

# SOCIAL STRUCTURAL AND SOCIAL PSYCHOLOGICAL BASES OF ENVIRONMENTAL CONCERN

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**ABSTRACT:** Efforts to explain environmental concern as a function of social structure have revealed some weak but reliable associations. Stronger associations have been found between environmental concern and social psychological variables including attitudes, beliefs, and worldviews. The authors used the 1993 General Social Survey to explore a conceptual framework that postulates four causal levels: social structural factors and early socialization experiences; general worldview and ideology about humanity and the environment; specific attitudes, beliefs, and cognitions about

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environmental issues; and environmentally relevant behavior. Each class of variable has explanatory power beyond that given by other classes of variables, with the social psychological variables generally adding more explanatory power than the structural variables. The patterns are different, however, for the five behavioral indicators. Efforts to explain the structural influences as indirect, operating through the social psychological variables, were mainly unsuccessful.

**The literature on environmentalism** can be divided into two major streams: studies focused on sociodemographic factors associated with environmentalism and studies of values, beliefs and other social psychological constructs related to environmentalism. Little has been done to test models that integrate theory about both the social structural and the social psychological bases of environmental concern (exceptions include some recent work on religion and environment and on gender and environment). Theory development has been hampered because studies on national or other broad samples that have substantial demographic variation lack adequate measures of a social psychological model, whereas data sets developed to test social psychological theories usually have limited demographic variation. In this article, we offer the beginnings of an integrated framework involving both social structural and social psychological variables. We test it using a U.S. national data set, the General Social Survey (GSS) environment module, which is sufficiently rich to allow at least preliminary testing of an integrated model.

The GSS is one of the most widely used data sets in the social sciences, so we expect that the environment module will be subject to many analyses. In addition, the module has been replicated in national samples in 19 other countries as part of the International Social Survey Program. There are plans to redo the survey in the United States and other countries in the year 2000. Thus, along with Dunlap's Health of the Planet Survey (Dunlap, Gallup, & Gallup, 1993), the items we analyze here are at the core of the largest data set on environmentalism ever collected and will see extensive replication and analysis. If work on environmentalism is to be cumulative and advance our understanding, it is essential that key data sets such as this be analyzed using frameworks that engage the larger literature on environmentalism (Heberlein, 1981). Here, we attempt to develop measures of key concepts that are statistically defensible and that are linked to ongoing theoretical debate in the literature. Our hope is that these scales can serve as guides for future analysis of the GSS and other implementations of the environment module.

## PREVIOUS STUDIES

Numerous studies over two decades have examined the associations between environmentalism and standard social structural categories. These studies reveal some factors that are consistently related to environmentalism over time and across studies (e.g., Jones & Dunlap, 1992; Van Liere & Dunlap, 1980). Among these are age/cohort and education. Other factors, such as gender and race, have a weaker and less consistent relationship to environmentalism but are still theoretically interesting. The strongest and most consistent predictor of environmentalism is age or birth cohort. The effects of age and cohort are conceptually distinct but cannot be disentangled in a single cross-sectional study (Buttel, 1979; Honnold, 1984; Mohai & Twight, 1987). Recent work suggests that age/cohort effects are stronger than period effects, with recent birth cohorts being more environmentalist than cohorts born earlier (Kanagy, Humphrey, & Firebaugh, 1994). Education, political ideology, and place of residence also are consistently related to environmental concern, with the well educated, the liberal, and the urban more concerned than others. Although the effects of race/ethnicity vary across studies, the best evidence suggests that Blacks have a higher absolute concern for the environment than Whites. However, Blacks may have lower concern for the environment relative to other public issues and thus are less likely to say they will take political action on the environment because many other issues of concern compete for their time and money (Mohai, 1990). Links to other social structural variables, such as income, class, and occupation or industrial sector, are weak, seldom statistically significant, and show no consistent pattern across studies.

The relationship between gender and environmental concern has been more carefully theorized than other structural variations in environmental concern (Blocker & Eckberg, 1989, 1997; Mohai, 1992; Stern, Dietz, & Kalof, 1993; Stern, Dietz, Kalof, & Guagnano, 1995; for a lucid review, see Davidson & Freudenburg, 1996). Women are generally more concerned than men, and the literature explores several possible mediating factors. One is gendered differences in the experience and effects of parenthood. For men, parenthood leads to less environmental concern, for women to greater concern (Hamilton, 1985). Other intervening factors may include labor-force participation (Blocker & Eckberg, 1997) and ethical socialization (e.g., Stern, Dietz, Kalof, et al., 1995).

Research on religion and environmentalism, despite provocative hypotheses of causal relationships (e.g., Hand & Van Liere, 1984; Toynbee, 1972; White, 1967), shows only one consistent relationship—a weak negative one between environmentalism and membership in fundamentalist sects (Guth,

Green, Kellstadt, & Smidt, 1995; Hand & Van Liere, 1984; but see Kanagy & Willits, 1993; Shaiko, 1987). Some studies also suggest a weak positive relationship with some measures of religious participation (Guth et al., 1995; Kanagy & Willits, 1993), and others report links of environmentalism to specific religious beliefs (e.g., Eckberg & Blocker, 1989; Greeley, 1993; Guth et al., 1995; Shaiko, 1987; Woodrum & Hoban, 1994); the latter findings, however, have not been replicated, and Wolkomir, Futreal, Woodrum, and Hoban (1997) suggest they may be spurious. For a recent review, see Eckberg and Blocker (1996).

A separate literature links indicators of environmentalism to social psychological factors, including attitudes, beliefs, values, and worldviews, identifying a wide range of correlates (Stern, 1992). It generally supports the conclusion that broad values and attitudes are predictive of specific ones, and it suggests that the most important social psychological factors depend on the type of behavior (for instance, the predictors of support for political action may be different from those of pro-environmental consumer behavior). Support for the broad goals of the environmental movement has been consistently associated with expectation of harmful consequences to the environment (e.g., Stern, Dietz, & Black, 1986; Stern, Dietz, Kalof, et al., 1995), adherence to the cluster of self-transcendent values identified by Schwartz (1987, 1992; see, e.g., Karp, 1996; Stern, Dietz, Kalof, et al., 1995), and acceptance of the "New Ecological Paradigm" (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, Catton, & Howell, 1992). There is also evidence of associations with postmaterialist values (Inglehart, 1990, 1995; but see Abramson, 1977; Brechin & Kempton, 1994, 1997; Dunlap & Mertig, 1995, 1997; Kidd & Lee, 1997; Lee & Kidd, 1997; Pierce, 1997) and with a so-called "orienting disposition" toward egalitarianism (Dake, 1991; Peters & Slovic, 1995).

