ENVIRONMENTAL ATTITUDE-BEHAVIOR CORRESPONDENCE BETWEEN DIFFERENT TYPES OF FOREST RECREATIONISTS

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Abstract: The purpose of this study was to examine the association of participation in outdoor recreation activities and the environmental attitude-behavior correspondence among forest recreationists. Environmental attitudes were operationalized with the revised New Ecological Paradigm (NEP) scale, and behaviors were operationalized using a series of proenvironmental behaviors that were derived from the literature. Outdoor recreation participation represented the respondents' most important activity. Data were collected at Bald Eagle State Forest, located in central Pennsylvania from June 12th 1999- March 11th, 2000. Bivariate correlations (Pearson's r) between attitudes and behaviors for appreciative, consumptive and motorized activities were conducted. Those involved with motorized activities showed the highest attitude-behavior contingency for ecocentric, and the lowest for technocentric attitudes. Those involved with appreciative activities generally had higher attitude-behavior consistency than those involved with consumptive activities for all three attitudinal indexes.

Introduction

The 1990s witnessed the highest level of environmentalism in regard to public attitudes; however, environmentally responsible behaviors did not simultaneously increase (Tarrant & Cordell, 1997). Why do people fail to practice environmentally responsible behaviors while, at the same time, expressing attitudes that are supportive of environmental protection? There are a plethora of studies about environmental attitudes and a substantial number that deal with responsible behaviors. However, we have only limited understanding of the causal connection between environmental attitudes and environmentally responsible behaviors. Previous studies have generally found weak or modest relationships between these variables (see Borden & Schettino, 1979; Dunlap & Van Liere, 1978; Gamba & Oskamp, 1994; Gigliotti, 1992; Guagnano, Stern & Dietz, 1995; Hines, Hungerford & Tomera; 1987; Jewell, 1978; Maloney & Ward, 1973; Ostman & Parker, 1987; Oskamp, Harrington, Edwards, Sherwood, Okuda & Swanson, 1991; Scott & Willits, 1994; Tarrant & Cordell, 1997; Thapa, 1999; Van Liere & Dunlap, 1981; Vogel, 1996).

Since outdoor recreationists are in 'direct contact with nature,' it is assumed that their environmental concern and awareness should increase. Furthermore, upon visitation to the natural environment, outdoor recreationists are exposed to informational and educational programs about environmental issues, which may generate environmental concern and empathy (Dunlap & Heffernan, 1975). However, empirical research has offered somewhat mixed or weak support for the association of participation in outdoor recreation activities and proenvironmental attitudes (Dunlap & Heffernan, 1975; Geisler, Martinson & Wilkening; 1977; Jackson, 1986; Pinhey & Grimes, 1979; Van Liere & Noe, 1981). Nevertheless, two studies show fairly strong support for the association of outdoor recreation and proenvironmental behaviors (Nord et. al., 1998; Theodori et. al., 1998). As a result, some researchers argue that proenvironmental behaviors are a 'better measure' than environmental attitudes in assessing the association or influence of participation in outdoor recreation activities and environmentalism (Nord et. al., 1998; Theodori et. al., 1998). Furthermore, Tarrant and Green (1999) explored the effect of participation in appreciative, consumptive and motorized recreation activities on environmental attitude-behavior correspondence. A mediating effect was demonstrated, in which participation in only appreciative activities (day hiking, backpacking, nature/bird viewing) mediated the environmental attitude-behavior relationship.

Some suggest that the inconsistencies in findings regarding the association of outdoor recreation and proenvironmental attitudes/behaviors are largely due to weak operationalization of key variables and other methodological issues. There is a need for 'better' conceptualization and operationalization of outdoor recreation, environmental attitudes, and other variables. The purpose of this study was to examine the association of participation in outdoor recreation activities and the environmental attitude-behavior correspondence among forest recreationists (appreciative, consumptive and motorized). Appreciative activities represent a preservationist ideology that includes enjoyment of the natural environment without altering it. Consumptive activities refer to a utilitarian ideology that includes taking something from the environment. Motorized activities employ the use of motorized or mechanized equipment during the process of recreation. A research question representing the effect of participation in outdoor recreation activities on environmental attitude-behavior correspondence was formulated:

> Is there a difference in environmental attitude-behavior correspondence between different types of forest recreationists (appreciative, consumptive and motorized)?

