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PROENVIRONMENTAL BEHAVIOURS OF FOREST LANDOWNER AND NONLANDOWNER RECREATIONISTS

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ABSTRACT

Data from a study of forest landowners and nonlandowners in Pennsylvania were used to test the hypothesis that forest landowner recreationists and nonlandowner recreationists exhibit dissimilar levels of proenvironmental behaviour. Bivariate and multivariate logistic regression analyses provide weak support for the hypothesis.

Differences in the descriptive factors and types of outdoor recreational activities engaged in by forest landowner and nonlandowner recreationists were also examined. The two groups differed in the patterns of their outdoor activities and in five of eight descriptive factors (age, income, political ideology, location of residence, and frequency of forest visitation for recreational activity).

The results indicate that forest landowners are slightly more involved in proenvironmental activities than nonlandowning recreationists, suggesting that separate programmes to address environmental and natural resources related issues with the two groups are required. These findings should be considered when designing education extension material.

Key words: environmentalism, forest landowner recreationists, nonlandowner recreationists, outdoor recreation, proenvironmental behaviour

INTRODUCTION

Since the emergence of the environmental movement as a salient public issue in the 1960s, a number of social and behavioural scientists have been active in measuring and understanding the determinants of environmental concern. A stream of research that has drawn empirical attention has focused on the associations between participation in outdoor recreational activities and environmentalism. Dunlap and Heffernan (1975) first suggested a relationship between involvement in outdoor

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recreation and concern for the environment. Subsequently, several researchers replicated and extended this work by examining the associations between participation in outdoor recreational activities and environmental attitudes (Geisler, Martinson, and Wilkening 1977, Pinhey and Grimes 1979, Van Liere and Noe 1981, Jackson 1986). Overall, the findings of these studies suggested that participation in outdoor recreation is only weakly associated with attitudes toward the environment.

More recently, Nord, Luloff, and Bridger (1998) and Theodori, Luloff, and Willits (1998) examined the associations of outdoor recreation and environmentalism using alternative measures of environmental concern—measures considered to be indicative of proenvironmental behaviours. These studies found that participation in outdoor recreation was associated with proenvironmental behaviours. Such findings have relevant implications for those responsible for the implementation of environmental policies. For example, an effective strategy for encouraging environmental protection may revolve around funding, promoting, and/or operating informational and educational programmes in parks, game lands, and outdoor recreational facilities.

Despite the extensive body of research examining the issue of whether or not involvement in outdoor recreational activities increases environmental concern among the general public, little work has been conducted comparing the environmentalism of outdoor recreationists who own forest land (hereafter referred to as "forest landowner recreationists") with recreationists who do not own forest land (hereafter referred to as "nonlandowner recreationists"). This paper extends the outdoor recreation and environmentalism literature by addressing this issue. In particular, the hypothesis that forest landowner recreationists and nonlandowner recreationists exhibit dissimilar levels of proenvironmental behaviours is tested. Differences in the types of outdoor recreational activities engaged in by forest landowner and nonlandowner recreationists are also examined, as are differences in associated factors used to describe these groups.

Data and Measurement

The data used in this paper were collected via telephone survey during October of 1991. The sample, drawn from a Pennsylvania probability sample frame generated by a private sampling firm, included both listed and unlisted numbers. Initial screening questions allowed interviewers to:

- limit the sample to individuals over age 18,
- include equal numbers of men and women (to reflect Pennsylvania's generally balanced sex ratio while providing important information from women who make up a smaller percentage of forest landowners in the Commonwealth; cf. Melbye *et al.* 2001), and
- differentiate forest landowners (persons owning at least one acre of forest land) from nonlandowners. In accordance with the research design of a larger project

on Pennsylvania's forest stewardship media campaign (see Luloff *et al.* 1993), forest landowners were oversampled in an approximately 10:1 ratio.

The final data set included responses from 601 forest landowners and 600 nonlandowners. Overall, the interview completion rate for households contacted and potentially eligible was 34%.

The survey instruments included specific questions about public awareness of efforts by the media to encourage forest stewardship and ecologically sound land use practices, as well as questions designed to measure environmental attitudes and engagement in proenvironmental behaviour. Questions were drawn from previous work on environmental concern (Dunlap and Van Liere 1978, Mitchell 1984, Mohai 1985) and the attitudes and practices among nonindustrial private forest landowners with respect to forest land stewardship (Bliss and Martin 1989, 1990, Kurtz and Lewis 1981). Prior to the actual conduct of the survey, pretests of the instruments were conducted by telephone. On the basis of these calls, changes in question wording and order were made. The final instruments were then input into a computer-assisted telephone interviewing system. The average call to a forest landowner lasted 18 minutes, while the call to the nonlandowner lasted 14 minutes.

