Value Orientations, Gender, and Environmental Concern

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VALUE ORIENTATIONS, GENDER, AND ENVIRONMENTAL CONCERN

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ABSTRACT: A social-psychological model is developed to examine the proposition that environmentalism represents a new way of thinking. It presumes that action in support of environmental quality may derive from any of three value orientations: egoistic, social-altruistic, or biospheric, and that gender may be implicated in the relation between these orientations and behavior. Behavioral intentions are modeled as the sum across values of the strength of a value times the strength of beliefs about the consequences of environmental conditions for valued objects. Evidence from a survey of 349 college students shows that beliefs about consequences for each type of valued object independently predict willingness to take political action, but only beliefs about consequences for self reliably predict willingness to pay through taxes. This result is consistent with other recent findings from contingent valuation surveys. Women have stronger beliefs than men about consequences for self, others, and the biosphere, but there is no gender difference in the strength of value orientations.

Environmental politics has long frustrated participants on all sides. Environmental movement activists accuse corporations and government agencies of trading irreplaceable values for short-term selfish gains, and corporate and government officials

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accuse environmentalists of irrational desires for a risk-free life. The participants seem to be talking past each other. And the conflicts do not recede in the face of increasing knowledge about the effects of different policy choices on the environment or on other things people value. Part of the problem is that the political actors represent competing interests: Environmental politics is an interchange between potential winners and potential losers. But the other part of the problem is that the actors do not all value the same things. Sometimes, it seems, they do not even see the same world (Dietz, Stern, & Rycroft, 1989).

Beginning with the work of Dunlap and Van Liere (1978, 1984), research on environmental attitudes has assessed the extent to which individuals concerned with the environment view the world in ways that differ fundamentally from those who are less concerned with the environment (see also Cotgrove, 1982, Inglehart, 1990, Milbrath, 1984). Much of this work has emphasized the emergence of a new worldview, or paradigm, associated with environmentalism. The work is consistent with the argument in the social movements literature that environmentalism, like other "new social movements," aims not at redistributing resources, but rather at a different and in many ways more fundamental restructuring of society (Buttel, 1987, Habermas, 1981, Offe, 1985).

To date, however, the idea that environmentalism represents a new way of thinking has not been linked to a social-psychological model. A number of critics have suggested that the lack of a general theoretical frame may be one reason that research on environmental attitudes and environmentalism is not cumulative (Heberlein, 1981; Stern & Oskamp, 1987). A major exception to this has been a growing literature that attempts to use Schwartz's norm-activation model of altruism to explain actions intended to ameliorate environmental problems (Black, Stern, &

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Elworth, 1985; Heberlein & Black, 1976; Hopper & Nielsen, 1991; Stern, Dietz, & Black, 1986; Van Liere & Dunlap, 1978). Schwartz's theory of altruism suggests that proenvironmental behavior becomes more probable when an individual is aware of harmful consequences (AC) to others from a state of the environment and when that person ascribes responsibility (AR) to herself or himself for changing the offending environmental condition. Under conditions of AC and AR, individuals experience a sense of moral obligation to prevent or mitigate the harmful consequences. This so-called personal norm motivates action.

The Schwartz-derived model treats proenvironmental behavior as a special case within a social-psychological theory of altruism. It implicitly assumes that people have a general value orientation toward the welfare of others, that is, that they value outcomes that benefit others and can be motivated to act to prevent harm to others. Under appropriate conditions, proenvironmental behavior will follow from this social or altruistic value orientation. We expand on the Schwartz model by offering an integrative theoretical model of environmental concern. We presume that the value orientation toward human welfare is only one of at least three value orientations that might underlie environmental attitudes and behavior. The others are the egoistic value orientation that many economic and sociobiological accounts of environmental problems assume to be the predominant motivation for human behavior (e.g., Hardin, 1968; Olson, 1965), and a biospheric value orientation such as that described and advocated in the writings of "deep ecologists" and others (Devall, 1988; Devall & Sessions, 1985; Naess, 1989; for reviews and critiques, see Brennan, 1988; Eckersley, 1992). Our preliminary test of the expanded model suggests it has reasonable explanatory power and also sheds some light on gender differences in environmental concern. In addition, our findings suggest that the model can help explain some of the surprising responses to contingent valuation surveys noted by other researchers (Gregory, Lichtenstein, & Slovic, 1992; Irwin, Slovic, Lichtenstein, & McClelland, in press).