By comparison with these literatures, little research links the social psychological correlates of environmentalism to social structure. Such research might show how environmental attitudes are shaped by social context and reveal some of the mechanisms by which social structural variables influence environmentally relevant behavior. One example of such research is the literature that explores how particular religious beliefs might mediate between denomination and environmentalism. These studies explore the possibility that religion may shape environmentalism through indirect effects on beliefs, attitudes, and values. They illustrate a conceptual strategy of explaining environmentalism as a joint product of social structure, socialization, and social psychological processes.

Models relating structural and social psychological variables could be derived directly from theoretical accounts of environmentalism if sufficiently compelling theory existed. Our approach here is to build a model inductively

from multivariate data and a broad conceptual framework that specifies general relationships among classes of variables. We are not the first to model the causal relationships among personal and contextual determinants of environmentally relevant behavior (see, e.g., Black, Stern, & Elsworth, 1985). This is, however, the first effort to do so using data from a representative national sample that includes good sociodemographic measures and a large array of items measuring environmentally relevant beliefs, attitudes, and behavior. Our data source is the 1993 GSS (Davis & Smith, 1993).

Several conceptual frameworks offer plausible accounts of the relationships among the key variables (e.g., Ajzen & Fishbein, 1980; Costanzo, Archer, Aronson, & Pettigrew, 1986; Ölander & Thøgerson, 1995; Stern & Oskamp, 1987). Each of these addresses the relationships of attitudinal variables to behavioral indicators of environmentalism; several also make a place for social structural and other contextual factors. Here, we employ a simplified version of the Stern-Oskamp framework that posits the following causal ordering: (a) contextual factors, including variables that reflect position in the social structure and socialization experiences; (b) general worldview and ideology about humanity and the environment; (c) specific attitudes, beliefs, and cognitions about environmental issues; and (d) behavioral indicators, including intentions and actual behavior. Stern and Oskamp (1987) and several of the other frameworks offer finer-grained causal hypotheses within these broad categories and add other classes of variables; however, the GSS does not offer data suitable for testing a more complex model.

### DATA AND MEASURES

The 1993 GSS interviewed a national sample of 1,606 respondents. Because of our interest in major social structural variables, our working sample excludes groups whose relatively small numbers preclude separate analysis. Individuals who were coded "other" on race (80 respondents), or who reported their religious denomination as "other" (42 respondents) or Jewish (33 respondents), were dropped from our working sample.

Using the battery of 56 items on the environment in the 1993 GSS, we developed scales where possible to measure variables meaningful within the blocks in our causal model. We first grouped items that were, on their face, linked to one of our theoretical constructs. We then used a principal components analysis to determine the dimensionality of each group.<sup>1</sup> An iterated principal factors extraction restricted to the appropriate number of factors with promax rotation was used to determine the factor structure of the group of items. Items with a loading above 0.35 on the resulting factors were used

to create scales using Armor's (1974) procedure. We have chosen this exploratory strategy rather than confirmatory modeling because most environment items included in the GSS are not derived from existing theory or empirical work on environmentalism. Thus, there are no clear hypotheses that could be used to structure a measurement model.

#### **LEVEL 4: BEHAVIORAL INDICATORS**

The GSS contained 11 items that asked respondents to report past behaviors or present behavioral intentions regarding environmental issues. We excluded two of the items: Davis and Smith (1993, p. 687) question the validity of the financial contribution item, and less than 3% of respondents answered yes to an item asking if they had participated in a demonstration about an environmental issue. Factor analysis of the remaining 10 items sorted them fairly neatly into three categories: willingness to sacrifice for environmental quality (3 items), consumer behavior (4 items), and collective or political behavior (2 items). The willingness to sacrifice and consumer behavior items, along with the  $\Theta$  reliabilities of the principal components factor scales and the loadings for each item, appear in the appendix. Some respondents indicated that they did not have access to organic produce or to recycling programs or do not drive a car. These were recoded to the midpoint of the range of the variable before factor analysis. Because a scale of the two collective or political behavior items has a  $\Theta$  reliability of only 0.41, we analyzed each of them separately. The items asked respondents whether they belonged to an environmental group or had signed a petition on an environmental issue. We also analyzed the item on government environmental spending, which has been used with previous versions of the GSS (e.g., Greeley, 1993; Jones & Dunlap, 1992; Kanagy et al., 1994). The 1993 GSS used two versions of this question in a split ballot experiment. We have combined these into a single variable, ignoring the slight differences in question wording.

#### **LEVEL 3: SPECIFIC ATTITUDES, BELIEFS, AND COGNITIONS**

The GSS included 25 items that appeared to represent this third level in the causal model, of which we analyzed 13.<sup>2</sup> These items asked whether six kinds of environmentally relevant human activities have negative consequences "for the environment," "for your family," and in the case of pollution from cars, "for . . . health." Such beliefs about the consequences of environmental problems have often been used as predictors of pro-environmental behavior in studies applying the Schwartz (1970, 1977) theory of moral norm activation. The beliefs are logically and empirically related to Van Liere and

Dunlap's (1978) New Ecological Paradigm Scale, which is one of the best developed measures of environmental concern in the existing literature (Dunlap et al., 1992; Stern, Dietz, & Guagnano, 1995). A discussion between Heberlein (1977) and Dunlap and Van Liere (1977) suggested that the distinction made among self-interest, concern for others, and concern with the biosphere was theoretically important, and there is supportive empirical evidence (Stern & Dietz, 1994; Stern et al., 1993; Stern, Dietz, Kalof, et al., 1995). Reliable scales can be developed consisting of items describing either consequences for your family or for the environment. However, the two scales are correlated 0.88 so are virtually indistinguishable in this data set. We used a 5-item scale describing consequences for the environment that has a  $\Theta$  reliability of 0.81 (see appendix).

