

Individual Differences in Environmental Attitudes

ROBERT GIFFORD, ROBERT HAY, and KAREN BOROS

An individual's attitude toward the environment can be predicted, in part, from knowledge of the individual's experience and background. For example, Maloney, Ward, and Braucht (7) showed that the attitudes of Sierra Club members, college students, and non-college people toward the environment differed significantly.

Environmental educators would like to believe that their programs, classes, and field experiences change student attitudes and behavior in positive ways. But as Hendee (5) pointed out, environmental education directors too often *assume* positive changes; little actual evidence supported these hopes and assumptions.

Some years later, the evidence on this point is still both scanty and mixed in its support for the environmental education program's ability to change the ideas and behavior of its graduates. Asch and Shore (1), for example, found that fifth graders exposed to appropriate classroom materials manifested more conservationist behaviors in a subsequent outdoor camp experience than did a control group of fifth graders who were not exposed to the classroom materials. However, Howell and Warmbrod (6) randomly assigned students either to a class using a manual of basic conservationist principles or to a control class and found on a subse-

quent test of environmental knowledge that the groups did not differ.

One reason for such mixed conclusions may be that influences other than environmental education are overlooked. Students differ in ways other than whether they have had an environmental education class or not. These other ways, which may not be under the control of an environmental education program, affect attitudes importantly. Consider, for example, the work of Borden and Francis (2) showing that individuals with high environmental concern differ from those with low environmental concern on a variety of personality traits. Further, Borden and Schettino (3) report that females show more "verbal commitment" to the environment than males.

Thus, factors such as personality and gender, over which the environmental educator has little control, appear to predispose individuals' environmental attitudes in one way or another independently of the educational experience. Indeed, some would argue that mass education is, in general, an expensive and inefficient way to change behavior. Etzioni (4), for example, argues that a restructured social environment is a more potent behavior-change agent. Etzioni would forego a lecture on recycling in favor of tripling the deposit on cans and bottles.

The present study investigates the influences on environmental attitudes of factors within the control of the educational system (e.g., offering environmental education or not) and some of those less amenable to control (student's academic orientation, age, sex, and year in school). The purpose is to gain some insight into the amount of influence the controllable factors have in comparison with some of the less controllable factors.

Robert Gifford, Robert Hay, and Karen Boros are in the Department of Psychology, University of Victoria, British Columbia.

An ever present consideration in the study of attitudes is their multiple component nature. Most of the findings outlined above apply to a verbal commitment component, *or* an affective component, *or* a knowledge component. As Maloney, Ward, and Braucht's work indicates, fuller understanding comes from the examination of all the components of the attitude. Basically following the traditional social psychological division of attitudes, Maloney et al.'s measure of environmental attitude includes Verbal Commitment, Actual Commitment, Affect, and Knowledge components. Unfortunately, the situation may be yet more complex: a recent factor analysis (8) of the Maloney et al. test suggests that it contains ten divisions, not merely four.

What, based on past research, might be expected? One reasonable hypothesis is that environmental education will positively influence all aspects of students' environmental attitudes (i.e., Verbal Commitment, Actual Commitment, Affect, and Knowledge). Students with greater natural science orientation might reasonably be expected to exhibit greater Knowledge scores than other students. Based on Borden and Schettino's work, females may be expected to have higher Verbal Commitment than males. Other possible hypotheses, while intuitively attractive, would not have any clear empirical underpinning from previous research. This study is exploratory with respect to other attitude-individual difference relationships.

Method

One hundred thirty-six students at a medium-sized British Columbia university participated in this study. One hundred participants (10 in each building on campus) were selected on a more or less random basis. The remaining 36 participants were students registered in a one-term course in Environmental Issues or were students registered in the university's Environmental Studies Program.