ENVIRONMENTALISM AND VALUE ORIENTATIONS

Schwartz's norm-activation theory (Schwartz, 1968a, 1968b, 1970, 1977), as we have noted, can treat environmentalism as a type of altruism. In the terminology of value theory (Rokeach, 1973), environmental attitudes can flow from a value orientation that reflects concern for the welfare of other human beings. This assumption has proven fruitful. Heberlein (1972; Heberlein & Black, 1976) first showed that this general model is applicable to environmental problems, using littering and purchase of lead-free gasoline as examples. Following these initial studies, the norm-activation approach has been applied to a variety of environmentally significant behaviors, including energy conservation (Black, Stern, & Elsworth, 1985), yard burning (Van Liere & Dunlap, 1978), recycling (Hopper & Nielsen, 1991; Oskamp et al., 1991) and political support for environmental protection (Stern, Dietz, & Black, 1986).

Some studies using the Schwartz model, however, also recognize that the effect of personally held normative beliefs (altruistic personal norms) is partially countered by the effect of perceived costs to the individual engaging in the behavior these norms prescribe (Black et al., 1985). Such studies in effect recognize that environmentally relevant behavior can reflect a trade-off between altruistic and egoistic motivations, and therefore that egoistic value orientations as well as social-altruistic ones are implicated in environmental attitudes and behavior.

A published debate of the 1970s was the first mention in the academic literature of a third value orientation affecting environmental behavior (Dunlap & Van Liere, 1977a, 1977b; Heberlein, 1972, 1977). It posed the question of whether proenvironmental behavior was a case of following the "golden rule" (treating others as you would have them treat you), as the Schwartz model assumes, or of adherence to a "land ethic" (Leopold, 1949), a value orientation toward the welfare of *nonhuman* species or the biosphere itself. Heberlein and Dunlap and Van Liere agreed that at the time they were writing, the golden rule was the most likely basis for environmental concern. Although

neither side in the debate was optimistic that the land ethic would become widespread as a value basis for environmental concern and action, Dunlap nevertheless incorporated a number of items that appear to measure adherence to a biospheric ethic in his New Environmental Paradigm scale (Dunlap & Van Liere, 1978). Here we develop a model that incorporates all three value orientations: concern for the welfare of other human beings, which we call the social-altruistic value orientation; concern with nonhuman species or the biosphere, which we call the biospheric orientation; and egoism or self-interest.

In the literature on evolutionary theory, social choice, and social psychology, the distinction between egoism and altruism is typically made so that the latter refers to values, attitudes, and behavior toward conspecifics (see Note 1). We maintain the familiar distinction but add to it the recognition that nonegoistic behavior, including environmentalism, may also be motivated by biospheric values that extend beyond the human species. Such behavior is altruistic in that it involves self-sacrifice but not in the sense of implying sacrifice for other people.

The three value orientations we identify are the most frequently noted in the Western literature on environmental concern, but they are not the only ones that might be relevant. In the disintegrating Soviet Union of 1989-1990, for example, environmental activism was often rooted in nationalist concerns about exploitation of resources in non-Russian areas by the central, Russian-dominated government. In different cultural contexts, still other value orientations might be salient.

Each value orientation, if present in a pure form, could produce environmental concern under different conditions. For example, if environmental concern were based entirely on self-interest, an individual would favor protecting the environment when and only when doing so would have expected benefits for the individual that would outweigh the expected costs.[1] A prototypical example is the NIMBY ("not in my back yard!") protest, in which individuals become concerned when they perceive that a hazardous industrial process may harm them and their fami-

lies. Individuals act more or less as would be predicted by various forms of rational-choice theory, and endure costs to protect the environment provided they expect benefits that exceed those costs.[2]

If environmental concerns were based entirely on a social-altruistic value orientation, an individual would bear personal costs to safeguard the environment only when doing so would protect other human beings. For instance, someone with a strong social value orientation might become an environmentalist on learning about potential harm to innocent people, such as children living downwind of an industrial plant over which they have no control, that exposes them to air pollution but gives them no benefits. To the extent that environmentalism is based on a social-altruistic value orientation, environmental concern should be closely correlated with other concerns and actions that are altruistic in the same sense, for example, concerns with the rights of minorities or with poverty. Similarly, we would expect environmentally protective behaviors such as recycling to be common among individuals who also engage in other forms of altruism, such as blood donation or community work.

If environmental concern were based entirely on biospheric values, an individual would express and act on moral principles that incorporate concerns with other species and with natural environments. Someone motivated purely by biospheric values would become involved in environmental issues when species extinction or habitat destruction is at stake, but would be relatively unconcerned when the only effects are on people. Echoes of this purist position are heard in the work of deep ecologists and some environmental philosophers, and within the animal rights movement. Biospheric morality extends beyond kin and beyond all of humanity to other species, to places, and to the biosphere itself.