#### **LEVEL 2: GENERAL WORLDVIEW AND IDEOLOGY ABOUT HUMANITY AND THE ENVIRONMENT**

The survey contained 10 items that we judged to assess general ideas about the nature of human-environment relationships: whether human activity is generally harmful to the environment, whether economic progress is environmentally harmful, and so on. We excluded two items related to animal rights and two items about science that do not specifically reference the environment. A principal components factoring of the six remaining items yields a two-factor solution (see appendix). Factor 1 contains two items relating to trade-offs between progress or economic growth and the environment, coded so that positive scores represent a pro-environmental position. It has a  $\Theta = 0.73$ . Factor 2 contains four items about human relationships with nature that we interpret to represent a belief in the fragility of nature. This factor appears to represent one of the key myths of nature identified in work on the cultural theory of risk (e.g., Dake, 1991; Thompson, Ellis, & Wildavsky, 1990) and associated in that work with an ideology of egalitarianism, high levels of concern about environmental risk, and participation in environmental movement organizations. This scale has a  $\Theta = 0.64$ .<sup>3</sup>

The GSS also measures an ideology or worldview variable—postmaterialism (Inglehart, 1990, 1995)—that is sufficiently well established in the literature to justify separate treatment without an exploratory factor analysis. Respondents were asked to choose “the one thing you think should be America’s highest priority, the most important thing it should do. America should: Maintain order in the nation; give people more say in government decisions; fight rising prices; protect freedom of speech.” Respondents were then asked to choose a second priority item from the same list. The second and fourth items listed are considered postmaterialist, the first and third, materialist. A postmaterialism score was created by assigning two points if a

postmaterialist item was selected as top priority and one point if one was given second priority, yielding a 0-3 scale.

#### **LEVEL 1: SOCIAL STRUCTURAL AND SOCIALIZATION-BASED VARIABLES**

We have included measures of a number of social structural variables that may be related to environmental concern. The GSS includes standard measures of age/cohort, education, race, and gender. We have used dummy variables for race (1 = Black), gender (1 = female), and age/cohort (three groups: those born after 1959, those born from 1946 to 1959, and those born before 1946). Because preliminary analyses indicated that the effects of education in this sample are roughly linear, we have used years of education rather than a more complex set of categories.

We also include in this block a 7-point measure of self-reported political ideology on a dimension from extremely liberal to extremely conservative. We scored this item so that high scores represent liberalism. Although this item may legitimately be considered a measure of general worldview and ideology, like postmaterialism, it is commonly grouped with social structural and socialization-based variables, and we follow this practice here.

We treat religion-related variables as socialization-based, even though religious affiliation, beliefs, and practices can change through the life cycle. We measured religious denomination with dummy variables for those without religious affiliation, for Catholics, and for each of the three broad categories of Protestants classified by the GSS as fundamentalist, moderate, and liberal (Smith, 1990). We have also included a measure of religiosity based on a question that asked "Would you call yourself a strong . . . or not a very strong . . . ?" Those responding "strong" were coded 3, those responding "somewhat strong" 2, those responding "not very strong" 1. Individuals indicating no religious affiliation were coded 0.<sup>4</sup>

#### **STATISTICAL PROCEDURES**

Ordinary least squares regression produces inconsistent estimates of coefficients when some of the independent variables are measured with error (Bollen, 1989, pp. 159-167). We have used an "errors in variable" regression method that yields consistent estimates of regression coefficients by taking account of the estimated reliability ( $\Theta$ ) of each scale when used as an independent variable (Fuller, 1987). Because environmental attitude data are often skewed, we used Hadi's (1992) method to identify multivariate outliers and reran our analysis with such outliers deleted. We found no substantial differences in results. Because some dependent variables are categorical, we



have used linear probability models to predict them. There is little collinearity among the independent variables. In no model did we find variance inflation factors above 1.7 (Fox, 1984, pp. 138-153).

## RESULTS

We estimated a block recursive model structure in which we make assumptions about causality across blocks but ignore causality within a block.<sup>5</sup> Table 1 presents regressions of behavioral indicators of environmentalism on the set of social structural and socialization-based variables. This set of variables explains between 4% and 15% of the variance in the behavioral indicators (median = 8%). Gender is related only to consumer behavior, with women more likely to engage in such behaviors. Race is related to consumer behavior, petition signing, and environmental spending, with Blacks reporting more pro-environmental consumer behavior and more support for government spending but less likelihood of having signed a petition. Age/cohort is related to support for environmental spending, the only environmentalism indicator in previous versions of the GSS, with older people less supportive than younger. However, age/cohort affects petition signing in a nonlinear way, with baby boomers (1946-1959 date of birth) more likely to engage in these actions than the more recent cohort. Pro-environmental consumer behavior is least prevalent among the youngest cohort. Education is associated with increased willingness to sacrifice, petition signing, environmental group membership, and government spending but has no significant effect on consumer behavior. Political liberalism affects all five behaviors, with liberals being more pro-environmental.

Religious denomination is related to willingness to sacrifice, consumer behavior, and willingness to sign a petition in the ways usually observed: Fundamentalists are sometimes less pro-environmental than other denominations. However, denomination does not affect support for environmental spending or group membership. Greater religiosity is not associated with any of the behavior measures.

Table 2 shows regressions of the behavioral indicators on the variables in the two social psychological blocks. This set of variables accounts for from 3% to 30% of the variance in the behavioral indicators (median = 18%), comparing favorably with the predictive value of the social structural variables even though some of the strongest social psychological correlates of environmentalism in the literature are not represented in this data set (i.e., Dunlap and Van Liere's [1978] New Ecological Paradigm and Schwartz's [1987] value measures). Postmaterialism is related to consumer behavior and

**TABLE 1**  
**The Effect of Social Structural Variables on**  
**Behavioral Self-Reports and Intentions**

	<i>Willingness to Sacrifice</i>	<i>Consumer Behavior</i>	<i>Sign Petition</i>	<i>Member of Group</i>	<i>Environmental Spending</i>
Gender					
Male	0.00	0.00	0.00	0.00	0.00
Female	-0.05	0.40**	-0.01	0.01	0.03
Race					
Black	-0.09	0.32**	-0.11**	0.01	0.10**
White	0.00	0.00	0.00	0.00	0.00
Age/cohort	1.33	6.78**	3.24**	0.13	26.73**
Born after 1959	-0.08	-0.25**	-0.08*	-0.01	0.08
Born 1946-1959	0.00	0.00	0.00	0.00	0.00
Born before 1946	-0.17	0.07	-0.06	0.00	-0.23**
Education	0.06**	0.00	0.04**	0.01**	0.01*
Liberalism	0.19**	0.11**	0.06**	0.03**	0.09**
Denomination	3.19**	6.11**	5.16**	0.71	0.72
Fundamentalist	0.00	0.00	0.00	0.00	0.00
Moderate Protestant	0.34*	0.28**	0.10**	0.01	0.04
Liberal Protestant	0.34**	0.15	0.01	0.00	0.07
Catholic	0.02	0.44**	0.13**	0.03	0.07
No affiliation	0.23	0.43**	0.10	0.05	0.08
Religious strength	-0.11	0.01	-0.02	0.01	-0.03
Intercept	-1.37**	-0.93**	-0.38**	-0.22**	2.04**
$R^2$	.08	.07	.15	.04	.11
<i>N</i>	1,218	1,274	1,243	1,279	1,279

NOTE: Numbers in rows corresponding to Age/cohort and Denomination are *F* tests on the significance of the block. Coefficients listed as "0" are zero by constraint.

