

**VALUES AND
PROENVIRONMENTAL BEHAVIOR
A Five-Country Survey**

P. WESLEY SCHULTZ

St. Lawrence University

LYNNETTE C. ZELEZNY

California State University, Fresno

AUTHORS' NOTE: We would like to thank Ernesto Bustamante, Octavio Chavez, David Barkin, Judith Deshotels, Ignacio Dobles, Leticia Ramos-Garza, Luis Iberico, Jim Kitts, Martiza Montero, Francisco Otero, Gustavo Pineda, Margot Aguilar Rivero, Tod Sloan, and Juan Carlos Wandemberg for their help and collaboration. We would like to thank Daniel Garcia, Rita Goldberg, Barbara Martinez, Margarita Cruz, and Dani Molliver for their help with translation. We would also like to thank Daniel Ennis and Daniel Gray for their assistance in developing and testing the survey, and Barbara Martinez and John Thomas for their assistance in data management. Portions of this article were presented at the meeting of the Society for the Psychological Study of Social Issues, June, 1996, Ann Arbor, Michigan. This project was funded by faculty research grants from St. Lawrence University and California State University, Fresno. Correspondence regarding this article should be addressed to P. Wesley Schultz, Psychology Program, California State University, San Marcos, CA 92096; e-mail: psch@mailhostl.csusm.edu.

There is growing realization around the world that humans are harming the natural environment. The air we breathe, the water we drink, and the land that sustains us are becoming increasingly overused, polluted, or otherwise destroyed (Allen, 1996; Milbrath, 1996). This realization is taking the form of a worldwide environmental movement that is intended to (a) heighten awareness about environmental problems and (b) change human behaviors to improve our sustainability (Milbrath, 1995; Olson, 1995). More than 30 years of research conducted in the United States has examined both the attitudinal and behavioral changes resulting from the environmental movement (e.g., Kempton, Boster, & Hartley, 1995; Pierce, Steger, Steel, & Lovrich, 1992; Schultz, Oskamp, & Mainieri, 1995). However, very little research has examined proenvironmental attitudes or behaviors in different countries. This article reports the results from a multinational study of values, norm-activation, and proenvironmental behavior.

For the past 25 years, psychologists have attempted to understand the factors that lead people to participate in environmental programs (Schultz et al., 1995). Research has examined demographics (e.g., age, gender, socioeconomic status, education, ethnicity, religion), attitudes, beliefs, and personality as predictors of environmental behavior (Oskamp, Burkhardt, Schultz, Hurin, & Zelezny, 1998; Schultz & Oskamp, 1996; Steel, 1996; Vining & Ebreo, 1990). This research has produced a long list of correlates found among U.S. samples, including age (negative), gender (female), education (positive), income (positive), general proenvironmental attitudes (positive), specific proenvironmental attitudes (positive), and locus of control (positive). Despite the established findings, the effect sizes in these studies are typically small, and because the area lacks a solid theoretical foundation, research results are fragmented and are not cumulative (Stem & Oskamp, 1987).

One source for useful theories of environmental behavior comes from the large psychological research literature on helping and altruism. *Helping* refers to any behavior intended to benefit another. We use the term *altruism* to refer to helping behavior motivated by an internal value and without the expectation of anything in return. Subsequently, we use the term *environmental altruism* to refer to behavior that is done to benefit the natural environment, motivated by an internal value, and without an expectation of anything in return. Viewing proenvironmental behavior as helping behavior leads to a variety of potentially useful predictors. In addition, theories of altruism offer the possibility of integrating the fragmented research findings into a more coherent and parsimonious understanding of who acts in a proenvironmental manner, in what circumstances, and for what reasons. One widely cited theory of helping is Schwartz's (1968, 1977; Schwartz & Howard, 1981) model of norm-activation. In this article, we examine the relationship between values and proenvironmental behavior within the context of Schwartz's norm-activation model, drawing on data from the United States, three Latin American countries, and one European country.