Of course, egoistic, humanistic, and biospheric value orientations toward the environment are not incompatible; indeed, they may be related. We presume that many people's environmental attitudes reflect some combination of the three orientations.[3]

A MODEL OF ENVIRONMENTAL CONCERN

To investigate the links between value orientations and to assess the relationship of each to environmental behavior, we develop a model that extends the Schwartzian model. We presume that each value orientation predisposes people to be sensitive to information about certain outcomes (outcomes for things they value). In Schwartz's terms, behavior depends on awareness of consequences (AC) that are significant in terms of the value orientation. We refer to AC as a belief rather than an awareness, however, because the consequences lie in the future and may therefore not arise. Our general presumption is that people who believe an environmental condition has adverse consequences (AC) for things they value will be predisposed to take action. For someone with a strong social-altruistic orientation, a belief that an environmental condition has adverse consequences for other people will motivate proenvironmental behavior. In the same way, behavior can be triggered in someone with strong biospheric values by the belief that an environmental condition has adverse consequences for the biosphere or the nonhuman environment, and in an egoist by a belief that there may be adverse consequences for the self. We refer to these conditions as biospheric AC and egoistic AC, respectively. We consider motivation to act to be the product of beliefs about consequences for a valued object (AC) and the weight or importance of the value orientation toward that object (V), summed across value orientations:

$$M = V_{ego}AC_{ego} + V_{soc}AC_{soc} + V_{bio}AC_{bio},$$

where the subscripts ego, soc, and bio refer to egoistic, social-altruistic, and biospheric value weights (V) or consequences (AC). This equation has the form of a regression model in which the V terms are the regression coefficients when an index of motivation to act is regressed on measures of the three AC beliefs. In this study, we measure beliefs about consequences for self, others, and the biosphere with scales of survey items, use behavioral-intention statements as the index of motivation to act, and estimate the weights given to each value using re-

gression coefficients. Although the Schwartz model specifies that ascription of responsibility to self (AR) and personal norms mediate between AC and behavior, we do not measure the intervening variables in this study.

The model can also be expressed in the language of behavioral-decision theory. In this formulation, an individual believes an environmental condition has a set of consequences (AC) for valued things: personal well-being, social well-being, and the health of the biosphere. Each value (V) has a weight for each individual, and according to the axioms of decision theory, the utility of the environmental condition for the individual is described by the equation above. In economic analyses, utilities or preferences have the same theoretical status as the concept of motivation to act in psychology. Indeed, efforts to model preferences or utility functions often took a form similar to that which we are using. The demand for a good, service, or state of the world is regressed on its characteristics (defined objectively or in terms of respondents' perceptions or beliefs). The resulting coefficients represent the preference for or utility associated with those characteristics. Similarly in our model, the AC scales measure beliefs about states of the world and the regression coefficients for each AC estimate the preference or value assigned to those states.[4]

GENDER AND ENVIRONMENTALISM

Theoretical arguments linking gender to altruism or environmental attitudes often invoke or imply gendered differences in value orientations that can be investigated within the present theoretical framework. For example, Gilligan's work on women's moral development suggests that women may be more altruistic than men because of stronger socialization to consider the wishes of others (Gilligan, 1982).[5] In the terms of our model, the argument can be read in either or two ways: that women have a stronger altruistic value orientation than men (i.e., they are more concerned about and affected by consequences to oth-

ers), or that women are more aware than men of the consequences of events for others and are therefore more likely to develop beliefs about these consequences. The first reading would predict a relatively stronger correlation between social-altruistic AC and behavioral intention among women (compared with the correlation of behavior with egoistic or biospheric AC); the second reading would predict higher levels of awareness of human consequences (AC_{soc}) among women, but no difference in relative value orientations. Brody's (1984) examination of gender differences in attitudes toward nuclear power provides evidence consistent with the second reading. Using national survey data, he found that women are more concerned about safety issues of nuclear power (higher AC), whereas there is no evidence of gender differences in the effects of safety concerns on support for nuclear power (no difference in weights assigned to AC).

Some ecofeminist writings suggest that women are potentially more environmentalist than men because of a biospheric orientation (Diamond & Orenstein, 1990; Griffin, 1978; Merchant, 1979). This argument may also be read either as a claim that women assign greater weight to biospheric values ("care more" about the biosphere) or as a claim that women, possibly because they are more "rooted" in the natural environment, are more likely to become aware of the consequences of human activity for the biosphere. The theoretical literature is ambiguous or equivocal on this point.

We note in passing that such gendered differences in values need not be based on "essentialist" assumptions for which ecofeminist writers have been criticized (Biehl, 1991; Code, 1991; Eckersley 1992). Concern with others or the biosphere may well derive from cultural and social-structural factors rather than any innate, universal, or biological characteristics of women. It has been argued, for example, that women's relationship-centered moral views result from their subordinated or "minority" status and may therefore also be common among men from socially subordinated groups (e.g., Tronto, 1987). Data regarding race and social class in relation to environmental attitudes are

scarce, however. For a review of theoretical arguments and empirical evidence, see Mohai (1985). We presume that if gender differences in value orientations exist with regard to humanistic or biospheric altruism, they are more likely to derive from shared experience than innate differences.