\* $p < .05$ . \*\* $p < .01$ .

petition signing. Awareness of consequences is related to all but group membership. Progress beliefs are related to all behavioral measures except consumer behavior. Fragility beliefs are related to all but group membership, with a weak negative effect on petition signing.

Table 3 reports results of regressions of behavioral indicators on the full set of measures of environmental beliefs (Level 3), worldview and ideology variables (Level 2), and social structural and socialization-based factors (Level 1). Although some of the statistically significant relationships in the partial analyses disappear, almost all the variables in the model have explanatory power for some of the behavioral indicators, controlling for all other measured variables.<sup>6</sup> The effects of the explanatory variables vary across the behavioral indicators. For instance, the table reveals the surprising finding that pro-environmental consumer behavior is most common in the oldest

**TABLE 2**  
**The Effect of Social Psychological Variables**  
**on Behavioral Self-Reports and Intentions**

	<i>Willingness to Sacrifice</i>	<i>Consumer Behavior</i>	<i>Sign Petition</i>	<i>Member of Group</i>	<i>Environmental Spending</i>
Postmaterialism	0.07	0.08*	0.03**	0.01	0.00
Awareness of consequences	0.12**	0.23**	0.04**	0.01	0.08**
Progress beliefs	0.55**	0.04	0.14**	0.04**	0.26**
Fragility beliefs	0.20**	0.16**	-0.04**	0.00	0.08**
Intercept	-0.09	-0.08	0.27**	0.09**	2.51**
$R^2$	.22	.13	.18	.03	.30
N	1,300	1,357	1,325	1,362	1,324

\* $p < .05$ . \*\* $p < .01$ .

cohort, a result contrary to most past research on environmentalism but specific to one behavioral indicator. The result may be attributable to the oldest cohort's formative experience in the 1930s and 1940s, an era of economic stringency when they may have developed habits of frugality or to dietary restrictions undertaken in the interests of health.

A comparison of the coefficients of determination ( $R^2$ ) in Tables 1 to 3 allows exploration of whether a block of variables adds predictive value beyond what can be achieved from other blocks of variables. Adding the social psychological variables to a prediction from social structural and socialization-based factors alone (the comparison of Table 3 with Table 1) explains, at a minimum, an additional 2% of the variance (for group membership) and at a maximum, an additional 21% of the variance (for support for environmental spending). The median increase in predictive ability was 10%. For three of the five equations, adding these four variables more than doubled predictive power; it tripled predictive power for the two behavioral intention variables (willingness to sacrifice and support for spending).

Adding the social structural variables to predictions from the social psychological variables (the comparison of Table 3 with Table 2) explains, at a minimum, an additional 2% of the variance (for support for environmental spending) and at a maximum, an additional 5% (for petition signing). The median increase was 3%. Only for group membership did adding these variables approach a doubling in predictive power. In general, the social psychological factors account for more variance than social structure. This finding is consistent with past research in that variables closer to behavior in the causal model have more predictive value than more causally distant variables. However, the differences between behaviors are also important.

**TABLE 3**  
**The Effect of Social Structural and Social Psychological**  
**Variables on Behavioral Self-Reports and Intentions**

	<i>Willingness to Sacrifice</i>	<i>Consumer Behavior</i>	<i>Sign Petition</i>	<i>Member of Group</i>	<i>Environmental Spending</i>
Gender					
Male	0.00	0.00	0.00	0.00	0.00
Female	-0.20*	0.26**	-0.03	0.00	-0.05
Race					
Black	0.04	0.33**	-0.05	0.02	0.15**
White	0.00	0.00	0.00	0.00	0.00
Age/cohort	1.24	11.09**	2.77	0.78	10.10**
Born after 1959	-0.09	-0.24**	-0.06*	-0.01	0.09*
Born 1946-1959	0.00	0.00	0.00	0.00	0.00
Born before 1946	0.07	0.17*	0.00	0.02	-0.10*
Education	0.04**	0.02	0.03**	0.01**	0.00
Liberalism	0.10**	0.06*	0.04**	0.03**	0.04**
Denomination	2.17	5.68**	3.99**	0.46	
Fundamentalist	0.00	0.00	0.00	0.00	0.00
Moderate Protestant	0.15	0.26*	0.06	0.00	-0.07
Liberal Protestant	0.19	0.14	-0.02	-0.01	-0.04
Catholic	-0.10	0.43**	0.10**	0.02	0.00
No affiliation	-0.11	0.22	0.04	0.03	-0.10
Religious strength	-0.04	0.00	-0.01	0.01	-0.01
Postmaterialism	0.08*	0.11**	0.03*	0.00	0.00
Awareness of consequences	0.10**	0.19**	0.03*	0.00	0.09**
Progress beliefs	0.52**	0.04	0.11**	0.04**	0.23**
Fragility beliefs	0.24**	0.20**	-0.01	0.01	0.07**
Intercept	-0.88**	-1.06**	-0.22*	-0.20**	2.38**
$R^2$	.25	.17	.23	.06	.32
$N$	1,211	1,258	1,226	1,262	1,233

NOTE: Numbers in rows corresponding to Age/cohort and Denomination are  $F$  tests on the significance of the block. Coefficients listed as "0" are zero by constraint.

\* $p < .05$ . \*\* $p < .01$ .