NORM ACTIVATION

Schwartz's norm-activation model predicts that an altruistic behavior is more likely to occur when a person is both aware of the harmful consequences (awareness of consequences) of his or her (potential) actions for others and when the person ascribes responsibility (**AR**) for these consequences to the self. In such circumstances, people develop a sense of moral obligation to act in ways that benefit rather than harm others. Applying this model, proenvironmental behavior can be viewed as an altruistic action that is motivated by an internalized moral norm

grounded in values concerned with the welfare of others. People who endorse such values and who are exposed to circumstances likely to activate norms based on them (i.e., they are aware of the harmful consequences of environmental damage to others and they ascribe responsibility for this damage to themselves) tend to act in a proenvironmental manner (other things being equal).

More recent work by Schwartz (1992, 1994) has gone beyond the welfare of others in an attempt to identify the domain of human values. A value is defined as "a belief pertaining to desirable end states or modes of conduct that transcends specific situations, guides selection or evaluation of behavior, people, and events, and is ordered by importance relative to other values to form a system of value priorities" (Schwartz, 1994, p. 20). Through several large-scale cross-cultural studies, Schwartz (1994) and his colleagues have developed an instrument to measure these universal values. Multidimensional scaling of the 56 items in Schwartz's scale has shown that these items measure 10 distinct value types that are organized along two dimensions: self-transcendence/self-enhancement and openness to change/conservation. Self-transcendence is an orientation toward the welfare of others, whereas self-enhancement is an orientation toward self-interests. Openness to change reflects the degree to which a person is motivated to follow his or her own emotional and intellectual interests, whereas conservation reflects a motivation to preserve the status quo (Schwartz, 1992).

Stem, Dietz, and Kalof (1993) argued that the value orientation toward the welfare of others is only one of several possible values that lead to proenvironmental behavior. Other values that could lead to environmental action are those that are based on the harmful consequence of environmental damage for self (termed egocentric) and those based on the harmful consequences that environmental damage will have for all living things

(termed biocentric). As Stern et al. (1993) state:

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....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....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. (pp. 326-327)

In essence, Stern et al. (1993) are proposing three distinct value bases for environmental behaviors.

NORM-ACTIVATION, VALUES, AND PROENVIRONMENTAL BEHAVIOR

Several studies have examined the applicability of the norm-activation model to proenvironmental behavior (Black, Stern, & Elworth, 1985; Fuhrer, 1995; Guagnano, 1995; Guagnano, Dietz, & Stern, 1994; Hopper&Nielsen, 1991; Noe, Hull, & Wellman, 1982; Stern, Dietz, & Black, 1986; Stern, Dietz, & Guagnano, 1995; Van Liere & Dunlap, 1978). Overall, these studies have tended to support the norm-activation model. One of the first studies to examine the relationship between norm-activation and proenvironmental behavior tested the relationship between awareness of consequences, ascribed responsibility, and yard burning behavior (Van Liere & Dunlap, 1978). The results from a telephone survey of 307 U.S. residents was consistent with Schwartz's norm activation model-there was a significant interaction between awareness of

consequences (AC) and ascribed responsibility (AR) in the prediction of yard burning. For respondents high in AC and high in AR, only 16.7% reported burning, whereas 35.4% of respondents low in both AC and AR reported burning. For respondents high in AC and low in AR, 42.9% reported burning, and for respondents low in AC and high in AR, 26.3% reported burning.

More recent research has found additional support for Schwartz's model. Stern, Dietz, Kalof, and Guagnano (1995) conducted telephone interviews with 199 randomly selected adults in Fairfax, Virginia. Values were measured with items selected from Schwartz's dimensions of self-transcendence, self-enhancement (four items), openness (four items), and conservation (nine items). Stern, Dietz, Kalof, et al. (1995) proposed that each of the three value-based sets of environmental concerns could be measured with selected items from Schwartz's (1992, 1994) value items. The egoistic orientation was measured with items from self-enhancement; the social altruistic orientation was measured with items from self-transcendence that were specific to other people; the biospheric orientation was measured with items from self-transcendence that were specific to the natural environment. Behavior was measured with self-reported intentions, and a scale was constructed by averaging four Likert-type rated items about willingness to take proenvironmental action. Regression analyses revealed a significant positive relationship between biospherism (i.e., the value items from self-transcendence that are specific to the natural environment) and proenvironmental behavior but nonsignificant relationships for the other value orientations.