In fact, the empirical research on gender and environmental concern does not report consistent findings (Arcury, Scollay, & Johnson, 1987; Blocker & Eckberg, 1989; Borden & Francis, 1978; Brody, 1984; McStay & Dunlap, 1983; Mohai, 1992; Schahn & Holzer, 1990), and a meta-analysis confirms these inconsistencies (Hines, Hungerford, & Tomera, 1986-1987). In some studies, women appear more concerned about the environment, whereas in others the gender relationship disappears or is reversed. Mohai's (1992) recent review suggests that women express more concern than men in local environmental issues and that the difference is smaller for national issues. He also notes that women are less likely than men to take political action to protect the environment. Research findings on gender and altruism are also inconsistent. See, for example, Austin (1979), Deaux and Major (1987), Mills, Pedersen, and Grusec (1989), and, for a meta-analysis, Eagly and Crowley (1986).

Our model offers a theoretical account that could make sense of such inconsistent findings. If there are gendered differences in value orientations or in the tendency to become aware of certain kinds of consequences, gender differences in environmental attitudes would vary with the actual or perceived consequences of particular environmental conditions, and therefore with the environmental problem. This line of argument is consistent with Blocker and Eckberg's (1989) discussion of "mother" and "father" effects, and the earlier statements of McStay and Dunlap (1983) and Hamilton (1985). Blocker and Eckberg report a "mother effect" in which women with children are substantially more concerned about local environmental problems than are men, and a "father effect" (initially reported by George and Southwell, 1986) in which men with children are more concerned with economic than environmental consequences. These effects suggest that having children may in-

crease parents' attentiveness to consequences bearing on their sex-typed roles in families: for mothers, concern for their children's health; for fathers, concern for the material well-being of the family.

Although such interpretations are not yet well supported, these findings and those of Brody (1984) suggest that it may be fruitful to look at gender effects within a model that allows us to asses whether men and women differ in the degree to which they hold beliefs about the consequences of environmental conditions for self-interest, other human beings, or nonhuman species or the biosphere, or in the weights they give to egoistic, social-altruistic, and biospheric values. A difference in beliefs may reflect gender differences in the degree to which individuals are attuned or attentive to information about particular consequences of environmental problems. A difference in the weight given those beliefs in choosing what actions to take implies a difference in the strengths of value orientations toward self, others, and the biosphere.

This article reports a limited test of our theoretical model. Using data from a sample of college undergraduates, we develop scales to measure beliefs about the consequences of pollution and environmental protection for self, others, and the biosphere. We then examine the relationship of these scales to three measures of action with regard to the environment—one that measures political action, and two measures of willingness to pay for improved environmental quality. Finally, we examine the relationship of gender to beliefs about consequences, to the three value orientations, and to behavioral intentions.

DATA AND METHODS

Data are from a systematic random sample of undergraduates at a large public university in northern New York State.[6] Table 1 reports the items used to form scales of beliefs about the consequences of environmental quality or environmental protection for the self, the welfare of others, and the biosphere, as well as the items on the scale of political action. Responses

TABLE 1
Items Used in Belief and Behavioral-Intention Scales

	Mean	SD	*Loading*	*Theta*
Belief in consequences for self (AC_{ego})				.66
Protecting the environment will threaten jobs for people like me	1.66	.65	−.78	
Laws to protect the environment limit my choices and personal freedom	1.87	.64	−.77	
A clean environment provides me with better opportunities for recreation	3.39	.56	.77	
Belief in consequences for others (AC_{soc})				.62
We don't need to worry much about the environment because future generations will be better able to deal with these problems than we are	1.36	.56	−.72	
The effects of pollution on public health are worse than we realize	3.25	.67	.77	
Pollution generated here harms people all over the earth	3.30	.56	.77	
Belief in consequences for the biosphere (AC_{bio})				.56
Claims that current levels of pollution are changing the earth's climate are exaggerated	1.69	.72	−.64	
Over the next several decades, thousands of species will become extinct	3.15	.65	.81	
The balance of nature is delicate and easily upset	3.21	.63	.73	
Political Action				.77
I would participate in a demonstration against companies that are harming the environment	2.80	.82	.79	
I would contribute money to environmental organizations	3.02	.68	.84	
I would sign a petition in support of tougher environmental laws	3.34	.63	.79	
I would take a job with a company I knew was harming the environment	2.03	.72	−.66	

to all items were on 4-point Likert-type scales with categories *strongly disagree, disagree, agree,* and *strongly agree.*[7] The scales were constructed using Armor's (1974) theta scaling procedure. The reliabilities of the AC scales are only moderate, which is not surprising given the small number of items available to construct each scale. Despite measurement error, however, the analysis shows that the scales have significant predictive power.