The social psychological variables predict best with indicators that measure behavioral intentions (willingness to sacrifice and support for government spending), for which they explain an average of 26% of the variance by themselves and add an average of 19% to the variance explained by structural variables. They do not do nearly so well with the other indicators, which report past behavior. For these, they explain a median of 13% of the variance by themselves and add a median of 4% to the variance explained by structural variables. These findings suggest that the link from behavioral intention to

**TABLE 4**  
**The Effect of Social Structural Variables and**  
**Postmaterialism on Environmental Beliefs**

	<i>Awareness of Consequences</i>	<i>Fragility Beliefs</i>	<i>Progress Beliefs</i>
Religious strength	0.05	0.00	-0.12*
Denomination	2.23	1.65	4.46**
Fundamentalist	0.00	0.00	0.00
Moderate Protestant	0.22	-0.07	0.31**
Liberal Protestant	0.19	-0.10	0.31**
Catholic	0.20	-0.17	0.21*
No affiliation	0.56**	0.21	0.37**
Gender			
Male	0.00	0.00	0.00
Female	0.49**	0.21**	0.10
Race			
Black	-0.08	0.28*	-0.35**
White	0.00	0.00	0.00
Age/cohort	3.15*	3.18*	14.71**
Born after 1959	-0.09	0.14	-0.05
Born 1946-1959	0.00	0.00	0.00
Born before 1946	-0.28*	-0.09	-0.39**
Education	0.01	-0.14**	0.09**
Postmaterialism	0.03	-0.08*	0.08**
Liberalism	0.15**	0.05	0.10**
Intercept	-1.17**	1.61**	-1.56**
$R^2$	.05	.12	.18
<i>N</i>	1,296	1,298	1,299

NOTE: Numbers in rows corresponding to the label for a block of variables are *F* tests on the significance of the block. Coefficients listed as "0" are zero by constraint.

\* $p < .05$ . \*\* $p < .01$ .

actual behavior is mediated by other factors. One possibility is external barriers to action (see Gardner & Stern, 1996; Guagnano, Stern, & Dietz, 1995).

The data allow us to examine the hypothesis that social structural variables affect environmentalism indirectly, with the effects operating through the social psychological variables in the model. We explore this possibility by treating the Level 3 variables as dependent variables in regression models with Level 1 and 2 variables as predictors. We include postmaterialism here because theoretically it is causally prior to the other social psychological variables. Table 4 shows that women are significantly more likely than men to see adverse consequences to the environment and to see nature as fragile. Blacks are more likely than Whites to see nature as fragile but less likely to choose the environment over economic progress. Those born before 1946 are

less likely to perceive adverse consequences to the environment and less likely to choose environment over economic progress. Education increases choice of the environment over economic progress but reduces the tendency to see nature as fragile. Political liberalism increases awareness of consequences and choice of the environment over economic progress. Postmaterialism decreases beliefs that nature is fragile but increases choosing environmental protection over economic progress. Religious denomination and religiosity are related only to beliefs about progress.

An examination of Tables 1, 3, and 4 suggests that the links from social structural variables to behavioral indicators of environmentalism generally cannot be interpreted as indirect effects operating through the social psychological variables measured in the GSS. This interpretation is supported by the small number of changes in the patterns of statistically significant associations between Table 1 and Table 3. The effects of race and age/cohort on petition signing and of education on environmental spending are mediated by social psychological variables. The only other substantial change is that when social psychological factors are controlled, women are less likely than men to express willingness to sacrifice to protect the environment.

## DISCUSSION AND CONCLUSIONS

The present findings do little to clarify the picture of how social structural variables affect environmentalism and, in some respects, muddy it. Education is positively related to behavior, as is typically found, but it is negatively related to one environmental belief (in the fragility of nature) that both cultural theory and the present data link to environmentalism. Age/cohort does not show the simple consistent relationship often reported, in which younger respondents are always more pro-environmental (Buttel, 1979; Honnold, 1984; Jones & Dunlap, 1992; Kanagy et al., 1994; Mohai & Twight, 1987; Van Liere & Dunlap, 1980). Depending on the indicator, the youngest group in the sample may be most pro-environmental or least. Women have more strongly pro-environmental beliefs than men, but holding these beliefs constant, are less willing to sacrifice and more willing to engage in pro-environmental consumer behavior than men. These findings raise further questions in the already unsettled research area of gender and environmentalism (Blocker & Eckberg, 1989; Davidson & Freudenburg, 1996; McStay & Dunlap, 1983; Mohai, 1992; Stern et al., 1993; Stern, Dietz, Kalof, et al., 1995). Blacks are more pro-environmental than Whites in behavior but only on some indicators; similarly, their environmental beliefs are sometimes more pro-environmental than Whites but sometimes less.

We believe there are two main reasons these data do not tell a clear story about social structural influences on environmentalism. One is a failure of theory. Available conceptual models do not specify particular social psychological mechanisms or variables that link these deeper influences to specific attitudes, beliefs, and behavior. Indeed, with the exception of gender and age/cohort, there is little theoretical argumentation about why various sociodemographic variables would influence environmental concern. The other reason is a failure of measurement. The GSS environment module does not measure several environmentally relevant belief and worldview variables on which theoretical work has been done, such as the New Ecological Paradigm (Dunlap & Van Liere, 1978; Dunlap et al., 1992; Stern, Dietz, & Guagnano, 1995), the orienting dispositions of cultural theory (e.g., Dake, 1991), value orientations (Stern & Dietz, 1994; Stern et al., 1993; Stern, Dietz, Kalof, et al., 1995), and moral norm activation (e.g., Heberlein, 1977; Stern, Dietz, & Black, 1986). A national survey that measured these variables might be better able to trace the empirical relationships between social psychological and structural variables.

The data nevertheless highlight some interesting connections between environmentalism and underlying beliefs, values, and worldview. The awareness of consequences measure, which approximates a variable from norm activation theory, predicts four of the five behavioral indicators when all other predictors are controlled. The belief in the fragility of nature, which, on its face, approximates a variable in cultural theory and also shares some content with the New Ecological Paradigm scale, predicts three of the indicators. Individuals' attitudes on trade-offs between environment and economy, a variable that has not been developed theoretically but is closely linked to recent political debates, predicts four of five behavioral indicators. A highly consistent predictor of both environmental beliefs and behavior is political liberalism, an ideological factor that affects environmentalism independently, it appears, of environmental beliefs. Its effect may be linked to basic values (Stern & Dietz, 1994; Stern, Dietz, Kalof, et al., 1995), but investigating that possibility requires direct measurement of values.

Finally, postmaterialism predicts three behavioral indicators and two of the environmental beliefs measured by the GSS. Postmaterialists are less likely to see nature as fragile, but they are more likely to choose environmental protection over economic progress. The latter finding is consistent with Inglehart's (1990, 1995) argument that environmentalism is a postmaterialist value, so postmaterialists should be more likely than materialists to prefer environmental quality when asked to trade it off against economic progress. Thus, the data show some links from sociodemographic variables

through beliefs to behavior but do not paint a picture with a clear theoretical interpretation.