Similar results were found by Karp (1996) in a study of 302 U.S. undergraduates. Values were measured using all 56 of Schwartz's value-items, and environmental behaviors were measured using self-reported frequency of participation in eight environmental activities. A factor

analysis revealed four value factors that corresponded to each quadrant of Schwartz's model: self-transcendence/conservation, self-transcendence/openness to change, self-enhancement/openness to change, and self-enhancement/conservation. As predicted, the self-transcendence/openness to change factor was significantly positively related to self-reported environmental behaviors. None of the other three value dimensions correlated with proenvironmental behavior. These findings suggest that values, particularly the nature items within self-transcendence, play an important role in determining environmentally responsible behavior. However, all of the available evidence comes from U.S. samples. The multinational research on environmentalism that has been published to date has tended to focus on environmental attitudes (e.g., Dunlap, Gallup, & Gallup, 1993; Dunlap & Mertig, 1995; Noe & Snow, 1990; Schultz & Zelezny, 1996), with a few exceptions (e.g., Levy-Leboyer, Bonnes, Chase, Ferreira-Marques, & Pawlik, 1996). The present study was designed to examine the relationship between values and proenvironmental behavior in different countries and to examine the relationship between values of self-transcendence and proenvironmental behavior with respect to norm-activation.

A conceptual diagram of the norm-activation model is presented in Figure 1. The figure shows values (e.g., a concern for self-enhancement, a general concern for the welfare of others, a concern for the welfare of all living things) leading to proenvironmental behavior. This link is moderated by AC and AR. We predicted a positive relationship between self-transcendence values and self-reported proenvironmental behavior across cultures. We also expected, consistent with the norm-activation model, that this relationship would be stronger among individuals who were high in AC and AR, regardless of culture.

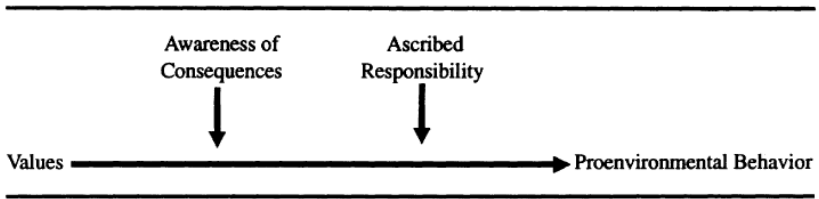


Figure 1: Schematic Model of Norm-Activated Proenvironmental Behavior

METHODOLOGY

Participants in the study were undergraduates at colleges and universities in the United States, Europe, and Latin America. Survey data were collected from college students in Mexico ($n = 187$), Nicaragua ($n = 78$), Peru ($n = 160$), Spain ($n = 187$), and the United States ($n = 345$). Spanish-speaking countries provide a diverse population along many dimensions and have been traditionally underrepresented in the research literature (Sloan, 1990; Triandis, 1990; for an exception, see Obregón-Salido & Corral-Verdugo, 1997). A comparable sample of English-speaking U.S. undergraduates was also obtained. All of the respondents were college undergraduates residing in large metropolitan areas. To help produce a comparable sample across countries, all students were enrolled in social/behavioral science courses (e.g., economics, sociology, or psychology).

MATERIALS

A four-page questionnaire was developed to measure values, self-reported proenvironmental behaviors, awareness of the consequences of environmental damage, ascribed responsibility for environmental damage, environmental attitudes, and demographics. Self-reported environmental behaviors were measured using Likert-type scale ratings of past behavior. Respondents were asked to rate how often they had performed several behaviors. The

behaviors were selected because they have appeared in U.S. research as environmentally responsible, and they included recycling, energy conservation, water conservation, purchasing environmentally safe products, and using public transportation. The frequency of each behavior was rated as daily, weekly, monthly, or never.