Methods

This study was conducted at Bald Eagle State Forest, encompassing 195,624 acres within five counties (Clinton, Centre, Mifflin, Snyder and Union) in central Pennsylvania. Due to multiple entry and exit points, the Forest was demarcated into eight zones based upon natural or man-made features. Between 1-3 sampling sites per zone were identified. There were a total of 13 sites, 2 of which were

picnic areas while the others were located on various State Forest roads and intersection points. A combination of survey methods was used to collect the data (on-site interviews and windshield surveys). On-site interviews were conducted from June 12th - October 24th, 1999, while windshield surveys were conducted from October 2nd - March 11th, 2000.

Operationalization of Variables

Environmental attitudes were operationalized with the revised New Ecological Paradigm (NEP) scale, which consisted of 15 items tied to a 5-point Likert Scale format, ranging from Strongly Disagree (1) to Strongly Agree (5) (Dunlap, Van Liere, Mertig, Catton & Howell, 1992). Environmentally Responsible Behaviors were operationalized using a series of proenvironmental behaviors (15 items) juxtaposed in a 5-point Likert Scale format, ranging from Rarely (1) to Usually (5). The items were general items that were derived from the literature (see Scott & Willits, 1994; Smith-Sebasto, 1995). Outdoor recreation participation was not limited to a yes/no dichotomy (activity participation) but rather included the respondents' "most important activity."

Results

Profile of Participants

Collectively, the usable sample from both sampling methods was 522 respondents. Males comprised about 87% of the total sample while 13% were females. The age distribution was skewed towards the ages of 41-50, which represented about 28% of the total sample. However, about 21% represented the 60 and over category. Respondents were extremely homogeneous in terms of ethnicity (99% Caucasian). About 40% indicated that they currently reside in rural areas. Similarly, about 52% reported having a high school education or less, while 35% indicated they have some form of college education (technical/vocational or up to 4 yrs). About 27% reported a combined household income of under $30,000, while 43% indicated over $50,000 (see Table 1).

TABLE 1. Profile of Respondents

Characteristics	Frequency	Percentage (%)
Gender (n=522)		
Male	453	87
Female	69	13
Age (n=513)		
Under 30	67	13
31-40	116	22
41-50	142	28
51-60	82	16
60+	106	21
Ethnicity (n=522)		
Caucasian	518	99
Other	4	01
Residence (n=403)		
Farm, ranch, rural area	161	40
Small Town (under 9,999)	168	42
Large town (10,000-49,999)	43	11
Small/Large city/Metropolitan area	31	07
Highest Education Level (n=517)		
High School or less	266	52
4 year College/Technical School	182	35
Graduate School or more	69	13
Annual Household Income (n=468)		
Under $19,999	40	08
$20,000 - $29,999	85	18
$30,000 - $49,999	143	31
$50,000 - $79,999	130	28
$80,000+	70	15

Note: The valid percentages have been rounded to equal 100%

Respondents were asked to identify their *most important activity* from all the activities that they had participated in at Bald Eagle State Forest and elsewhere. The activity identified as the most important activity was used as the variable to delineate type of participation in outdoor recreation activity. Hunting, fishing and snowmobiling were the most popular activities. The activities were recoded in the appreciative-consumptive-motorized activity orientation framework. Appreciative activities accounted for about 34%, while consumptive activities were strongly represented at 51%, and the motorized activity category was the least represented at 15% (see Table 2).