An intriguing finding links religious socialization through beliefs to environmentalism. The GSS included a single item that asked respondents to choose among the following statements: "Nature is sacred because it is created by God," "Nature is spiritual or sacred in itself," and "Nature is important, but not spiritual or sacred." We conducted a preliminary analysis of this trichotomous variable, which has not been used in previous survey research, to explore the possible impact of beliefs that directly link the sacred and the environmental. We created two dummy variables, one coded 1 for people who endorse the idea that nature is sacred because it was created by God, and one coded 1 for people who consider nature sacred or spiritual in itself. When the block of sacredness variables was used to predict the behavioral indicators along with all the other predictors, it significantly affected both willingness to sacrifice and consumer behavior. Individuals who believed nature is sacred because it is created by God were more likely to be willing to sacrifice than either of the other groups, and pro-environmental consumer behavior was reported most frequently by those who saw nature as sacred in itself. This suggests that the three response categories do not fall along a continuum from more to less sacredness ascribed to nature but rather that the reason for sacredness makes an important difference. Analysis of the determinants of sacredness beliefs supports this inference. Women, the educated, the politically liberal, members of liberal Protestant denominations, those with no religious affiliation, and postmaterialists are more likely than others to endorse the notion that nature is sacred in itself. Men, Whites, the less educated, political conservatives, and those who are stronger adherents to their denomination are most likely to see nature as sacred because it was made by God, whereas postmaterialists, moderate Protestants, Catholics, and those with no religious affiliation reject this view.

These results suggest that there may be meaningful links between religion and environmentalism that are not tied to denomination or religiosity and that have not yet been properly specified theoretically. A useful lead exists in recent ethnographic work by Kempton, Boster, and Hartley (1995), who reported the frequent spontaneous mention of sacredness in open-ended interviews about the environment, even among individuals who were embarrassed to speak of the sacredness of nature because they saw themselves as nonreligious. A deeper understanding of what people mean by the sacredness of nature may help clarify the connections between religious experience and environmentalism.

Despite some intriguing findings, our analysis is limited by the dilemmas noted above. The GSS contains well-measured demographics, but with the



exception of age/cohort and gender, existing theory provides little guidance on how to specify a model linking these influences to environmentalism. Instead, the theory of environmentalism has been elaborated around social psychological constructs such as worldview and values that are not well measured in the GSS environment module. Resolving the former problem will require careful theorizing, resolving the latter will require better data.

The links between environmentalism and social structure may be forged in the communities of discourse that shape core beliefs and values (Brulle, 1995). For instance, an individual's membership in communities that use the environment for either production activities or recreation might shape environmentalism. But analyses of GSS data on industrial sectors of employment and on recreational activities provide little evidence for causal links from these variables to the environmentalism variables examined above.<sup>6</sup> We suspect that this is because environmental concern grows out of engagement with the environmental movement and its critics and may reflect as much the circumstances of one's community as one's personal circumstances. This suggests that a fuller theory of environmentalism must attend to contextual effects that influence beliefs and values as well as individual level variables.

## APPENDIX

### Scale Items and Factor Loadings

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#### *Willingness to Sacrifice*

$$\Theta = 0.85$$

How willing would you be to . . . in order to protect the environment?	
pay much higher taxes	0.60
pay much higher prices	0.58
accept cuts in your standard of living	0.56

#### *Consumer Behavior*

$$\Theta = 0.54$$

How often do you . . .	
make a special effort to buy fruits and vegetables grown without pesticides or chemicals?	0.56
refuse to eat meat for moral or environmental reasons?	0.52
cut back on driving a car for environmental reasons?	0.49
sort glass or cans or plastic or paper and so on for recycling?	0.42

#### *Progress Versus the Environment*

$$\Theta = 0.73$$

We worry too much about the future of the environment, and not enough about prices and jobs today.	0.71
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People worry too much about human progress harming the environment. 0.71

*Fragility of Nature*

$\Theta = 0.64$

Almost everything we do in modern life harms the environment. 0.52

Nature would be at peace and in harmony if only human beings would leave it alone. 0.48

Any change humans cause in nature—no matter how scientific—is likely to make things worse. 0.49

Economic growth always harms the environment. 0.51

*Awareness of Consequences*

$\Theta = 0.81$

These questions take the form: "In general, do you think [insert text below] is . . . extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, or not dangerous at all for the environment."

air pollution caused by industry 0.47

a rise in the world's temperature caused by the greenhouse effect 0.46

pollution of America's rivers, lakes, and streams 0.45

pesticides and chemicals used in farming 0.42

air pollution caused by cars 0.41

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**NOTES**

1. We retained all components for which a 90% bootstrap percentile confidence interval did not include values less than 1.0. We used 250 replicates in determining the confidence interval. For a discussion of the performance of the bootstrap percentile method, see Hamilton (1992, pp. 319-323) or Hall (1988).

2. The remaining 12 items, identified by the suffix TEST in their variable names, were apparently intended to test respondents' knowledge of environmental science. We had some concern about the validity of a number of these as knowledge items rather than as beliefs. Factor analysis of the 12 items yields three factors. One contains only a single item that asserts that all chemicals cause cancer (which has a factor loading of 1.2). A second factor contains three items: one related to long-term hazards of nuclear power, one on contributions of fossil fuels to the greenhouse effect, and one on humans as the cause of most extinctions. The third factor includes four items: all radiation is caused by humans, astrology has some scientific truth, any amount of radiation will kill, and all pesticides and chemicals used on food cause cancer in humans. Only this last factor has reasonable  $\Theta$  reliability (0.67). Given the weak factor structure, the difficulty interpreting some of the items, and our inability to understand how environmental knowledge might have this factor structure, we have chosen not to include these items in our analysis.

3. Because each item used in constructing the fragility, progress, and awareness of consequences scales has moderate amounts of missing data, strict listwise deletion in scale construc-

tion and regression would reduce the working sample size to less than 900. The data seem to be missing at random, so we have used a best-subset regression imputation method to estimate factor scores for each of these variables from the nonmissing items used to compose the scales (Stata Corporation, 1993, Vol. 2, pp. 415-419). This raises the effective sample size in regressions including these three variables to levels comparable to the sample size in regressions not including these variables.

