

A STUDY OF PREDICTORS OF ENVIRONMENTAL BEHAVIOUR USING U.S. SAMPLES

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The purpose of this research was to determine the relative contribution of eight variables in predicting responsible environmental behaviour. Scores on the Behaviour Inventory of Environmental Action served as the criterion variable. Multilinear regression analyses were used to determine the performance of each predictor variable and to ascertain the most parsimonious set of variables that predicts environmental behaviour. The following conclusions were drawn: (1) All variables, except belief in/attitude toward technology, were significant individual predictors of environmental behaviour. (2) Stepwise regression showed that the best predictors for all respondents were skill in using environmental action strategies, level of environmental sensitivity and perceived knowledge of environmental action strategies. Profiles of high and low environmentally active groups are described. Results imply that the three major behaviour predictors (perceived skill and knowledge of environmental action strategies and level of environmental sensitivity) need to be addressed in curriculum development and instructional practice.

The ultimate goal of environmental education (EE) is the promotion of responsible environmental behaviour (Hungerford & Peyton, 1976; Roth, 1971; Stapp, 1969), yet an examination of EE research and curriculum materials indicates that this goal is not emphasized. Instead more attention is directed towards awareness and analysis of environmental problems while environmental problem solving skills and citizen participation are neglected (Tomera, Hungerford & Wilson, 1982; Fryman et al., 1982; Volk, 1983; Sia, 1984).

It would seem that responsible environmental problem solving behaviour may not be given due consideration because there has been a "paucity of data available to help in the understanding, predicting, and modifying of these behaviors" (Maloney & Ward, 1973). This is in agreement with Linke's (1980) observation that there is a lack of knowledge of those factors which influence the development of environmentally responsible behaviour.

PURPOSE

This research was an attempt to incorporate several variables, some theoretical (Hungerford & Tomera, in press) and others empirically established as having predictive power (Arbuthnot, 1977; Borden, 1979; Borden & Powell, 1982; Borden & Francis, 1978) into a single investigation. Its purpose was to determine these variables' relative strength in predicting responsible environmental behaviour. These predictor variables were:

1. level of environmental sensitivity /LES/
2. perceived knowledge of environmental action strategies /KNOW/
3. perceived skill in using environmental action strategies /SKILL/
4. perceived individual locus of control /ILOC/
5. perceived group locus of control /GLOC/
6. psychological sex role classification /SEX ROLE/
7. belief in/attitude towards pollution /POL/
8. belief in/attitude towards technology /TECH/.

Taking these variables together, the most parsimonious set of variables which best predicts environmental behaviour was identified.

INSTRUMENTATION

A 16-page instrument was used, consisting of seven sections, namely:

1. demographic data
2. behaviour inventory of environmental action /BIEA/
3. level of environmental sensitivity
4. environmental action: knowledge and skill levels /EAKS/
5. individual and group locus of control /ILOC and GLOC/
6. personal attributes questionnaire /PAQ/ and
7. pollution and technology questionnaire /PTQ/.

The demographic data section provided information that helped to describe the sample. The BIEA assessed environmental actions taken by the respondents during the past year, under each of five action categories, namely, consumerism, physical intervention (ecomangement), persuasion, legal action, and political action. A behaviour score, generated from the BIEA, served as the criterion variable. Sections three to seven of the instrument provided information on the eight predictor variables utilized in the study. The LES provided an environmental sensitivity score based on those variables identified in Peterson's (1982) study. The EAKS assessed respondents' perceived knowledge of and skill in using environmental action strategies. Respondents were assessed regarding their perceived ability to influence the solution of environmental problems/issues either as an individual or working with a group (ILOC and GLOC). The PAQ provided data for categorizing respondents into four psychological sex role classifications: androgynous, cross-typed, traditional sex role, and undifferentiated. The PTQ assessed in a semantic differential format respondents' beliefs in/attitudes towards pollution and technology.

Content validity of sections two to five and section seven were established by a panel of five science/environmental educators. Spence, Helmreich and Stapp (1978) established the construct validity and reliability coefficients of the PAQ.