TABLE 2. Activity Orientation and Frequency of Participation of Respondents

Most Important Activity	Frequency	Percentage
Appreciative Activities	**168**	**33.9**
Viewing scenery	39	7.9
Walking/day hiking	39	7.9
Camping	28	5.7
Wildlife watching/feeding	16	3.2
Swimming	15	3.0
Picnicking	9	1.8
Mountain biking	8	1.6
Horseback riding	6	1.2
Backpacking	2	0.4
Canoeing	2	0.4
Photography	2	0.4
Jogging/trail running	1	0.2
Hang-gliding	1	0.2
Consumptive Activities	**251**	**50.7**
Hunting	173	34.9
Fishing	75	15.2
Insect collection	1	0.2
Target shooting	1	0.2
Cutting firewood	1	0.2
Motorized Activities	**76**	**15.4**
Snowmobiling	64	12.9
Off-road vehicles	7	1.4
Motorboating	5	1.0

Environmental Attitudes and Behaviors

The revised 15-item New Ecological Paradigm scale was subjected to a principal components analysis using varimax rotation. However, prior to the factor analysis, 2 of the 15 items were reverse coded to maintain the consistent directionality of the items. Overall, almost 51% of the total variance was explained. The first factor (Ecocentric) registered 6 items with a Cronbach's alpha reliability of .81, and the second factor (Dualcentric) had 4 items with a reliability score of .58. The third factor (Technocentric) had 5 items and recorded a reliability score of .70 (see Table 3).

TABLE 3. Reliability Analysis for Respondents' Environmental Attitudes

Questionnaire Statements	Mean	SD[a]	Corrected Item Total Correlation	Alpha If Item Deleted
Ecocentric				
The earth is like a spaceship with very limited room & resources	3.44	1.2	.56	.77
If things continue on their present course we will soon experience a major catastrophe	3.25	1.1	.62	.76
We are approaching the limit of the number of people that the earth can support	3.44	1.2	.53	.78
The balance of nature is very delicate and easily upset	3.87	1.0	.58	.77
When humans interfere with nature, it often produces disastrous consequences	3.76	1.2	.48	.79
Humans are severely abusing the environment	3.93	1.1	.61	.76
Overall Index (N=498)	**3.62**	**4.9**		**.81**
Dualcentric				
Humans were meant to rule over the rest of nature*	3.44	1.4	.46	.44
Plants and animals have as much right as humans to exist	3.94	1.2	.46	.44
Humans have the right to modify the natural environment to suit their needs*	3.73	1.2	.33	.55
Despite our special abilities humans are still subject to the laws of nature	4.38	0.8	.26	.59
Overall Index (N=502)	**3.87**	**3.1**		**.58**
Technocentric				
Human ingenuity will insure that we do not make the earth Unlivable	3.08	1.2	.50	.63
Humans will eventually learn enough about how nature works to be able to control it	3.82	1.1	.39	.67
The earth has plenty of natural resources if we just learn how to develop them	2.43	1.2	.44	.66
The balance of nature is strong enough to cope with the impacts of modern industrial nations	3.84	1.1	.47	.64
The so-called ecological crisis facing humankind has been greatly exaggerated	3.22	1.2	.47	.65
Overall Index (N=498)	**3.28**	**3.9**		**.70**

*Items reverse coded
[a]Standard Deviation

The 15 proenvironmental behavior items were also subjected to a principal components analysis using varimax rotation. Five factors were identified explaining approximately 70% of the total variance. The first factor (Political Activism) registered 4 items with a Cronbach's alpha reliability of .78; the second factor (Recycling) had 3 items with a reliability score of .84, and the third factor (Educational) had 2 items and recorded a reliability score of .79. Similarly, the fourth (Green Consumerism) and fifth factors (Community Activism) registered 3 items each with Cronbach's alpha reliability of .73 and .66, respectively (see Table 4). The mean values of the items within each factor for environmental attitudes and behaviors were computed to devise a single index score for each factor.