4. We also measured image of God (Greeley, 1993) with three items asking respondents whether they saw God as more of a mother or father, a master or spouse, a judge or lover, and a friend or king. These items, which were asked of two thirds of respondents, load on a single factor and create a scale with  $\Theta = 0.62$ , with high scores indicating a nurturing or liberal image of God. A fourth related item did not load well on the factor. We have estimated models including this variable, but do not report them in our tables. We have also explored the effects of literal belief in the Bible and a more complex measure of religiosity based on attendance at religious services, frequency of prayer, and the self-reported religious intensity described above. Including these items reduces sample sizes by approximately one third, and the variable has only limited effects on the results, so we do not report them in detail here. Eckberg and Blocker (1996) provide a detailed analysis of the effects of religion on environmentalism using GSS data.

5. Some causal effects undoubtedly flow in the opposite direction. Even social structural and ascriptive factors are subject to reconstruction over the life course, which implies causality moving opposite to the direction assumed in our model. In a cross-sectional survey or short panel, the causal effects of the relatively fixed social structural variables on values, beliefs, attitudes, and behaviors are much stronger than the reciprocal effects. Ultimately, it would be useful to specify a model with reciprocal causation. But neither existing theory nor experimental evidence is adequate to support identification assumptions. Our assumption of block recursivity can lead to biased estimates of causal effect, but if the dominant direction of causality is as we have assumed, bias in estimates will be minimal. Even if causal linkages are more complex, the conceptual model is still helpful for organizing thinking about environmental concern. For more discussion of the model, see Stern and Oskamp (1987).

6. Employment by the respondent or spouse in an extractive industry has a significant effect only on support for environmental spending, net of other background variables. Employment in an industry that has historically produced substantial pollution at its plants (e.g., chemical, petroleum) has no significant effect net of other demographics. Although some previous work suggests a link between outdoor recreation and environmental concern (Dunlap & Heffernan, 1975), the GSS data provide only weak support. Those who have gone hunting or fishing in the last year score lower on some environmental concern measures than those who have not gone hunting or fishing, net of other demographic variables. Those who engaged in camping, hiking, and canoeing in the last year were more concerned than those who did not. Although these results are suggestive, there is a strong problem of causal ordering in interpreting them.

## REFERENCES

- Abramson, P. R. (1997). Postmaterialism and environmentalism: A comment on an analysis and a reappraisal. *Social Science Quarterly*, 78, 21-23.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting behavior*. Englewood Cliffs, NJ: Prentice Hall.

- Armor, D. (1974). Theta reliability and factor scaling. In H. L. Costner (Ed.), *Sociological methodology* (pp. 17-50). San Francisco: Jossey-Bass.
- Black, J. S., Stern, P. C., & Elsworth, J. T. (1985). Personal and contextual influences on household energy adaptations. *Journal of Applied Psychology, 70*, 3-21.
- Blocker, T. J., & Eckberg, D. L. (1989). Environmental issues as women's issues: General concerns and local hazards. *Social Science Quarterly, 70*, 586-593.
- Blocker, T. J., & Eckberg, D. L. (1997). Gender and environmentalism: Results from the 1993 General Social Survey. *Social Science Quarterly, 78*, 841-858.
- Bollen, K. A. (1989). *Structural equation models with latent variables*. New York: John Wiley.
- Brechin, S. R., & Kempton, W. (1994). Global environmentalism: A challenge to the postmaterialism thesis? *Social Science Quarterly, 75*, 245-269.
- Brechin, S. R., & Kempton, W. (1997). Beyond postmaterialist values: National versus individual explanations of global environmentalism. *Social Science Quarterly, 78*, 16-20.
- Brulle, R. J. (1995). Environmental discourse and environmental movement organizations: A historical and rhetorical perspective on the development of U.S. environmental organizations. *Sociological Inquiry, 65*, 58-83.
- Buttel, F. H. (1979). Age and environmental concern: A multivariate analysis. *Youth and Society, 10*, 237-256.
- Costanzo, M., Archer, D., Aronson, E., & Pettigrew, T. (1986). Energy conservation behavior: The difficult path from information to action. *American Psychologist, 41*, 521-528.
- Dake, K. (1991). Orienting dispositions in the perception of risk: An analysis of contemporary worldviews and cultural biases. *Journal of Cross-Cultural Psychology, 22*, 61-82.
- Davidson, D. J., & Freudenburg, W. R. (1996). Gender and environmental risk concerns: A review and analysis of available research. *Environment and Behavior, 28*, 302-339.
- Davis, J. A., & Smith, T. W. (1993). *General Social Surveys, 1972-1993: Cumulative codebook*. Chicago: National Opinion Research Corporation.
- Dunlap, R. E., Gallup, G.H.J., & Gallup, A. M. (1993). Global environmental concern: Results from an international public opinion survey. *Environment, 35*(November), 7-15, 33-39.
- Dunlap, R. E., & Heffernan, R. B. (1975). Outdoor recreation and environmental concern: An empirical examination. *Rural Sociology, 40*, 18-30.
- Dunlap, R. E., & Mertig, A. G. (1995). Global concern for the environment: Is affluence a prerequisite? *Journal of Social Issues, 51*(4), 121-137.
- Dunlap, R. E., & Mertig, A. G. (1997). Global environmental concern: An anomaly for postmaterialism. *Social Science Quarterly, 78*, 24-29.
- Dunlap, R. E., & Van Liere, K. D. (1977). Land ethic or Golden Rule. *Journal of Social Issues, 33*, 200-207.
- Dunlap, R. E., & Van Liere, K. D. (1978). The "New Environmental Paradigm": A proposed measuring instrument and preliminary results. *Journal of Environmental Education, 9*, 10-19.
- Dunlap, R. E., Van Liere, K. D., Mertig, A. D., Catton, W. R., Jr., & Howell, R. E. (1992). *Measuring endorsement of an ecological worldview: A revised NEP Scale*. Paper presented at the 1992 Meeting of the Rural Sociological Society, University Park, PA.
- Eckberg, D. L., & Blocker, T. J. (1989). Varieties of religious involvement and environmental concerns: Testing the Lynn White Thesis. *Journal for the Scientific Study of Religion, 28*, 509-517.
- Eckberg, D. L., & Blocker, T. J. (1996). Christianity, environmentalism, and the theoretical problem of fundamentalism. *Journal for the Scientific Study of Religion, 35*, 343-355.
- Fox, J. (1984). *Linear statistical models and related methods with application to social research*. New York: John Wiley.