Engagement in Proenvironmental Behaviour

Engagement in proenvironmental behaviour was assessed using a list of seven items. Respondents were asked if, during the previous year, they had engaged in any of the following activities:

- contributed time or money to an environmental or wildlife conservation group;
- stopped buying a product because it caused environmental problems;
- attended a public hearing or meeting about the environment;
- contacted a government agency to get information or complain about an environmental problem;
- read a conservation or environmental magazine;
- watched a television special on the environment; and
- voted for or against a political candidate because of his/her position on the environment.

Each proenvironmental behaviour was dummy coded (1 = yes).

In principal, three of the activities could indicate anti- rather than pro-environmental behaviour. Respondents could have attended a meeting, contacted a government agency, or voted for a candidate to prevent, rather than to promote, environmental protection. However, an examination of the interitem correlations among these variables and unambiguously proenvironmental behaviours indicated that such intentions were rare.

Forest Landowner and Nonlandowner Recreationists

To examine differences in engagement in proenvironmental behaviours between forest landowner recreationists and nonlandowner recreationists, a dummy variable was created (1 = forest landowner recreationists).

Associated Descriptive Factors

Following earlier studies (Dunlap and Heffernan 1975, Jackson 1986, Theodori *et al.* 1998), age, gender, level of education, income, political ideology, location of residence, frequency of forest visits for recreation and the number of forest recreational activities were included as descriptive factors.

- Age was measured in years.
- Gender was dummy coded (1 = female).
- Education was scored as follows: (1) less than high school; (2) high school equivalent; (3) some college; (4) college graduate; and (5) training beyond college.
- Income was measured by the categories: (1) $15,000 or less; (2) $15,001 to $30,000; (3) $30,001 to $45,000; and (4) more than $45,000.
- Political ideology was coded: (1) liberal; (2) moderate liberal; (3) moderate; (4) moderate conservative; and (5) conservative.
- Location of residence was dummy coded to reflect a rural-urban dichotomy (1 = city/suburbs; 0 = small town/rural).
- Reported frequency of forest visitation was coded as: (1) less than once a year; (2) once a year; (3) several times a year; (4) monthly; and (5) at least weekly.
- The number of forest recreation activities in which respondents participated was assessed using a list of eight outdoor recreation activities. Respondents were asked whether or not they engaged in (1) camping; (2) hiking; (3) sightseeing by car; (4) picnicking; (5) birdwatching; (6) fishing; (7) hunting; and/or (8) riding off-road vehicles. Multiple responses were allowed. Each outdoor recreation active was dummy coded (1 = yes). A score was calculated by summing the values for the eight activities. Responses ranged from 1 to 8.

Analyses[1]

Prior to testing our hypothesis, we examined the differences in types of outdoor recreational activities engaged in by forest landowner and nonlandowner recreationists. We then checked for statistically significant differences between the two groups with respect to the descriptive factors. As shown in Table 1, hiking was

[1]Cases that were missing data on any variable in the multivariate analyses were excluded from the bivariate analyses. A listwise deletion reduced the sample to 832 cases (430 forest landowners and 402 nonlandowners).

the most popular activity for both forest landowner and nonlandowner recreationists. Hunting was the second most participated in activity for the forest landowner recreationists, followed by camping and picnicking. Picnicking was the second most participated in outdoor activity for the nonlandowner recreationists, while sightseeing by car was the third most popular. For each group, birdwatching and riding off road vehicles were the activities least likely to be mentioned. Significance tests for the difference in the proportion of forest landowner and nonlandowner recreationists who engaged in each outdoor activity were examined using a z-test for the difference between proportions (Agresti and Finlay 1997). This z-test takes the form:

$$z = \frac{\hat{\pi}_2 - \hat{\pi}_1 - 0}{\sqrt{\frac{\hat{\pi}_2(1-\hat{\pi}_2)}{n_2} + \frac{\hat{\pi}_1(1-\hat{\pi}_1)}{n_1}}}$$

Where $\hat{\pi}_1$ and $\hat{\pi}_2$ denote the sample proportions, and n_1 and n_2 denote the independent random sample sizes.

Nonlandowner recreationists were more likely than forest landowner recreationists to engage in sightseeing and picnicking. Conversely, forest landowners were more likely than nonlandowners to engage in hiking, birdwatching, hunting, and riding off-road vehicles. There were no significant differences with respect to camping and fishing.