Reliability assessment utilizing the 171 respondents of this study yielded the following coefficient alpha values as computed using the Statistical Package for the Social Sciences (Nie et al., 1975):

1. BIEA = 0,90
2. LES = 0,76
3. EAKS = 0,82 for perceived knowledge and 0,79 for perceived skill
4. ILOC and GLOC combined = 0,67
5. PTQ = 0,59 for attitude towards pollution and 0,76 for attitude towards technology.

SAMPLES

Two distinct groups participated in this study: Sierra Club (SC) and Elderhostel (EH) members. Both were samples of convenience. The SC sample responded by mail. The second sample, the EH members, was given the instrument while in workshop attendance at the Southern Illinois University-Carbondale Touch of Nature Environmental Center. One-hundred and seventy-one (171) usable instruments were collected (SC = 105; EH = 66).

METHODS OF DATA ANALYSIS

- Utilizing the Statistical Analysis computer package (SAS, 1979), instrument data were analyzed by
1. tabulating means, standard deviations, and intercorrelations among the demographic, criterion, and predictor variables
 2. classifying total behaviour scores to establish low, medium, and high scores among all respondents (regardless of sample membership)
 3. ANOVA and regression analysis to determine significant differences between high and low behaviour scores on their behaviour and predictor variable scores
 4. multiple regression analysis to determine relative contribution of the eight predictor variables to the dependent variable - environmental behaviour
 5. determining intercorrelations between dependent and predictor variables
 6. stepwise regression (MAXR) to identify the most parsimonious set of variables that predicts environmental behaviour for the total sample as well as for SC and EH memberships separately.

RESULTS AND DISCUSSION

Demographics

The SC sample was represented by 59 males (56%) and 46 females (44%) while the EH sample was represented by 31 males (47%) and 35 females (53%). Analysis of the data indicated that the SC sample was characterized as a relatively young mixture of single and married highly educated individuals with at least a college degree, occupying diverse professions. The majority had taken environmental courses of which ecology was the typical course taken. Most held memberships in an average of two environmental organizations. The most frequently identified organizations were the Sierra Club, the Audubon Society and the Nature Conservancy respectively. Most had read/subscribed to an average of two environmental publications.

On the other hand, the EH sample was characterized as a group of elderly and retired, married, college educated respondents. The majority had not taken courses regarding environmental concern. Most held memberships in an average of one environmental organization. The most frequently identified organizations were the Audubon Society, the Nature Conservancy and the National Wildlife Federation. Most had read/subscribed to an average of one environmental publication.

High and Low Behavior Profiles

When the entire set of respondents was classified

into low, medium and high behaviour groups on the basis of their environmental behaviour scores, the following action sub-groups resulted:

1. low = 45 respondents with behaviour scores ranging from 3-19
2. medium = 80 respondents with scores ranging from 20-49
3. high = 46 respondents with scores ranging from 50- upwards.

Table 1 shows the frequency and percentage of respondents exhibiting low, medium and high levels of behaviour.

TABLE 1 Frequency and Percentage of Respondents Exhibiting Low, Medium and High Levels of Behaviour based on Environmental Action Scores.

Group	Quartile of Environmental Action Behavior*		
	1st (Low)	2nd & 3rd (Medium)	4th (High)
Sierra Club (SC)	19 (18%)	53 (51%)	33 (31%)
Elderhostel (EH)	26 (39%)	27 (41%)	13 (20%)
Total	45 (26%)	80 (47%)	46 (27%)

*Low = Respondents with scores between 0-19
 Medium = Respondents with scores between 20-49
 High = Respondents with scores of 50 or higher

A scrutiny of the average environmental behaviour scores on the five environmental action categories between the high and low behaviour groups indicated that the scores of the high action group surpassed the scores of the low action group in all categories, as graphically represented in Figure 1.