AC was measured using the revised New Environmental Paradigm Scale (NEP; Dunlap, Van Liere, Mertig, & Howell, 1992). The revision of the widely used NEP (Dunlap & Van Liere, 1978) contains 15 items, 7 of which are reverse coded. Responses were made on a 5-point Likert-type scale. The scale is often used as a measure of general proenvironmental attitudes. Recent work by Stern, Dietz, and Guagnano (1995) has demonstrated that the NEP is an environmentally related measure of AC. Examples of items from the scale include "Humans are severely abusing the natural environment" and "If things continue on their present course, we will soon experience a major ecological crisis." Stern, Dietz, and Guagnano (1995) reported a correlation coefficient of $r = .78$ between scores on the NEP and a general awareness of consequences scale.

AR was measured with a single Likert-type scale question. The question asked "How responsible are you for environmental problems?" Responses were extremely, moderately, slightly, or not at all responsible.

The survey also included items from Schwartz's Values Survey (Schwartz, 1992, 1994). Because of space constraints, all 56 items were not used. Instead, four items were selected from each of the 10 value types identified by Schwartz. Items were selected based on the empirical locations of each value in regions generated from a series of smallest space analyses (Schwartz, 1994). We selected items with the greatest frequency of occurrence in each of the 10 primary regions, such that the selected items were those that emerged most often in the appropriate value-type region in 97 independent samples from 44 countries reported by Schwartz (1994, Table 3). Two of the value regions (stimulation and hedonism) are composed of less than four items, and all of the items were included from these scales. This selection process resulted in

37 items. Respondents rated each of the value-items "as a guiding principle in my life" from 0 (*not important*) to 7 (*extreme importance*). Values to which the respondent was opposed were scored -1. The items used in the survey, the 10 value-types, and the four higher order constructs are presented in Table 1.

Demographic measures included gender, age, social class, and strength of religious beliefs. Social class was measured with the question, "Relative to the people in your country, would you say that your family is:" and responses ranged from 1 (*lower class*) to 10 (*upper class*). Education was measured as the number of years of school completed since the age of 5. Strength of religious beliefs was rated on scale from 1 (*weak*) to 10 (*strong*).

The survey was translated into Spanish using a back-translation procedure.¹ Modifications were made to the Spanish items to equate them with the English version. The Spanish survey was pilot tested with five fluent Spanish speakers from different Latin American countries, and the English version was pilot tested with 25 U.S. undergraduates. A version of the survey was also sent to the collaborators in each country who provided suggestions for clarifying the items.

Table 1: Items From Schwartz's Values Survey

<i>Self-Transcendence</i>	<i>Self-Enhancement</i>	<i>Openness</i>	<i>Conservation</i>
Universalism	Power	Self-direction	Tradition
Protecting the environment ^a	Social power	Creativity	Devout
A world of beauty ^a	Authority	Curious	Humble
Unity with nature ^a	Wealth	Freedom	Moderate
Broad-minded ^b	Preserving my public image	Choosing own goals	Respect for tradition
Benevolence	Achievement		
Helpful ^b	Successful	Stimulation	Conformity
Honest ^b	Capable	Daring	Politeness
Forgiving ^b	Ambitious	A varied life	Honoring parents and elders
Loyal ^b	Influential	An exciting life	Obedient
		Hedonism	Self-discipline
		Pleasure	Security
		Enjoying life	Clean
			National security
			Social order
			Family security

SOURCE: Schwartz (1994)

a. Items used to measure self-transcendence (nature).

b. Items used to measure self-transcendence (general).

DESIGN AND PROCEDURE

A network of contacts at universities in Costa Rica, Mexico, Nicaragua, Peru, Spain, and Venezuela was developed for this study. In addition, a sample of U.S. undergraduates was obtained from four states: California, Minnesota, New York, and Utah. Each contact received a packet containing between 50 and 200 surveys, depending on the number of students with whom they interacted. Each contact distributed, collected, and returned the surveys. A total of 1,525 surveys were mailed out, and 958 were returned. A large number of the unreturned surveys occurred in Costa Rica and Venezuela where 100 surveys were mailed to a contact in each country and none were returned.

Demographic characteristics of the sample from each country are summarized in Table 2. These measures showed small variations across countries, but overall they were quite similar. The Mexican sample tended to be less female, higher social class, and more religious than the U.S., Peruvian, Nicaraguan, or Spanish samples, and the Spanish sample was more female than the other four. However, all the samples were relatively middle class, more than half female, moderately religious, highly educated, and young.