TABLE 4. Reliability Analysis for Respondents' Environmentally Responsible Behaviors

Questionnaire Statements	Mean	SD[a]	Corrected Item Total Correlation	Alpha If Item Deleted
Political Activism				
Written to your elected officials expressing your opinions on environmental issues	1.67	1.0	.58	.73
Subscribed to environmental publications	1.95	1.1	.60	.71
Voted for a public official due to his/her record on protecting the environment	2.52	1.4	.56	.73
Donated money or paid membership dues to an environmental/conservation organization	2.56	1.4	.60	.71
Overall Index (N=498)	**2.18**	**3.8**		**.78**
Recycling				
Recycled glass bottles or jars or aluminum cans	4.26	1.0	.72	.75
Sorted your trash to separate non-recyclable from recyclable materials	3.87	1.4	.69	.76
Recycled old newspapers	4.00	1.3	.67	.78
Overall Index (N=509)	**4.04**	**3.2**		**.84**
Educational				
Watched TV programs about the environment	3.68	1.1	.65	-
Read books/magazines about the environment	3.30	1.2	.65	-
Overall Index (N=510)	**3.49**	**2.0**		**.79**
Green Consumerism				
Taken into account the amount of packaging on goods you buy	2.68	1.2	.65	.54
Switched products because of environmental reasons	2.62	1.1	.64	.56
Bought products made from recycled materials	3.60	0.9	.43	.79
Overall Index (N=511)	**2.97**	**2.7**		**.73**
Community Activism				
Car pooled or used public transportation to work	1.95	1.4	.39	.67
Attended meetings on environmental/conservation issues	1.80	1.1	.55	.46
Joined in community cleanup efforts	2.31	1.2	.47	.54
Overall Index (N=485)	**2.02**	**2.8**		**.66**

[a]Standard Deviation

Bivariate correlations (Pearson's r) between environmental attitudes and environmentally responsible behaviors for appreciative, consumptive and motorized activities were conducted, with significance measured at the .05 level. Upon analysis, the pattern of findings of the correlation coefficients was identified. Those involved with motorized activities showed the highest attitude-behavior contingency for ecocentric, and the lowest for technocentric attitudes. But there were no significant correlations between technocentric attitudes and proenvironmental behaviors for those involved with motorized activities. Those involved with appreciative activities generally had higher attitude-behavior consistency than those involved with consumptive activities for all three attitudinal indexes (13 out of 15 correlations). Also, those who were involved with appreciative and consumptive activities and harbored technocentric attitudes were least likely to participate in proenvironmental behaviors, as shown by negative attitude-behavior correlations (see Table 5).

TABLE 5. Bivariate Correlations Between Environmental Attitudes and Environmentally Responsible Behaviors for Appreciative, Consumptive and Motorized Activities

Environmental Attitudinal Indexes	Environmentally Responsible Behavioral Indexes				
	Political Activism	Recycling	Educational	Green Consumerism	Community Activism
Ecocentric					
Appreciative	.23**	.15*	.22**	.32**	.18*
Consumptive	.23**	.08	.18**	.23**	.12*
Motorized	.39**	.18	.36**	.53**	.19*
Dualcentric					
Appreciative	.25**	.14	.28**	.27**	.17*
Consumptive	.17**	.03	.24**	.31**	.07
Motorized	.29*	.08	.31**	.38**	.13
Technocentric					
Appreciative	-.36**	-.18*	-.32**	-.27**	-.21**
Consumptive	-.16**	-.03	-.18**	-.18**	-.07
Motorized	.09	.13	-.11	.05	.07

*significant at .05 level (2-tail significance)
**significant at .01 level (2-tail significance)

Discussion

The fact that motorized activities showed the highest attitude-behavior contingency for ecocentric, and the lowest for technocentric attitudes, came as a surprise. In this sample, a sizeable majority of motorized recreationists (86% were snowmobiliers) were from rural and small town localities, had a high school or some college education, and also had a lower income when compared with other activity groups. This finding was consistent with the literature (Jackson & Wong, 1982; Knopp & Tyger, 1973). Furthermore, Knopp and Tyger (1973) found that although snowmobilers resonated an 'environmentalist value' theme, it was concluded that based on their level of education, "the snowmobiler may be less aware of the implications of his stated position. He may value the environment, but he may not appreciate what it takes to protect it" (p. 12). Previous research shows level of education does have a relationship with environmental concern and proenvironmental behaviors. Those who are more educated are more likely to support environmental issues (Roper Organization, 1990; Wall, 1995).