The political-action scale measures willingness to take four kinds of political action for environmental protection. The two additional measures assess willingness to pay: "How many extra dollars per year in income tax would you be willing to pay if you knew the extra money would be spent to protect the environment?" and "How much increase in gasoline prices, in cents per gallon, would you be willing to pay if the money was spent to protect the environment?" To analyze the willingness-to-pay items, we added $0.50 and $0.005, respectively, to each response to recode "zero" responses, and then used the natural logarithm of the recoded value to minimize skew in the distribution.

Our theory implies a regression model. We have analyzed it using ordinary least squares. A stochastic regressor or hierarchical model might better reflect our theoretical model, but more traditional techniques seem appropriate for this exploratory effort. Standard diagnostics suggest no problems with outliers in either carriers or residuals and a reasonable degree of normality in the estimated residuals (Dietz, Frey, & Kalof, 1987; Dietz, Kalof, & Frey, 1992). The level of collinearity in the model is moderate.[8] We interpret a statistically significant regression coefficient linking a belief scale to a behavioral intention measure as evidence of an effect of belief on behavioral intention, or to put it another way, as evidence of a nonzero weighting of the relevant value orientation. (The model treats each value orientation as the coefficient of association between behavioral intention and belief about a type of consequence of environmental conditions.) We test hypotheses about gender differences in AC beliefs by regressing the belief scales on gender, a procedure equivalent to a difference of means test. We test the

TABLE 2
Scale Intercorrelations

	AC_{ego}	AC_{soc}	AC_{bio}	*Political Action*	*Gas Tax*
AC_{ego}					
AC_{soc}	.57				
AC_{bio}	.43	.60			
Political action	.57	.59	.52		
Gas tax	.25	.23	.22	.39	
Income tax	.32	.26	.27	.40	.42

TABLE 3
Regressions of Behavioral-Intention Scales on Belief Scales

	Political Action Scale	*Income Tax*	*Gasoline Tax*
AC_{ego}	0.316**	0.419**	0.204*
AC_{soc}	0.270**	0.089	0.133
AC_{bio}	0.219**	0.280*	0.153
Intercept	–0.014	3.824**	1.631**
R square	0.458	0.122	0.078

*–$p < .05$; **–$p < .01$.

hypothesis of gender differences in the value weights by allowing the regression coefficients for each AC belief to differ between men and women and testing for significance of interaction effects.

RESULTS

Table 2 presents the intercorrelations of all the measures we developed in the study. Tables 3 to 5 report the results of regressions.

MODEL OF ENVIRONMENTAL CONCERN

Table 3 shows that belief in each of the three types of consequences significantly predicts willingness to take political action regarding the environment when other beliefs are statisti-

cally controlled, despite moderate collinearity among the scales and the measurement error in each. This finding is consistent with the Schwartz model, but implies that beliefs about consequences for self or for the biosphere, and not only about consequences for others, can motivate action on environmental issues. It supports our model of environmental concern as dependent on all three value orientations.

The regression equations for willingness to pay, however, have different implications. Prediction of willingness to pay via either gasoline or income taxes is much weaker than for political behavior. In each case, willingness to pay is significantly predicted by egoistic AC. Biospheric AC provides some explanatory power with regard to willingness to pay increased income taxes, but not gasoline taxes.

Nothing in our model of environmental concern, nor in other theoretical work in the literature, suggests that behavioral intentions toward a single attitude object should have a different value base for different behaviors.[9] We believe the most likely explanation lies in the possibility that different survey items—in this case, different behavioral intention items—focus the respondents' attention selectively on different value orientations, thereby affecting responses (Dietz & Stern, 1992). We hypothesize that because three value orientations coexist in respondents and may all influence behavior (as indicated by the data on political behavior), individual action may depend on the belief or value set that receives attention in a given context. Cialdini (Cialdini, Kallgren, & Reno, 1991; Cialdini, Reno, & Kallgren, 1990) has demonstrated a number of "focus effects" of this type in experimental settings. We hypothesize that in a survey, questions about intended political action draw respondents' attention to whatever values spur them to political action on the issue in question—and in environmental politics, the public debate suggests that each of the three value orientations may be involved. Questions about willingness to pay draw respondents' attention to the things on which they spend money, and these things are more likely to pertain to their well-being than to social-altruistic or biospheric values. If this argument is

correct, a willingness-to-pay question has the effect of focusing attention on the egoistic value orientation.