Differences between forest landowner and nonlandowner recreationists were examined by calculating mean scores for each of the eight descriptive factors. The

TABLE 1

Participation in Outdoor Recreational Activities

Outdoor Activity	Forest Landowner Recreationists (n = 430)			Nonlandowner Recreationists (n = 402)	
	Mean	Standard Deviation		Mean	Standard Deviation
Camping	.41	.49		.44	.50
Hiking	.64	.48	*	.57	.50
Sightseeing by car	.37	.48	*	.45	.50
Picnicking	.41	.49	***	.55	.50
Birdwatching	.22	.41	**	.13	.33
Fishing	.40	.49		.37	.48
Hunting	.49	.50	***	.27	.45
Riding off-road vehicles	.15	.36	**	.08	.27

* $p < .05$; ** $p < .01$; *** $p < .001$.

statistical significance of the observed differences between the two groups with respect to age, level of education, income, political ideology, frequency of forest visitation for recreational activity, and the number of forest recreation activities in which respondents participated were tested using a t-test for the difference between means. Concomitantly, the statistical significance of the observed differences between the two groups with respect to gender and residence were tested using a z-test for the difference between proportions. Age, income, political ideology, residence, and frequency of forest visitation for recreational activity showed statistically significant differences (Table 2). As opposed to their nonlandowner counterparts, forest landowner recreationists visited forests more often for recreational activity, had higher incomes, and were more likely to be older, conservative, and of rural residency.

Logistic regressions were used to analyze the differences in proenvironmental behaviours between forest landowner and nonlandowner recreationists. We conducted the analysis in two stages. We examined the bivariate relationships between the independent variable and each proenvironmental behaviour in the first stage. Then, in the second stage, we examined whether or not the bivariate relationships held when the descriptive factors were added to the model. Bivariate and net odds ratios for the forest landowner/nonlandowner recreationist variable are reported in Table 3.[2]

TABLE 2

Means and Standard Deviations of Descriptive Factors

Descriptive Factors	Forest Landowner Recreationists (n = 430)			Nonlandowner Recreationists (n = 402)	
	Mean	Standard Deviation		Mean	Standard Deviation
Age	43.97	14.02	**	40.51	15.08
Gender	.46	.50		.46	.50
Education	2.78	1.17		2.87	1.17
Income	3.02	.97	*	2.85	.99
Political ideology	3.59	1.29	**	3.34	1.28
Residence	.18	.38	***	.47	.50
Freq. of visitation	3.76	1.04	***	3.26	.93
No. of activities	3.10	1.99		2.86	1.72

* $p < .05$; ** $p < .01$; *** $p < .001$

[2]An odds ratio (θ) is e (natural logarithm) raised to the power of "b" (the metric logit coefficient); θ refers to the effect of a one-unit change in X on the odds of Y. It has a "times as likely" interpretation and θ can equal any nonnegative number. When X and Y are independent, θ equals 1. A value of 1 generally serves as a baseline for comparison. Odds ratios on either side of 1 reflect certain types of associations. An odds ratio greater than 1 ($1 < \theta < \infty$) indicates a positive association, while an odds ratio less than 1 ($0 < \theta < 1$) denotes a negative association. Values of θ farther from 1 in either direction designate stronger levels of association (Liao 1994).

At the bivariate level, as shown in Table 3, forest landowner recreationists were significantly more likely than nonlandowner recreationists to engage in two of the seven proenvironmental behaviours. Recreationists who owned forest land were more likely than their counterparts to attend a public hearing or meeting about the environment and read a conservation or environmental magazine. When we added the descriptive factors, the difference between forest landowner and nonlandowner recreationists with respect to attending a public hearing or meeting about the environment remained statistically significant. However, the difference between the two groups in regard to reading a conservation or environmental magazine became nonsignificant, while the difference with respect to no longer purchasing a product because it caused environmental problems reached statistical significance. Based on the results presented in Table 3, we found weak support for our hypothesis that there are differences between forest landowner and nonlandowner recreationists in terms of engagement in proenvironmental behaviours.