The participants were administered the inventory developed by Maloney, Ward, and Braucht (7). It is composed of 45 items: 30 true-false questions, and 15 multiple choice questions. The questionnaire was used unchanged with the exception of two minor item revisions concerning the names of government office holders, which were changed to their Canadian equivalents. Additional information about participant's age, sex, major, and year of study were collected. Based on their responses concerning major, students were categorized as follows into one of three academic orientations:

- Natural Sciences: biology, microbiology, chemistry, biochemistry, physics
- Social Sciences: political science, psychology, social science, economics,

geography, human development, anthropology

Non-Sciences: history, classics, physical education, recreation, French, philosophy, music, visual arts, English, social work, outdoor education, public administration, art history

Results

Is it true that important differences exist between students in their environmental attitudes? If there are none, or they are small, it is obviously a fruitless exercise to attempt their explanation. Table 1 presents the mean scores for various groupings of the students on the four attitude components of the Maloney-Ward-Braucht instrument. In certain areas, even visual inspection reveals differences which appear significant.

For example, older students seem to know more about the environment (i.e., have greater Knowledge scores) than younger students. On reflection, a possible reason emerged. Students in the environmental education program were older than non-environmental education students in this sample (based on a separate examination of age and registration of the environmental education program). Hence, it may be that the Knowledge difference is spurious—a mere byproduct of the fact that environmental education students have higher Knowledge scores than non-environmental education students, another finding reported in Table 1. More generally, the problem is to estimate the contribution of each individual difference variable to the prediction of attitude while controlling for the effects of the other individual difference variables.

Partial correlation analysis assisted in answering this question. Any given relationship (e.g., between Age and Knowledge) can be assessed with all other variables (e.g., registration in environmental education) controlled. A further advantage of a correlation analysis (compared with a procedure requiring that groups be divided into two or three subgroups such as ANOVA) is that correlational methods utilize *all* the information present in the data: groups are not merely divided into "high" and "low," but are graded as finely as the measure allows.

Table 2 presents the partial correlations between the individual difference measures and the attitude components. In each case (e.g., Affect correlated with Age) the effects of all the other individual difference measures are controlled. In a non-laboratory study of these relationships, this is as close as one can come to the experimental design ideal of randomly assigning subjects to conditions.

Eight of these partial correlations are significant.

TABLE 1. Means and Standard Deviations on Main Scales

Scale	Affect	Verbal Commitment	Actual Commitment	Knowledge
Group:				
Environmental Education Students	7.32/1.91	7.96/1.22	5.62/2.32	10.42/2.32
Non-Environmental Education Students	6.96/2.42	6.72/1.97	3.48/2.40	8.70/2.59
Males	6.70/2.27	6.69/1.96	3.76/2.50	9.71/2.67
Females	7.60/2.21	7.31/1.75	3.93/2.53	8.07/2.38
Natural Science	8.03/1.71	7.29/1.87	3.97/2.85	10.08/2.69
Social Science	6.90/2.28	7.20/1.90	4.12/2.45	9.00/2.61
Non-Science	6.95/2.42	6.62/1.95	3.50/2.47	8.62/1.98
1st & 2nd year	7.16/2.20	6.91/1.88	3.31/2.26	8.44/2.80
3rd & 4th year	7.16/2.26	7.17/1.84	4.48/2.61	9.60/2.36
Under age 18	7.30/2.11	6.90/1.91	3.39/2.29	8.49/2.70
Over age 17	6.79/2.48	7.00/1.88	4.40/2.68	9.68/2.49
Whole Sample	7.08/2.28	6.94/1.89	3.83/2.50	9.01/2.67

TABLE 2. Partial Correlations between Individual Difference Measures and Environmental Attitude Components

	Affect	Verbal Commitment	Actual Commitment	Knowledge
Age	-.06	-.01	.02	.14
Gender	.20*	.17*	.05	-.31***
Academic Orientation	-.22**	-.13	-.08	-.27**
Year	.06	.08	.14	.16
EE	-.06	.24**	.30***	.20*

Note. * = $p < .05$, ** = $p < .01$, *** = $p < .001$. To understand the direction of the correlations, note the coding system used: age = years old; male = 1, female = 2; natural science = 1, social science = 2, non-science = 3; year coded as freshman = 1, sophomore = 2, etc.; non-environmental education = 1, environmental education = 2. For attitude scales, larger numbers indicate "more" of the component in question.