Our argument is similar to one recently advanced in the literature on contingent valuation surveys, a method of assessing preference that relies on willingness-to-pay questions.[10] Irwin et al. (in press) found that respondents' preference orderings were different as a function of the way willingness-to-pay questions were asked. People who were asked to give the dollar prices they were willing to pay to reduce local air pollution and to buy a higher quality camera (they saw pictures of two Denver cityscapes and two cameras) offered more money for the camera. The preference ordering was reversed when people were asked whether they would pay more for the improved air quality or the improved camera. Gregory et al. (1992) interpret the findings in terms of cognitive heuristics. The compatibility effect (Slovic, Griffin, & Tversky, 1990) is an overreliance on attributes that are scaled in the same units as the response: Consumer goods are normally scaled by prices, but air quality is not, so the nonmonetary values of air quality tend to be ignored when people are asked to evaluate it in terms of money. However, when people are asked whether better air quality or an improved camera is worth more to them, they are implicitly asked to marshal arguments for their choices: In this frame, there are many good reasons to favor air quality.

Our findings and those of Irwin et al. (in press) support the argument we have made elsewhere (Dietz & Stern 1992), that the focus concept has important implications for interpreting expressions of preference, such as on contingent valuation surveys. Techniques of contingent valuation direct individuals to focus on a monetary calculus for evaluating goods and services. They may thereby give a skewed impression of preferences or at the least, a systematically different impression from what would emerge from other measurement techniques. We hypothesize that questions about behaviors that involve financial commitments focus attention on an economic calculus, and thus elicit an egoistic value orientation to a greater degree than general behavioral questions. We expect that in general, biospheric

TABLE 4
Regressions of Behavioral Intentions on Gender and Belief Scales

	Political Action Scale		*Income Tax*		*Gasoline Tax*	
Gender	0.511**	0.174	0.744**	0.453	0.427*	0.246
AC_{ego}	—	0.326**	—	0.427**	—	0.218*
AC_{soc}	—	0.262**	—	0.019	—	0.066
AC_{bio}	—	0.178**	—	0.289*	—	0.162
Intercept	–0.281**	–0.098	3.381**	3.543**	1.334**	1.434**
R square	0.062	0.461	0.034	0.134	0.020	0.085

*–$p < .05$; **–$p < .01$.

TABLE 5
Regressions of Belief Scales on Gender

	AC_{ego}	AC_{soc}	AC_{bio}
Gender	.470**	.511**	.278*
Intercept	.264**	–.268**	–.152
R square	.050	.064	.017

*–$p < .05$; **–$p < .01$.

and social-altruistic values will be more predictive of nonfinancial measures of behavioral intent, whereas egoistic values will explain more variance in willingness-to-pay items.

GENDER EFFECTS

Tables 4 and 5 examine the effects of gender on political action and the willingness-to-pay items. In each case, gender has a significant total effect, with women taking a more pro-environment stance. But when the three beliefs are controlled, the effect of gender drops substantially and is not significant. Table 5 indicates that gender is strongly related to each of the three beliefs. Thus the model provides a mechanism for interpreting the effects of gender on environmental action. Women tend to see environmental quality as more likely than men to have consequences for personal well-being, social welfare, and the health of the biosphere. When these gender-differentiated belief systems are taken into account, there is no remaining direct effect of gender on either political action or willingness to

pay. These findings support the interpretation that when women are more active on environmental issues, it is because of an increased likelihood to make connections between environmental conditions and their values, rather than because they have different value structures from men. The regression analysis in Table 4, as well as an analysis-of-covariance *F* test for gender differences in the slopes relating the belief scales to the dependent variables, indicates that there are no significant gender differences in the weights given each belief.[11]

DISCUSSION

Our theory is an attempt to integrate three themes in research on environmental concern. The first, and oldest, is the theme of environmentalism as altruism. We expand the Schwartz norm-activation model, which treats environmental concern as altruism toward other human beings, to incorporate both self-interest, or egoism, and concern with other species or the biosphere itself. By allowing the possibility that biospheric values may influence behavior, we integrate the Schwartz model with the ideas of Dunlap and others about environmental worldviews. In essence, we argue that environmental concern in the United States has three distinguishable, although correlated, components—self-interest, concern with others, and concern with other species or natural environments.

In our sample, all three types of beliefs have some influence on expressed willingness to take political action. But as suggested by focus theory, the effects of beliefs about consequences beyond the self are much weaker when we ask about willingness to pay taxes to protect the environment—questions that draw attention to the monetary, and thus egoistic, aspects of environmental problems. Some of the anomalies in contingent valuation research and the apparent inconsistencies in the literature on environmental concern may be the result of such focus effects. Different sets of environmental attitude or preference questions draw attention to different value frames and yield differing degrees of measured environmental concern.

It may be that egoistic, social-altruistic, and biospheric orientations represent points on a dimension of moral scope or breadth of moral concern. Such is an implication of the kin-selection approach to cultural evolution, which suggests that concern and altruism are a function of closeness of blood kinship. Or it may be that the orientations compete, as is suggested by the criticisms of environmentalists as lacking concern about people. These are empirical issues. The moderate positive correlations we find among AC beliefs suggest that in the area of environmental perception, the value orientations may be part of a single perceptual package. Disentangling the relationships among them will require more sophisticated analysis than that performed here.