- Fuller, W. A. (1987). *Measurement error models*. New York: John Wiley.
- Gardner, G. T., & Stern, P. C. (1996). *Environmental problems and human behavior*. Needham Heights, MA: Allyn & Bacon.
- Greeley, A. (1993). Religion and attitudes toward the environment. *Journal for the Scientific Study of Religion*, 32, 19-28.
- 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.
- Guth, J. L., Green, J. C., Kellstedt, L. A., & Smidt, C. E. (1995). Faith and the environment: Religious beliefs and attitudes on environmental policy. *American Journal of Political Science*, 39, 364-382.
- Hadi, A. S. (1992). Identifying multiple outliers in multivariate data. *Journal of the Royal Statistical Society, Series B*, 54, 761-777.
- Hall, P. (1988). Theoretical comparisons of bootstrap confidence intervals. *Annals of Statistics*, 16, 927-953.
- Hamilton, L. C. (1985). Who cares about water pollution? Opinions in a small-town crisis. *Sociological Inquiry*, 55, 170-181.
- Hamilton, L. C. (1992). *Regression with graphics: A second course in applied statistics*. Belmont, CA: Duxbury.
- Hand, C. M., & Van Liere, K. D. (1984). Religion, mastery-over-nature, and environmental concern. *Social Forces*, 63, 555-570.
- Heberlein, T. A. (1977). Norm activation and environmental action. *Journal of Social Issues*, 33, 79-87.
- Heberlein, T. A. (1981). Environmental attitudes. *Zeitschrift für Umweltpolitik*, 2, 241-270.
- Honnold, J. A. (1984). Age and environmental concern: Some specification of effects. *Journal of Environmental Education*, 16, 4-9.
- Inglehart, R. (1990). *Culture shift in advanced industrial society*. Princeton, NJ: Princeton University Press.
- Inglehart, R. (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science and Politics*, 15, 57-71.
- Jones, R. E., & Dunlap, R. E. (1992). The social bases of environmental concern: Have they changed over time. *Rural Sociology*, 57, 28-47.
- Kanagy, C. L., Humphrey, C. R., & Firebaugh, G. (1994). Surging environmentalism: Changing public opinion or changing publics. *Social Science Quarterly*, 75, 804-819.
- Kanagy, C. L., & Willits, F. K. (1993). A "greening" of religion? Some evidence from a Pennsylvania sample. *Social Science Quarterly*, 74, 674-683.
- Karp, D. G. (1996). Values and their effects on pro-environmental behavior. *Environment and Behavior*, 28, 111-133.
- Kempton, W., Boster, J. S., & Hartley, J. A. (1995). *Environmental values in American culture*. Cambridge, MA: MIT Press.
- Kidd, Q., & Lee, A.-R. (1997). Postmaterialist values and the environment: A critique and reappraisal. *Social Science Quarterly*, 78, 1-15.
- Lee, A.-R., & Kidd, Q. (1997). More on postmaterialist values and the environment. *Social Science Quarterly*, 78, 36-43.
- McStay, J. R., & Dunlap, R. E. (1983). Male-female differences in concern for environmental quality. *International Journal of Women's Studies*, 6, 291-301.
- Mohai, P. (1990). Black environmentalism. *Social Science Quarterly*, 71, 744-765.
- Mohai, P. (1992). Men, women and the environment: An examination of the gender gap in environmental concern and activism. *Society and Natural Resources*, 5, 1-19.

- Mohai, P., & Twight, B. W. (1987). Age and environmentalism: An elaboration of the Buttel model using national survey evidence. *Social Science Quarterly*, *68*, 798-815.
- Ölander, F., & Thøgersen, J. (1995). Understanding of consumer behavior as a prerequisite for environmental protection. *Journal of Consumer Policy*, *18*, 345-385.
- Peters, E., & Slovic, P. (1995). *The role of affect and worldviews as orienting dispositions in the perception and acceptance of nuclear power*. Eugene, OR: Decision Research.
- Pierce, J. C. (1997). The hidden layer of political culture: A comment on "Postmaterialist values and the environment: A critique and reappraisal." *Social Science Quarterly*, *78*, 30-35.
- Schwartz, S. H. (1970). Moral decision making and behavior. In J. Macauley & L. Berkowitz (Eds.), *Altruism and helping behavior* (pp. 127-141). New York: Academic Press.
- Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 221-279). Orlando, FL: Academic Press.
- Schwartz, S. H. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology*, *53*, 550-562.
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, *25*, 1-65.
- Shaiko, R. G. (1987). Religion, politics and environmental concern: A powerful mix of passions. *Social Science Quarterly*, *68*, 244-262.
- Smith, T. W. (1990). Classifying Protestant denominations. *Review of Religious Research*, *31*, 225-245.
- Stata Corporation. (1993). *Stata Reference Manual: Release 3.1*. College Station, TX: Author.
- Stern, P. C. (1992). Psychological dimensions of global environmental change. *Annual Review of Psychology*, *43*, 269-302.
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, *50*, 65-84.
- Stern, P. C., Dietz, T., & Black, J. S. (1986). Support for environmental protections: The role of moral norms. *Population and Environment*, *8*, 204-222.
- Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The New Environmental Paradigm in social psychological perspective. *Environment and Behavior*, *27*, 723-745.
- Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior*, *25*, 322-348.
- Stern, P. C., Dietz, T., Kalof, L., & Guagnano, G. (1995). Values, beliefs and pro-environmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology*, *25*, 1611-1636.
- Stern, P. C., & Oskamp, S. (1987). Managing scarce environmental resources. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1043-1088). New York: John Wiley.
- Thompson, M., Ellis, R., & Wildavsky, A. (1990). *Cultural theory*. Boulder, CO: Westview.
- Toynbee, A. (1972). The religious background of the present environmental crisis: A viewpoint. *International Journal of Environmental Studies*, *3*, 141-146.
- Van Liere, K. D., & Dunlap, R. E. (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public Opinion Quarterly*, *44*, 181-199.
- White, L. J. (1967). The historical roots of our ecological crisis. *Science*, *155*, 1203-1207.
- Wolkomir, M., Futreal, M., Woodrum, E., & Hoban, T. (1997). Substantive religious belief and environmentalism. *Social Science Quarterly*, *78*, 96-108.
- Woodrum, E., & Hoban, T. (1994). Theology and religiosity effects on environmentalism. *Review of Religious Research*, *35*, 193-206.