Additionally, machine oriented recreationists express more desire for environmental dominance. Such individuals tend to ignore the results caused by their machines; however, these individuals do not hold negative attitudes towards the environment because their drive for dominance supersedes their actions. Consequently their activities take first priority (Bury, Holland & McEwen, 1983). Motorized recreationists (snowmobiles and offroad vehicles) have often been blamed for environmental degradation as well as recreation conflict with competing user groups. Currently, snowmobilers are facing opposition from other competing users in the backcountry, notably heli-skiers, snowcat skiers, backcountry skiers/snowboarders and Nordic skiers (Shelton, 1999). Additionally, they face being permanently banned in federally designated areas such as National Parks (e.g. Yellowstone National Park). Due to such issues, snowmobilers in this sample may be more aware of their consequences, and hence are more attuned to the environment and uphold favorable attitudes that predispose responsible behavior. Additionally, national and local snowmobiling associations have also stepped up their campaign to promote responsible riding. Conversely, snowmobilers may be responding to questionnaires based on social desirability, in which they respond to questions in a manner that does not depict them in an unfavorable light.

On the comparison between the appreciative and consumptive groups, the results made intuitive sense in that those involved with appreciative activities (which represent a preservationist ideology that includes enjoyment of the natural environment without altering it) generally had higher attitude-behavior correspondence than those involved with consumptive activities for all three attitudinal indexes.

This study introduced several improvements to the literature. Outdoor recreation participation was not limited to a yes/no dichotomy as in most past studies, but rather focused on the respondents' "most important activity." Such an operationalization was a new way of combating the mutually exclusivity issue. Secondly, environmental attitudes (NEP Scale) and environmentally responsible behaviors were analyzed as multidimensional constructs. The multidimensionality of environmental attitudes and behaviors has largely been ignored in the literature. This study combined many activities into an activity orientation rather than examining the activities individually. Future research should account for each activity rather than using the appreciative-consumptive-motorized orientation framework. Analyzing each activity group offers a comprehensive outlook towards that specific activity rather than a generalization of the activity cluster. Also, this study was based on a preliminary analysis and hence was limited to bivariate analysis. For a more detailed and comprehensive account, the reader is referred to Thapa (2000).

REFERENCES

Borden, R.J., & Schettino, A.P. (1979). Determinants of environmentally responsible behavior. Journal of Environmental Education, 10(4), 35-39.

Bury, R.L., Holland, S. M., & McEwen, D. N. (1983). Analyzing recreational conflict: understanding why conflict occurs in requisite to managing that conflict. Journal of Soil and Water Conservation, 3(5), 401-403.

Dunlap, R.E., & Heffernan, R.B. (1975). Outdoor recreation and environmental concern: An empirical examination. Rural Sociology, 40(1),18-30.

Dunlap, R.E., & Van Liere, K.D. (1978). The "new environmental paradigm." Journal of Environmental Education, 9(4), 10-19.

Dunlap, R.E., Van Liere, K.D., Mertig, A.G., Catton, W.R., & Howell, R.E. (1992).

Measuring endorsement of an ecological worldview: A revised NEP scale. Paper presented at the annual meeting of the Rural Sociological Society, The Pennsylvania State University, University Park, PA. Also presented at The Sixth meeting of the Society for Human Ecology at Snowbird, Utah.

Gamba, R.J., & Oskamp, S. (1994). Factors influencing community residents' participation in commingled curbside recycling programs. Environment and Behavior, 26(5), 587-612.

Geisler, C., Martinson, O.B., & Wilkening, E.A. (1977). Outdoor recreation and environmental concern: A restudy. Rural Sociology, 42(2), 241-249.