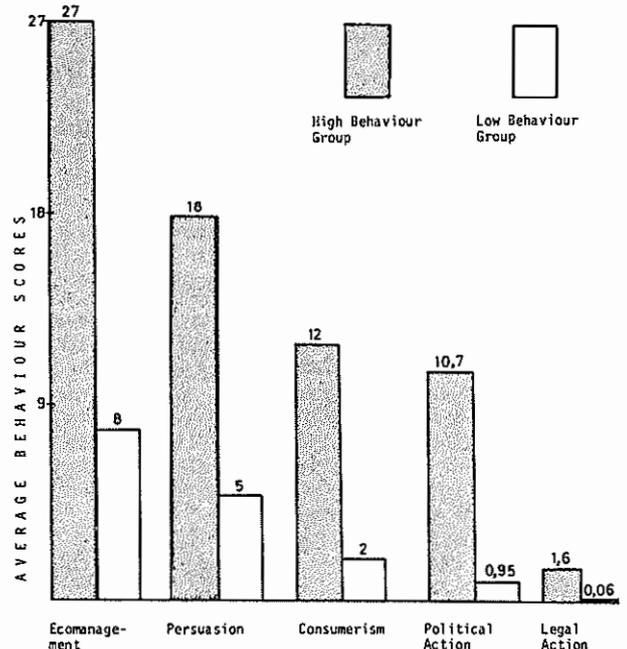


FIGURE 1 Average environmental behaviour scores on the five environmental action categories between the high (n=46) and low (n=45) behaviour groups.

Tests of group differences on the eight predictor variables, (refer to Table 2) indicated that the high and low behaviour groups differed significantly in all predictor variables, except in belief/attitude towards technology.

TABLE 2 Regression Analysis of Scores on the Eight Predictor Variables of the Combined Sierra Club (SC) and Elderhostel (EH) Samples Categorized into High (n=46) and Low (n=45) Behaviour Groups.

df = 1, 89

Variable **	Mean	SD	F	Prob>F	Sig *
SKILL	High 14.83 Low 9.71	3.53 2.67	60.61	0.0001	s
LES	High 49.57 Low 35.11	8.25 7.4	79.78	0.0001	s
GLOC	High 4.04 Low 3.31	0.84 0.82	17.64	0.0001	s
KNOW	High 17.41 Low 13.13	3.78 3.38	32.46	0.0001	s
TECH	High 29.11 Low 31.13	6.80 5.85	2.31	0.1318	ns
ILOC	High 3.15 Low 2.42	0/87 0/81	17.15	0.0001	s
PAQ	High 2.07 Low 2.76	1.12 1.26	7.59	0.0071	s
POL	High 11.48 Low 14.56	3.99 5.04	10.46	0.0017	s

*s=significant at .05 level ns = not significant

**Variables indicate:

- SKILL = Perceived Skill in Using Environmental Action Strategies
- LES = Level of Environmental Sensitivity
- GLOC = Perceived Group Locus of Control
- KNOW = Perceived Knowledge of Environmental Action Strategies
- TECH = Belief in/Attitude toward Technology
- ILOC = Perceived Individual Locus of Control
- PAQ = Used for Psychological Sex Role Category
- POL = Belief in/Attitude toward Pollution

From the comparative findings on the dependent measure and the predictor variables describing both high and low behaviour groups, as shown in Table 2 and Figure 2, a high environmental activist profile emerges:

1. Versatility in utilizing the environmental action categories in taking environmental action.
2. Substantial knowledge of and moderate skill in the use of environmental action strategies.
3. A considerable degree of environmental action strategies.
4. A perception of being moderately effective as an individual but more so as a group member (i.e. the locus of control variables).
5. A moderately negative attitude towards pollution.
6. A slightly ambivalent attitude towards technology.
7. Likely to be androgynous in psychological sex role classification.

The profile of a low environmentally active person has the following attributes:

1. Inability to utilize the varied environmental action categories in taking environmental action, almost limited to the use of ecomanagement strategy.
2. A perception of little knowledge of and skill in the use of environmental action strategies.