An examination of the descriptive factors, as shown in Table 4, indicated that education was positively and significantly associated with engagement in four of the seven proenvironmental activities. Higher educated recreationists were significantly more likely than those with lower education to contribute time or money to an environmental or wildlife conservation group, attend a public hearing or meeting about the environment, contact a government agency to get information or complain about an environmental problem, and watch a television special on the environment. Recreationists with higher incomes were more likely than those with lower incomes to contribute time or money to an environmental or wildlife

TABLE 3

Odds Ratios for the Recreationist Variable[a]

Proenvironmental Behaviour	Bivariate Analyses	Multivariate Analyses
Contributed time or money to an environmental or wildlife conservation group	1.27	1.22
Stopped buying a product because it caused environmental problems	1.29	1.39*
Attended a public hearing or meeting about the environment	2.41***	2.39***
Contacted a government agency to get information or complain about an environmental problem	1.37	1.26
Read a conservation or environmental magazine	1.39*	1.21
Watched a television special on the environment	1.03	1.14
Voted for or against a political candidate because of his/her position on the environment	1.13	1.03

[a]Values reported in table are odds ratios for the forest landowner/nonlandowner recreationists variable (1 = forest landowner recreationists). The multivariate odds ratios were computed controlling for age, gender, level of education, income, political ideology, residence, frequency of forest visitation, and number of forest recreation activities in which respondents participated.

* $p < 0.05$; *** $p < 0.001$.

conservation group, contact a government agency to get information or complain about an environmental problem, and read a conservation or environmental magazine. Politically liberal recreationists were significantly more likely than their politically conservative counterparts to contribute time or money to an environmental or wildlife conservation group, stop buying a product because it caused environmental problems, and vote for or against a political candidate because of her/his position on the environment. Urban recreationists were significantly more likely than those from more rural areas to contribute time or money to an environmental or wildlife conservation group. Females were significantly more likely than males to stop buying a product because it caused environmental problems. Older recreationists were significantly more likely than their younger counterparts to contribute time or money to an environmental or wildlife conservation group and vote for or against a political candidate because of her/his position on the environment. Conversely, younger recreationists were more likely than their older equivalents to stop buying a product because it caused environmental problems and watch a television special on the environment. Respondents who frequently visited forests for recreational purposes were more likely than those who visited less frequently to contribute time or money to an environmental or wildlife conservation group, contact a government agency to get information or complain about an environmental problem, read a conservation or environmental magazine, and vote for or against a political candidate because of her/his position on the environment. Lastly, recreationists who engaged in a multitude of outdoor activities were significantly more likely than those who did not to contribute time or money to an environmental or wildlife conservation group and contact a government agency to get information or complain about the environment.

CONCLUDING COMMENTS

What, then, can be concluded from these data? First, the results of this study indicate that differences in patterns of outdoor recreation exist between forest landowner and nonlandowner recreationists. Furthermore, differences with respect to age, income, political ideology, location of residence, and frequency of forest visitation for recreational activity were uncovered between the two groups. More important, though, are the findings concerning the hypothesis. The data only weakly support our hypothesis, which states that forest landowner recreationists and nonlandowner recreationists exhibit dissimilar levels of proenvironmental behaviour. At the multivariate level, while the two groups did not differ statistically on five of the seven proenvironmental activities, forest landowner recreationists were 1.39 times more likely than nonlandowner recreationists to stop buying a product because it caused environmental problems and 2.39 times more likely to attend a public hearing or meeting about the environment.

Knowledge about forest landowner and nonlandowner recreationists' environmental behaviour may be important when it comes to designing more effective

TABLE 4

Odds Ratios for the Descriptive Factors[a]

Proenvironmental Behaviour	Age	Gender	Education	Income	Political Ideology	Residence	Freq. of Visitation	No. of Activities
Contributed time or money to an environmental or wildlife conservation group	1.02***	.97	1.24**	1.35***	.86**	1.77**	1.35***	1.17***
Stopped buying a product because it caused environmental problems	.99*	1.83***	1.14	1.08	.86*	1.18	1.09	1.05
Attended a public hearing or meeting about the environment	1.00	1.11	1.54***	1.06	.92	.88	1.09	1.07
Contacted a government agency to get information or complain about an environmental problem	1.00	1.16	1.16*	1.27*	.91	1.35	1.30**	1.11*
Read a conservation or environmental magazine	1.00	.97	1.15	1.29**	.93	1.05	1.37***	1.08
Watched a television special on the environment	.99*	.88	1.34**	1.22	.88	1.46	1.16	1.10
Voted for or against a political candidate because of his/her position on the environment	1.02**	.96	1.12	1.14	.84**	1.18	1.27**	1.04

[a]Values reported in table are the net odds ratios for the descriptive factors.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

extension education programmes. Forest landowners are regularly involved in regional, countywide, and statewide organizations and meetings. Based upon the results of this analysis, it appears that using such venues as a basis for informing forest landowners about environmental and natural resources issues could be an important and accessible vehicle. Moreover, it appears that a separate programme for nonlandowners that addresses environmental and natural resources related issues should be developed.

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