Gigliotti, L.M. (1992). Environmental attitudes: 20 years of change? Journal of Environmental Education, 24(1): 15-26.

Guagnano, G.A., Stern, P.C., & Dietz, T. (1995). Influences on attitude-behavior relationships: A natural experiment with curbside recycling. Environment and Behavior, 27, 699-718.

Hines, J.M., Hungerford, H.R., & Tomera, A.N. (1986). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. Journal of Environmental Education, 18(2), 1-8.

Jackson, E. L., & Wong, R. A. (1982). Perceived conflict between urban cross-county skiers and snowmobilers in Alberta. Journal of Leisure Research, 14, 47-62.

Jackson, E.L. (1986). Outdoor recreation participation and attitudes to the environment. Leisure Studies, 5, 1-23.

Jewell, T.D. (1978). Outdoor leisure and environmentalism among college students. Unpublished master's thesis, The Pennsylvania State University. University Park, Pennsylvania.

Knopp, T.B., & Tyger, J.D. (1973). A study of conflict in recreational land use: Snowmobiling vs. ski-touring. Journal of Leisure Research, 5, 6-17.

Maloney, M.P., & Ward, M.P. (1973). Ecology: Let's hear from the people. American Psychologist, 28, 583-586.

Nord, M., Luloff, A.E., & Bridger, J. (1998). The association of forest recreation with environmentalism. Environment and Behavior, 30(2), 235-246.

Oskamp, S., Harrington, M.J., Edwards, T.C., Sherwood, D.L., Okuda, S.M., & Swanson, D.C. (1991). Factors influencing household recycling behavior. Environment and Behavior, 23, 459-519.

Ostman, R.E., & Parker, J.L. (1987). Impact of education, age, newspapers, and television on environmental knowledge, concerns, and behaviors. Journal of Environmental Education,19, 3-9.

Pinhey, T.K., & Grimes, M.D. (1979). Outdoor recreation and environmental concern: A reexamination of the Dunlap-Heffernan Thesis. Leisure Sciences, 2(1), 1-11.

Roper Organization. (1990). The environment: Public attitudes and individual behavior.

New York: The Roper Organization Inc.

Scott, D., & Willits, F.K. (1994). Environmental attitudes and behavior: A Pennsylvania survey. Environment and Behavior, 26(2), 239-260.

Shelton, P. (November, 1999). Gas Bros. Ski, 68-70.

Smith-Sebasto, N.J. (1995). The effects of an environmental studies course on selected variablesrelated to environmentally responsible behavior. Journal of Environmental Education, 26(4), 30-34.

Tarrant, M.A., & Cordell, H.K. (1997). The effect of respondent characteristics on general environmental attitude-behavior correspondence. Environment and Behavior, 29(5), 618-633.

Tarrant, M.A., & Green, G.T. (1999). Outdoor recreation and the predictive validity of environmental attitudes. Leisure Sciences, 21(1), 17-30.

Thapa, B. (1999). Environmentalism: The relation of environmental attitudes and environmentally responsible behaviors among undergraduate students. Bulletin of Science, Technology & Society, 19(5), 432-444.

Thapa, B. (2000). The association of outdoor recreation activities and environmental attitudes and behaviors among forest recreationists. Unpublished doctoral dissertation. The Pennsylvania State University, University Park, Pennsylvania.

Theodori, G.L., Luloff, A.E., & Willits, F.K. (1998). The association of outdoor recreation and environmental concern: Reexaming the Dunlap-Heffernan thesis. Rural Sociology, 63(1), 94-108.

Van Liere, K.D., & Dunlap, R.E. (1981). Environmental concern: Does it make a difference how it's measured ? Environment and Behavior, 13(6), 651-676.

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.

Vogel, S. (1996). Farmers' environmental attitudes and behavior: A case study for Austria. Environment and Behavior, 28(5) 591-613.

Wall, G. (1995). General versus specific environmental concern: A western Canadian case. Environment and Behavior, 27(3), 294-316.