TABLE2**Demographic Characteristics of Sample From Each Country**

	<i>United States</i>		<i>Mexico</i>		<i>Nicaragua</i>		<i>Peru</i>		<i>Spain</i>	
	<i>(n =345)</i>		<i>(n =187)</i>		<i>(n =78)</i>		<i>(n=160)</i>		<i>n =187</i>	
<i>Behavior</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>
Gender (percentage female)	64	(.48)	52	(.49)	64	(.48)	68	(.47)	72	(.44)
Relative social class (10-point scale)	5.89	(1.74)	6.09	(1.61)	4.37	(1.92)	5.62	(2.57)	5.33	(2.75)
Strength of religious beliefs (IO-point scale)	5.92	(2.80)	6.30	(2.63)	6.62	(2.58)	5.85	(1.46)	5.30	(1.29)
Education(numberof years in school)	13.90	(2.47)	14.20	(2.90)	12.84	(1.79)	13.09	(3.45)	14.21	(3.00)
Age	21	(5.56)	24	(9.23)	21	(3.99)	26	(10.06)	23	(3.96)

RESULTS

The original New Environmental Paradigm (Dunlap & Van Liere, 1978) has been shown to have good internal reliability with U.S. samples. However, cross-cultural research has demonstrated difficulty in translating several of the items (Noe & Snow, 1990). Reliability coefficients for the 15-item revised scale were calculated separately for each country. The alpha coefficients were .50 for Mexico, .61 for Nicaragua, .37 for Peru, .58 for Spain, and .81 for the United States. An examination of the item-total correlations revealed that three items detracted from the scale. To ensure that scale scores were comparable, these items were excluded for all respondents.² The modified scale showed improved internal consistency with alpha coefficients of .58 for Mexico, .62 for Nicaragua, .50 for Peru, .64 for Spain, and .78 for the United States.

Schwartz's value items were collapsed into four measures: self-transcendence (8 items), self-enhancement (8 items), openness (9 items), and conservation (12 items). Alpha reliabilities for the four scales were calculated separately for each country. Alpha reliabilities for self-transcendence, self-enhancement, openness, and conservation in Mexico were .69, .78, .72, and .77, respectively. In Nicaragua, the reliabilities were .66, .70, .69, and .82, respectively. In Peru, the alpha reliabilities were .60, .83, .68, and .86, respectively. In Spain, the reliabilities were .79, .85, .57, and .86, respectively. In the United States, the alpha reliabilities were .76, .80, .75, and .87, respectively.

Self-transcendence was assessed with four items drawn from universalism and four items from benevolence. These items were selected to assess the range of possible values that compose self-transcendence. However, three of the four values (a world of beauty, unity with nature, environmental protection) selected from universalism are particularly relevant to environmental issues. These items reflect a

nature subtype of self-transcendence values and measure what Stern and Dietz (1994) have labeled biosphericism. It seems likely that biospheric values will be more predictive of environmental behavior than self-transcendence in general. To address this issue, the eight self-transcendence items were divided into two separate variables: self-transcendence (nature) and self-transcendence (general). The self-transcendence (nature) variable consisted of the three nature items—a world of beauty, unity with nature, and environmental protection. The self-transcendence (general) measure consisted of the remaining five self-transcendence items: broad-minded, helpful, honest, forgiving, and loyal. Alpha reliabilities for the three nature items were .62 in Mexico, .62 in Nicaragua, .53 in Peru, .62 in Spain, and .76 in the United States. Alpha reliabilities for the five self-transcendence (general) items were .50 in Nicaragua, .55 in Mexico, .52 in Peru, .78 in Spain, and .63 in the United States.