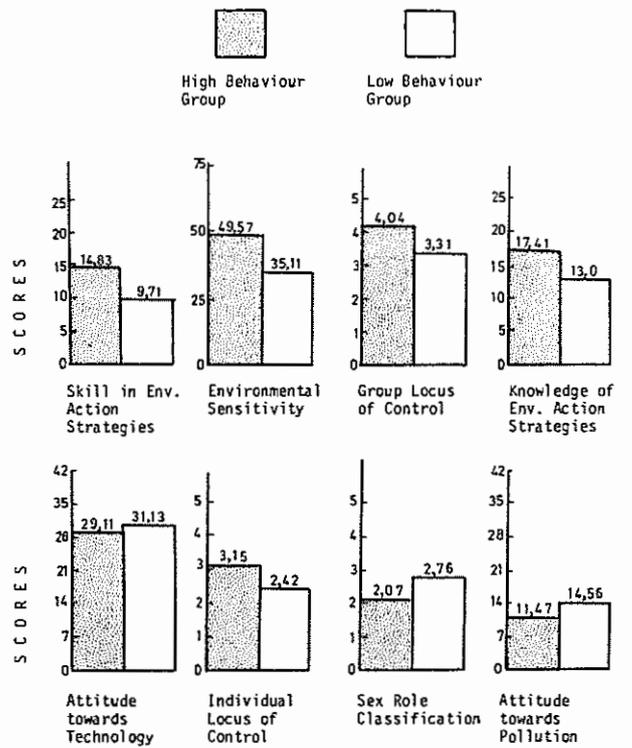


FIGURE 2 Average environmental predictor variable scores for high (n=46) and low (n=45) active groups.

3. A low degree of environmental sensitivity.
4. A perception of external locus of control working as an individual.
5. A perception of being moderately effective as a member of a group.
6. A slightly negative attitude towards pollution.
7. A slightly positive attitude towards technology.
8. Undifferentiated in psychological sex role classification.

ZERO-ORDER CONTRIBUTION

The BIEA scores of all respondents were used for regression analysis to determine the relative contribution of each of the eight predictor variables. Results of the multiple regression analysis, as shown in Table 3, indicate statistically significant zero-order contributions* by seven predictor variables in the following order:

1. SKILL, F = 119,79
2. LES, F = 109,02
3. KNOW, F = 104,20
4. GLOC, F = 51,68
5. ILOC = 48,64
6. POL, F = 24,22
7. SEX ROLE, F = 9,79.

TECH was not found to be a significant predictor (F = 2,45, n.s.).

The above regression analysis results are substantiated by significant correlations between the criterion measure and the predictor variables, respectively, SKILL (r = 0,59), LES (r = 0,56), KNOW (r = 0,55), GLOC (r = 0,39), ILOC (r = 0,38), SEX ROLE (r = -0,29), and POL (r = -0,26). As shown in Table 4, the correlations with environmental behaviour indicated by these predictors followed the same order of strength as the results of the multiple regression analyses.

TABLE 3 Regression Analysis Indicating Zero Order Contribution of Eight Predictor Variables Individually Considered in Predicting Overt Environmental Behaviour.

For All Respondents (n = 171)

DY: Behavior Score
Source: Type I SS
df = 1, 169

Predictors	R ²	F Value	Prob>F	Sig*
Perceived Skill in Using Environmental Action Strategies	0.3454	89.16	0.0001	s
Level of Environmental Sensitivity	0.3143	77.47	0.0001	s
Perceived Knowledge of Environmental Action Strategies	0.3005	72.58	0.0001	s
Perceived Group Locus of Control	0.1490	29.59	0.0001	s
Perceived Individual Locus of Control	0.1403	27.57	0.0001	s
Psychological Sex Role Classification	0.0827	15.24	0.0001	s
Belief in/Attitude towards Pollution	0.0698	12.69	0.0005	s
Belief in/Attitude towards Technology	0.0071	1.20	0.2740	ns

* significant at .05 level ns = not significant

TABLE 4 Intercorrelations between Environmental Behaviour Scores and the Scores on the Eight Predictor Variables for all Respondents (n=171).