From the strongest to the weakest of these findings:

1. males have more environmental knowledge than females ($r = .31, p = .001$)
2. environmental education students report more actual commitment than other students ($r = -.30, p = .001$)
3. natural science majors have more environmental knowledge than those in social sciences or non-sciences ($r = -.27, p = .003$)
4. environmental education students express more verbal commitment than non-environmental education students ($r = -.24, p = .008$)
5. natural science students show more emotion about the environment than social sciences and non-science students ($r = -.22, p = .01$)

6. females express greater affect about the environment than males ($r = .20, p = .02$)
7. environmental education students have more knowledge than others ($r = -.20, p = .02$)
8. females report more verbal commitment than males ($r = .17, p = .05$)

The three hypotheses outlined in the introductory paragraphs are all supported. Five other significant relationships are noted. An overall examination of the results reveals three trends:

- a. an interesting anomaly
- b. some noteworthy non-significant relationships
- c. a complex pattern of results at a finer level (i.e., of analysis of attitude components factors from the factor analysis mentioned earlier)

First, the importance of including at least four attitude components is underlined by noting an anomaly in the findings. Females (in comparison with males) *say* they are more upset by anti-environment events (Affect), and *say* they will do more about it (Verbal Commitment), yet report *doing* no more (Actual Commitment), and actually know *less* (Knowledge).

Second, the non-relationships center on age and level of the student. With other variables controlled, it appears attitudes and knowledge about the environment do *not* change or improve as the student moves from the first to fourth year of college. But, as environmental education instructors and administrators will be please to note, environmental education experience is associated with positive changes in verbal commitment, actual commitment, and knowledge.

Third, recall that Smyth and Brook maintain that the Maloney-Ward-Braucht test is composed of 10 divisions, not 4. Smyth and Brook do not subdivide the knowledge component, but they do subdivide the other three components. Their version of the test allows closer examination of the relationships uncovered in the present study. Each of the three subdivided scales will be discussed in turn.

Verbal Commitment

Verbal Commitment is subdivided into three subscales, Transportation, Economic, and Public Advocacy, each containing three or four items reflecting its title. The sex-Verbal Commitment correlation reported earlier appears to be a subtle additive effect to which all three subscales (Transportation, Economics, Public Advocacy) contribute, since no one of them alone is significantly correlated with gender.

There is a significant academic orientation-Economic correlation ($r = .25, p = .005$), indicating that natural science majors profess greater verbal commitment in the economic domain than do social science and non-science students. But since correlation for Verbal Commitment-Transportation and Verbal Commitment-Public Advocacy are not significant, the overall academic orientation-Verbal Commitment correlation is non-significant.

The environmental education-Verbal Commitment correlation is interestingly varied in its support among the three subscales. There is no significant environmental education-Transportation relationship. The environmental education-Economic correlation is mildly significant ($r = .17, p = .04$), indicating that environmental education students are slightly more verbally committed to the environment in the economic area than are non-environmental education students. The strongest subscale relationship is environmental education-Public Advocacy ($r = .28, p = .002$); environmental education students are more likely to have

voiced publicly their verbal commitment than non-environmental education students.

Actual Commitment

Actual Commitment is divided by Smyth and Brook into four subscales. These are Actual Club Membership, Clean-up Activities, Government Contacts, and Purchases. There are no Actual Commitment relationships with age, sex, year, or major. The significant environmental education-Actual Club Membership correlation is $.40 (p < .001)$, indicating that environmental education students express their Actual Commitment by joining organizations much more often than do non-environmental education students. They also differ in purchasing behavior ($r = .18, p = .03$), but there are no significant differences between environmental education and non-environmental education students in government contacts or clean-up activities.

