors. First, they reported only bivariate measures of association; second, they focused only on the most commonly used social and demographic variables. In spite of these shortcomings, several other researchers have found that education and political ideology were consistent predictors of environmental concern (e.g., Buttell and Flinn 1974; Constantini and Hanf 1972; Devall 1970; Faich and Gale 1971; Harry 1971; Harry et al. 1969; Hendee et al. 1969).

The second hypothesis reconsidered

As noted in Table 2, participation in each of the outdoor recreational activities was positively and significantly related to pro-environmental behavior when considered individually, thus providing strong support for the first hypothesis. Furthermore, the second hypothesis (that there are differences between/among different types of outdoor activities regarding their impact on pro-environmental behaviors) received mixed support in both the bivariate and partial correlation analyses. However, this finding may be misleading.

The above analysis and several previous analyses failed to take into consideration the fact that recreationists may engage in more than one outdoor activity (e.g., Dunlap and Heffernan 1975; Geisler et al. 1977; Van Liere and Noe 1981). Thus, while theoretically it is possible to compare the correlations for the relationships between participation in appreciative to slight resource-utilization activities, and pro-environmental behavior with those for the relationships between participation in moderate-to-intensive resource-utilization activities and pro-environmental behavior, both realistically and statistically, this procedure is questionable. That is, it is reasonable to expect that a proportion of recreationists participate in at least one activity from both categories.

A more comprehensive test of the second hypothesis would be to compare the pro-environmental behaviors of the respondents who participated solely in one or more of the appreciative to slight resource-utilization activities with the pro-environmental behaviors of those who participated solely in one or more moderate-to-intensive resource-utilization activities. Thus, respondents who participated in at least one outdoor activity from both categories would be excluded from such an analysis. Unfortunately, these data suggest

Table 3. Zero-order and partial correlations between recreational participation in exclusive outdoor activity pairs and pro-environmental behavior^a

Exclusive outdoor activity pairs	Pro-environmental behavior		
	N	Zero-order	Partial correlation
Picnicking-fishing	392	.000	.001
Picnicking-hunting	485	-.048	-.006
Picnicking-riding off-road vehicles	605	-.052	-.039
Camping-fishing	289	.004	.025
Camping-hunting	360	-.111*	-.014
Camping-riding off-road vehicles	337	-.034	-.021
Birdwatching-fishing	350	-.121*	-.060
Birdwatching-hunting	390	-.215***	-.077
Birdwatching-riding off-road vehicles	350	-.132*	-.069
Hiking/backpacking-fishing	332	-.091	-.013
Hiking/backpacking-hunting	361	-.204***	-.075
Hiking/backpacking-riding off-road vehicles	314	-.128*	-.060
Mountain biking-fishing	385	-.021	.036
Mountain biking-hunting	325	-.097	-.010
Mountain biking-riding off-road vehicles	163	-.171*	-.037
Skiing-fishing	392	-.083	-.024
Skiing-hunting	359	-.140**	-.037
Skiing-riding off-road vehicles	211	-.107	.023

^a Partial correlations were computed controlling for age, education, gender, income and political ideology; Ns vary due to frequency of participation.

* Significant at the .05 level.

** Significant at the .01 level.

*** Significant at the .001 level.

that such a test is not feasible. Here, approximately 64 percent of the outdoor recreation participants indicated that they engaged in at least one appreciative to slight resource-utilization activity *and* at least one moderate-to-intensive resource-utilization activity. Less than two percent of the respondents participated *solely* in one or more of the moderate-to-intensive resource-utilization activities, while approximately 35 percent of the respondents engaged *exclusively* in one or more of the appreciative to slight resource-utilization activities.

Therefore, to further explore the second hypothesis, a more appropriate test, one that examined participation in specific outdoor activities individually, was conducted using correlation/regression techniques. Similar to procedures utilized by Jackson (1986), each appreciative to slight resource-utilization activity was paired with each moderate-to-intensive resource-utilization activity. For each of the 18 possible pairs of outdoor activities, the pro-environmental behaviors of the respondents who participated in the appreciative to slight resource-utilization activity and *not* in the moderate-to-in-

tensive resource-utilization activity were compared with the pro-environmental behaviors of the respondents who participated in the moderate-to-intensive resource-utilization activity and *not* in the appreciative to slight resource-utilization activity.

The analysis was conducted by creating 18 dummy variables (see Table 3). The first activity was coded as 0 and the second as 1. Each pair of activities was entered individually into a regression model, with age, education, gender, income, and political ideology as control variables. As noted in Table 3, the results of the bivariate analysis indicate that the difference between eight of the 18 pairs of outdoor recreational activities is statistically significant. Individuals who engaged in the appreciative to slight resource-utilization activity and not in the moderate-to-intensive resource-utilization activity were significantly ($p < 0.05$) more likely to perform pro-environmental behaviors.

As indicated by the partial correlation coefficients, all of the statistically significant zero-order correlation coefficients drop to non-significance when the effects of age, education, gender, income, and political ideology are controlled. In short, the partial correlation analysis of the paired-activity comparisons indicate that there is no significance difference between individuals who engaged in appreciative to slight resource-utilization activities and those who engaged in moderate-to-intensive resource-utilization activities regarding pro-environmental behaviors.

Conclusion

The results of this study indicate that participation in outdoor recreational activities is positively associated with pro-environmental behaviors. Furthermore, these associations change only slightly when sociodemographic characteristics are controlled. Although the total explained variances of the recreational activities are small, they do not differ substantially from social and demographic variables, such as education and political ideology, that have been shown elsewhere to be associated with environmental concern. Thus, these data provide substantial support for the first hypothesis of the study, namely, that there is a positive association between outdoor recreational participation and pro-environmental behavior.

The application of a more appropriate form of analysis, one that examined participation in specific outdoor activities individually, did not find support for Dunlap and Heffernan's (1975) second hypothesis—that consumptive activities (moderate-to-intensive resource-utilization activities) are less strongly correlated with environmental concern. The bivariate results of the paired exclusive outdoor recreational activities analysis indicate that the difference between participants in appreciative to slight resource-utilization activities

and participants in moderate-to-intensive resource-utilization activities regarding pro-environmental behaviors is significant in slightly less than 50 percent of the possible 18 combinations. When the effects of age, education, gender, income, and political ideology are controlled, all of the statistically significant associations drop to non-significance. Thus, the data do not support the second hypothesis. Recreationists who engaged in an appreciative to slight resource-utilization activity but *not* in a moderate-to-intensive resource-utilization activity did not differ significantly in regard to pro-environmental behavior from those who engage in a latter type of activity but *not* in a former type of activity.

If current outdoor recreation participation trends continue (see Cordell et al. 1995), and if, as Dunlap and Heffernan (1975) argue, outdoor recreationists constitute a potential constituency for environmentalists, then the findings of this study have policy implications. Funding and promoting informational and educational programs in parks, game lands, and outdoor recreation facilities may be an effective strategy in promoting environmental protection. A comparison of previous studies of outdoor recreation and environmental issues with this one suggests that pro-environmental behavior may be a better measure than environmental attitudes when considering environmental concern. This study also suggests that the "appreciative-consumptive" typology used in previous research may not be adequate for understanding environmental orientation. Instead, a conceptual framework based on the varying degrees of resource utilization appears to be more sufficient. Further research examining the associations among non-participants, participants in either the appreciative to slight resource-utilization group or in the moderate-to-intensive resource-utilization group, and those who participate in both in regard to environmental behavior is warranted.

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