Variables**	LES	SKILL	KNOW	ILOC	GLOC	PAQ	POL	TECH
BIEA	0.56*	0.59*	0.55*	0.38*	0.39*	-.39*	-.26*	-.08
LES		0.39*	0.35*	0.31*	0.37*	-.31*	-.29*	0.15
SKILL			0.74*	0.43*	0.40*	-.21*	-.13	-.08
KNOW				0.36*	0.35*	-.16*	-.27*	-.11
ILOC					0.50*	-.24*	-.10	0.03
GLOC						-.25*	-.25*	0.03
PAQ							0.14	-.17*
POL								-.13

*Statistically significant at the .05 level.

**Variables indicate:

- BIEA: Behavior Inventory of Environmental Action (Used to determine environmental behavior scores)
- LES: Level of Environmental Sensitivity
- SKILL: Perceived Skill in Using Environmental Action Strategies
- KNOW: Perceived Knowledge of Environmental Action Strategies
- ILOC: Perceived Individual Locus of Control
- GLOC: Perceived Group Locus of Control
- PAQ: Personal Attributes Questionnaire (Used to measure psychological sex role classification)
- POL: Belief in/Attitude towards Pollution
- TECH: Belief in/Attitude towards Technology

Stepwise Regression (MAXR)

Putting all the eight predictors in a stepwise regression (MAXR) equation with the criterion measure indicated that the most parsimonious set of variables which predicts responsible environmental behaviour included:

1. SKILL (F_{1 169} = 89,16; p ,0001), accounting for 34,54% of the variance.
2. LES (F_{2 168} = 41,31; p ,0001), accounting for 12,92% of the variance.
3. KNOW (F_{3 167} = 5,87; p ,02), accounting for 1,78% of the variance.

These three predictor variables accounted for 49,24% of the variance in explaining environmental behaviour. Table 5 indicates the result of all respondents.

TABLE 5 Stepwise Regression (MAXR) Analysis of Eight Variables used to Predict Overt Pro-Environmental Behaviour Considering Scores of all Respondents (n=171).

Predictor Variables	Percent Contribution	F Value	Prob>F	Sig*
Perceived Skill in Using Environmental Action Strategies (df = 1, 169)	34.54	89.16	0.0001	s
Level of Environmental Sensitivity (df = 2, 168)	12.92	41.31	0.0001	s
Perceived Knowledge of Environmental Action Strategies (df = 3, 167)	1.78	5.87	0.0165	s
Belief in/Attitude towards Technology (df = 4, 166)	0.97	3.24	0.0737	ns
Psychological Sex Role Classification (df = 7, 163)	0.93	3.14	0.0784	ns
Belief in/Attitude towards Pollution (df = 8, 162)	0.57	1.92	0.1673	ns
Perceived Individual Locus of Control (df = 9, 161)	0.36	1.25	0.2649	ns
Perceived Group Locus of Control (df = 10, 160)	0.08	0.24	0.6261	ns

* s = significant at .05 level ns = not significant

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

On the basis of the data analyses, considering the entire sample, there are three predictor variables that best predict overt responsible environmental behaviour. These predictors are perceived skill in using environmental action strategies, level of environmental sensitivity, and perceived knowledge of environmental action strategies. Therefore, it can be concluded that the more skilful in environmental action strategies, the higher the level of environmental sensitivity and the more knowledgeable of environmental action strategies an individual is, the more likely it is to predict that an individual will take more environmental actions.

The above conclusion implies the need for curriculum development and instructional practice in EE to address citizenship participation in environmental problem solving. Students need to be equipped with the knowledge of environmental action strategies which they can consider in problem/issue remediation. Furthermore, they need to be given training in order to develop skills and expertise in the use of these strategies in remediating the specific environmental problems facing them in their daily lives. The need for nurturing one's level of environmental sensitivity is also indicated by the results of the study.

The respondents in this study were U.S. citizens. EE, however, is an international entity and responsible environmental behaviour is a global imperative. Whether the findings of this study extend to other cultures is subject to speculation. It is, therefore, recommended that the study be replicated across a variety of cultural situations and across various age levels to further assess the generalizability of this study's findings in a global context.

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Artikels Benodig

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