Gender is the third theme integrated into our work. We provide a social-psychological model for understanding gender differences in environmental concern. Women may hold different beliefs than men about the consequences of environmental conditions and/or they may assign different value weights to each type of consequence. We find that in our student sample gender differences in environmentalism are the result of gender differences in beliefs about the effects of environmental problems. Women apparently are more accepting than men of messages than link environmental conditions to potential harm to themselves, others, and other species or the biosphere. We find no substantial male-female differences in the value weights assigned to those beliefs, however. Our findings are consistent with the argument in feminist theory that women tend to see a world of inherent interconnections, whereas men tend to see a world of clearly separate subjects and objects, with events abstracted from their contexts. That argument suggests that men might be less attentive than women to links between the environment and things they value, even if men and women hold the same values.

Our approach suggests that socialization and social structure can shape individual environmental concern either by affecting value orientations or by altering individuals' attentiveness to information. Our results suggest that gender differences involve

the latter mechanism. The mother and father effects that have been identified in the literature on gender and environmental concern may depend on such differential awareness. Becoming a parent increases attention to information about things that may affect one's children's well-being; gender socialization may lead women to focus on children's health, and men on children's economic well-being, with opposite effects on environmental concern.

The model also suggests a mechanism for understanding age, period, and cohort differences in environmental concern (Dunlap, 1991; Van Liere & Dunlap, 1980). We suspect that beliefs about the effects of environmental conditions on the self, others, and the biosphere or other species, because they depend to a great degree on secondhand information and are not tightly linked to self-identity, should be changeable on the basis of new information. In contrast, the values that can turn these beliefs into action are much less mutable. Thus we hypothesize that differences in beliefs about the consequences of environmental conditions may be largely period effects based on changing publicity about the consequences of environmental change for the self, others, and the biosphere. In contrast, differences in value orientations are more likely to reflect cohort effects that come about from differences in early socialization and the shared formative experiences of cohorts. Age effects are likely to involve both value differences rooted in formative experience and changes in beliefs resulting from different information. This line of thinking implies that the same scientific information will affect environmental concern differently for different cohort and age groups.

Here we have not discussed in any detail how individual concern is shaped by macro factors, such as social movements and political-economic forces. In earlier articles (Dietz et al., 1989; Stern et al., 1986), we have sketched some links between individual beliefs and values and these macro forces, and examined how policy actors attempt to shape public attitudes by molding problem definitions. These processes both influence environmental beliefs and focus attention selectively on certain values,

and in this way are conformable with our social-psychological model.

Of course, the present results are quite preliminary. Further empirical work is needed to see if these results generalize to more diverse and representative populations. Further methodological work is needed to improve the measurement of beliefs and the measurement and estimation of value orientations. Further theoretical work is needed to clarify the ways scientific knowledge, political-economic forces, social movements, and the processes of public discourse link to individuals' environmental concerns and to integrate a more complete model with a broader social-psychological theory.

NOTES

1. Theories of genetic kin selection and reciprocal altruism suggest that the calculus of self-interest may include consideration of others when they are either close kin or when repeated contacts make reciprocity likely (Hamilton, 1964; Trivers, 1971). In addition to these approaches grounded in sociobiology, some theorists have suggested that altruism benefits the altruist through mechanisms such as joint utility functions (Arrow, 1963, 1975; Buchanan, 1954) or internal rewards (Cialdini et al., 1987; Schaller & Cialdini, 1988). For the purposes of our analysis, these intangible internal rewards still produce behavior that is altruistic in the sense that the material or instrumental costs to the altruist outweigh her or his material or instrumental benefits, while providing benefits to others. The model we develop is consistent with these arguments that all altruism is at some level egoistic, as well as with Schwartz's model. Contrary to many assumptions of sociobiology and rational-choice theory, recent work on cultural evolution demonstrates that the interests of individuals and the collectivity often may coincide and that under a variety of plausible conditions altruism may persist and spread in a culture (Boyd & Richerson, 1985, chap. 7; Dietz & Burns, 1992; Dietz, Burns, & Buttel, 1990; Simon, 1990).

2. Even in NIMBY protests, free rider problems may occur (Walsh & Warland, 1983). But because NIMBY protests by definition deal with localized issues, the free rider problem is much less severe at the local level than in national or international environmental problems. Note, however, that some participants in NIMBY protests base their actions on more than self-interest.