Environmental behaviors were assessed with five self-report questions about the frequency that the respondent engaged in various proenvironmental behaviors: recycling, using public transportation, conserving energy, conserving water, and making a special effort to purchase products that are environmentally friendly. Responses were made on a 4-point scale: *daily* (4), *weekly* (3), *monthly* (2), *never* (1). Means and standard deviations for each environmental behavior, calculated separately by country, are listed in Table 3. An omnibus multivariate analysis of variance was used to test for country-level differences in reported behavior. The results from this analysis indicated a significant difference between the five countries, Pillais $F(20, 3564) = 31.88, p < .001$. Univariate analyses revealed significant differences across countries on each of the five behaviors: recycling, $F(4, 892) = 34.63, p < .001$, using public transportation, $F(4, 892) = 214.77, p < .001$, water conservation, $F(4, 892) = 4.15, p < .01$, energy

conservation, $F(4, 892) = 3.45, p < .01$, and purchasing environmentally safe products, $F(4, 892) = 3.95, p < .01$. Tukey's HSD post hoc tests were used to examine differences across countries on each measure, and significant differences are shown in Table 3.

A composite behavioral scale was generated by averaging the five environmental behavior items, and a reliability analysis was performed separately for each country. In the United States, none of the items detracted from the scale and the alpha reliability was .67. However, in Spain, Mexico, Nicaragua, and Peru, using public transportation detracted from the scale. This item was dropped, and the alpha reliabilities were recalculated separately for each country. The resulting alpha values were Mexico, .54; Nicaragua, .52; Peru, .58; Spain, .62; and the United States, .63. Scores on these four items were averaged to produce a composite measure of environmental behavior.

Table 3
Self-Reported Proenvironmental Behaviors Across Cultures

	<i>United States</i>		<i>Mexico</i>		<i>Nicaragua</i>		<i>Peru</i>		<i>Spain</i>	
	<i>(n =345)</i>		<i>(n =187)</i>		<i>(n =78)</i>		<i>(n=160)</i>		<i>n =187)</i>	
<i>Behavior</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>
Recycling	2.91	(1.04) ^a	2.34	(1.21) ^b	1.55	(.97) ^c	2.00	(1.25) ^d	2.37	(1.00) ^b
Public transportation	1.67	(.91) ^a	2.76	(1.18) ^b	3.85	(.49) ^c	3.57	(.95) ^c	3.76	(.74) ^a
Conserve water	3.01	(1.12) ^a	3.33	(1.05) ^b	3.18	(1.18)	3.43	(.99) ^b	3.11	(1.25)
Conserve energy	3.31	(1.00)	3.39	(.97)	3.42	(1.04)	3.48	(.93)	3.10	(1.21)
Purchase safe products	2.34	(1.02) ^a	2.57	(1.12)	2.58	(1.21)	2.54	(1.10)	2.70	(1.09) ^b

NOTE: Means with differing superscripts are statistically different at $p < .05$, Tukey's HSD. Responses were made on a 4-point scale: *daily* (4), *weekly* (3), *monthly* (2), *never* (1).

PREDICTORS OF PROENVIRONMENTAL BEHAVIOR

The composite measure of proenvironmental behavior was correlated with values, awareness of consequences, and ascribed responsibility. These relationships were examined separately for each country. To control for individual differences in the use of the values response scale, each person's mean value rating was used as a covariate. Mean value ratings were produced by averaging the responses to all 37 of the value items used in the questionnaire. Partial correlation coefficients were calculated between each of the predictors and self-reported proenvironmental behavior, controlling for the mean value response. These partial coefficients are shown in Table 4. The results from these analyses show, in general, a positive relationship between self-transcendence (nature) and proenvironmental behavior. Results for the self-transcendence (other) scale showed a significant positive effect only among the U.S. sample. In addition, self-enhancement was found to correlate negatively with proenvironmental behavior in four of the five samples. Other correlation coefficients, including scores on the NEP, showed an inconsistent pattern across countries.

To assess the unique predictive ability of each variable, along with the moderating effects of AC and AR, a series of multiple regression analyses were calculated separately for each country.