Affect

Affect is divided into two subscales, corresponding to degree of emotional arousal. Intense Personal refers to strong feelings; Qualified refers to weaker affective responses. The Affect relationships are largely based on the Qualified type of affect. For example, the sex-Affect correlation is based on a significant sex-Qualified correlation ($r = .24, p = .006$) while the sex-Intense Personal correlation is not significant. Both Academic Orientation-Affect subscales are significant, but the Academic Orientation-Qualified relationship is stronger (Academic Orientation-Qualified $r = .24, p = .006$; Academic Orientation-Intense Personal $r = .18, p = .04$).

Discussion

This study provides an analysis of the association between 10 components of environmental attitudes and five individual difference measures. Of the individual difference measures, the single most important is exposure to environmental education. Three of the four main subscales of the Maloney-Ward-Braucht inventory are positively and significantly related to participation in an environmental education program. Independent of such possibly confounding factors as age, sex, year in college, and academic orientation, environmental education students not only know more and are more verbally committed to the environment, but they report more actual commitment than non-environmental education students.

These results provide empirical support for the existence of the educational outcomes that environmental education programs strive for. As noted in the introduction, empirical research has not, so far, clearly supported the assumptions of environmental education ef-

ficacy undoubtedly held by many environmental educators.

However, the strong relationship of gender to environmental attitude must be noted. It, too, is significantly correlated with three of the four main subscales, although not quite as strongly as is participation in environmental education. This note of caution is sounded for several reasons. First, many environmental educators may simply be unaware of these sex differences. Second, their existence may signal the need for incorporating changes in environmental education programs, at least informally, to respond to the differences. The sex differences are not flattering to women; compared to men, they appear to know less, while professing to be more emotionally upset and more verbally committed. Third, gender is not under the control of an environmental education program. Without doubt, the attitude differences are not due to any inherent defect in women. Almost certainly they are due to differential socialization of women. These attitude differences are probably just the latest in a long series of effects attributable to sex-role stereotyping. While the long term solution is to erode or extinguish the detrimental effects of such stereotyping, it is important to note that an environmental education instructor cannot overcome years of stereotyping in one term. Within the context of an environmental education program, the sex differences must be viewed as a fixed effect; programs should be designed to accommodate the special needs of women students. Since the findings apply both inside and outside environmental education programs, efforts on behalf of women should also be undertaken in other areas of the curriculum.

The student's academic orientation is also of importance, again, independently of the other factors. Natural science majors know more about and report being more emotionally affected by the environment than the others. Still, they are no more verbally committed, nor do they report engaging in more pro-environment actions.

In contrast, environmental education students know more than non-environmental education students, but they also match cognition with greater verbal and actual commitment. One might assume that their lack of greater affect results from their activities on behalf of the environment. Perhaps they once felt more strongly, but since they have been "doing their share" (or more), the negative affect concerning abuses of the environment has lessened.

These ideas about science and environmental education students must be considered speculative. Further work would be necessary to confirm or disconfirm them.

The Smyth and Brook subscales appear to be a useful elaboration of the Maloney-Ward-Braucht inventory. They allow for examination of trends within the four main scales. It is valuable, for instance, to differentiate between a relationship which is mildly true for all three subscales of a main scale (e.g., with the sex-Verbal Commitment relationship) and a relationship which is strong for some subscales but weak or non-existent for others (e.g., the academic orientation-Verbal Commitment relationship).

For example, we discover that natural science majors, after all, are at least *verbally* committed to the environment in the area of economic decisions they make, even if they are not committed in the other two sub-areas (or in any of the Actual Commitment sub-areas).

In sum, environmental attitudes are importantly related to individual difference measures. Greater understanding of individual differences in relation to environmental attitudes will create greater potential for designing and implementing programs that work well.

NOTE

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