3. The same is true of environmental-movement organizations. The Greens and the "new environmental movement" that predated them in the seventies in the United States are strongly concerned with issues of social justice that are a mark of the social-altruistic value orientation. Critics of the environmental movement on the left, however, have until recently vilified environmentalists for "caring more about whales

than poor people," suggesting that the targets of their attacks hold only biospheric and not social-altruistic values. Some of the rhetoric of Earth First! and other militant groups does suggest a limited concern for people compared to the biosphere. Still, the preponderance of environmental organizations and of the environmentally concerned probably hold both social-altruistic and biospheric concerns. For example, Jasper and Nelkin's (1991) account of the animal rights movement indicates that only one branch of the movement, which they label "fundamentalist," would afford animal welfare a strict equivalence with human welfare, and thus give equal or greater weight to biospheric than to social-altruistic concerns.

4. Of course, it would be possible to use a psychometric approach and develop scales that measure preference or value orientation directly. Further work might move in this direction. The regression approach we use offers the advantage of linking to a standard approach in decision theory. In addition, because our model posits that values are weights assigned to a type of consequence, direct measurement of the values would lead to a multiplicative model, which would greatly increase the effects of measurement error and make statistical estimation more difficult.

5. The same conclusion can also be derived from genetic and cultural models of egoism and altruism, both of which accept that individuals act altruistically toward close kin. Because many environmental threats are long-term and may have greater effects on future generations than on contemporary adults, and because children are more susceptible to many environmental toxins, parents may be more environmentally concerned than nonparents. Further, mothers, who typically are more intimately involved in childraising than fathers, might also be more sensitive to environmental threats to their immediate families. This awareness may provide a causal mechanism for Gilligan's observation of women's greater concern for the other in making moral judgments. In our terms, such concerns with one's children might easily generalize to concern with other children and with other humans. That is, concerns with family might be precursors to humanistic altruism. This point is raised by Hamilton (1985) and by Blocker and Eckberg (1989).

6. The initial sample was of 553 undergraduates, of whom 349 returned usable surveys, for a response rate of 63%. The survey was conducted by mail in the fall of 1990. The Dillman (1978) protocol with an initial mailing and two follow-up mailings was used to minimize nonresponse.

7. College students tend to exhibit high levels of concern about the environment, and our sample is no exception, as is obvious from the small coefficient of variation for most items used in scaling. The limited variance on most items undoubtedly reduces the reliability of the scales. The high degree of skewness on the items suggests it would not be appropriate to use inferential methods, such as confirmatory factor analysis, in constructing scales. When observed variables are ordinal, polychoric correlations are generally considered the most robust measure of association (Jöreskog & Sörbom, 1988; Olsson, 1979), but the use of these correlations assumes that the latent variables underlying the observed variables have a bivariate normal distribution. An analysis of the 36 polychoric correlation coefficients linking our nine AC indicators leads to rejection of the null hypothesis of bivariate normality at the 0.01 level for two thirds of the pairs. Thus, in this exploratory study we have not applied inferential scaling methods. We believe the content and construct validity of the scales, combined with their moderate reliability, justifies their use in this exploratory effort (Bollen, 1989, pp. 151-190). Note that measurement error in the independent variables in a regression has complex

effects, but in the simplest case the effect is to attenuate regression coefficients. Thus the statistically significant effects we find support our argument for distinct belief domains.

8. The R_2 values for the auxiliary regressions for models including the three belief scales and gender are 0.37, 0.53, 0.39, and 0.08 for egoistic AC, social-altruistic AC, biospheric AC, and gender, respectively.

9. There is an argument in the literature that environmentally relevant behaviors are predicted by beliefs and personal norms specific to the behavior (Black et al., 1985), but no such argument applies to the kind of general environmental beliefs and values measured here. The environmental-attitudes literature on gender often notes a distinction between local and general environmental issues. Such a difference could be based on value orientations, especially egoistic versus social-altruistic values.

10. The very substantial literature on contingent valuation is reviewed in Mitchell and Carson (1989) and Cummings, Brookshire, and Schulze (1986). The contingent valuation method is seen by advocates as providing a method of valuing public goods when markets do not provide an adequate mechanism for assigning value to them. The method has become very popular with environmental economists. Mitchell and Carson (1989, pp. 308-215) list 104 contingent valuation studies in their summary, and each month adds a few more studies or contributions to theory and methods. The method has been criticized on a number of grounds (discussion in Cummings, Brookshire, & Schulze, 1984; Dietz & Stern, 1992; Harris, Driver, & McLaughlin, 1989; Slovic, 1992).

11. The F values for a gender difference in belief slopes are 0.9 ($p = .44$), 2.3 ($p = .08$) and 1.7 ($p = .17$) for the political action, gasoline tax, and income taxes items, respectively. The interaction term for self-interest was significant at the 0.05 level in the regressions for the two tax items, with women giving less weight to self-interest than men, as is consistent with the ecofeminist literature. Because the overall F test for interaction effects was not significant, and because a Bonferroni correction for nine hypothesis tests (three interaction terms for each of three equations) suggests a test at the 0.0056 level, we do not discuss this effect further.

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