TABLE 4

Partial Correlation Coefficients Between Each Predictor and Self-Reported Proenvironmental Behavior, Controlling for the Mean Value Rating

	<i>Country</i>				
<i>Mexico</i>	<i>Mexico</i>	<i>Nicaragua</i>	<i>Peru</i>	<i>Spain</i>	<i>United States</i>
<i>Predictor</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>
Self-transcendence (nature)	.18***	.26**	.14*	.28*** *	.36****
Self-transcendence (general)	.04	.08	.01	.07	.14**
Self-enhancement	-.17**	-.30***	-.01	-.21***	-.25****
Openness	.16**	.06	.15*	.00	.15***
Conservation	-.07	.05	-.07	-.06	-.17***
NEP(AC)	.17**	.11	.01	.13*	.32****
Responsibility (AR)	.14**	.12	.00	.40*** *	.29****

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

The independent variables were entered into the regression equation sequentially following the conceptual model presented in Figure I-values, attitudes (i.e., AC and AR), and the multiplicative¹ variables used to test the norm-activation model. First, the value scores were entered sequentially into the equation: self-transcendence (nature), self-transcendence (general), self-enhancement, openness, conservation. Next, the NEP scale (AC) scores and responses to the item about AR were entered into the equation. Following these variables, three two-way multiplicative variables (AC x Self-transcendence [nature], AR x Self-transcendence [nature], and AC x AR) were entered into the equation. Finally, the three-way (AC x AR x Self-transcendence

¹ Following Pedhazur (1997), we prefer to call the product effects of nonmanipulated variables multiplicative rather than an interaction

[nature]) multiplicative variable was entered into the equation. The results from these five analyses are summarized in Table 5. The table shows the multiple R at each step of the analysis and the outcome from a significance test for the change in R for each variable. The results from these analyses were consistent with previous research conducted in the United States—the nature subtype of self-transcendence was positively related to proenvironmental behavior across samples.

THE NORM-ACTIVATION MODEL OF ALTRUISM

The findings for the multiplicative variables generated to test the norm-activation model were less consistent across the multinational samples. Although the predicted two-way multiplicative variables were significant in the United States, they were not significant in Mexico, Nicaragua, Peru, or Spain. In Mexico, Peru, and Spain, the tolerance limit of .0001 was reached, and the three-way multiplicative variable was not entered into the equation. Reaching the tolerance level indicates that the three-way multiplicative variable was almost entirely related to the variables already in the analysis and that it did not have unique predictive ability.

Follow-up tests for the significant two-way multiplicative effects were calculated in the U.S. sample. The partial correlation coefficients were calculated between self-transcendence (nature) and behavior, controlling for the mean value response for the most activated (i.e., high AC and high AR) and least activated (i.e., low AC and low AR) respondents. To form high and low groups of AC, a median split was performed on the NEP. The median value for the U.S. sample was 3.75. Scores that were equal to the median value were excluded from subsequent analyses.

Table 5 Regression Equations for the Prediction of Self-Reported Proenvironmental Behavior

	<i>Country</i>									
	<i>Mexico</i>		<i>Nicaragua</i>		<i>Peru</i>		<i>Spain</i>		<i>United States</i>	
<i>Predictor</i>	R	<i>FChange</i>	R	<i>FChange</i>	R	<i>FChange</i>	R	<i>FChange</i>	R	<i>FChange</i>
1. Self-transcendence	.23	9.20***	.38	11.82****	.15	3.29*	.27	14.29****	.32	39.13****
2. Self-transcendence (general)	.23	.19	.40	1.57	.15	.03	.27	.21	.33	.52
3. Self-enhancement	.23	.46	.41	.23	.15	.19	.31	3.96**	.37	11.69***
4. Openness	.28	5.09**	.47	4.75**	.20	2.86	.31	.02	.37	.54
5. Conservation	.30	1.81	.48	.90	.21	.20	.31	1.30	.38	3.52
6. NEP(AC)	.31	1.14	.51	2.90*	.21	.21	.32	.72	.41	7.92***
7. Responsibility (AR)	.32	.62	.52	.01	.21	.00	.47	26.96****	.45	13.56****
8. AC x Self-transcendence (nature)	.32	.11	.53	1.09	.21	.07	.47	.90	.46	4.82**
9. AR x Self-transcendence (nature)	.33	1.96	.53	.00	.24	1.65	.48	.43	.47	5.61**
10. ARxAC	.34	.70	.55	2.56	.27	2.49	.48	.39	.47	.02
11. AR x AC x Self-transcendence (nature)	tolerance limit		.57	1.58	tolerance limit		tolerance limit		.48	1.59
Adjusted R ²	.06		.20		.01		.19		.20	
<i>F</i>	(10, 165) = 2.15**		(11, 60) = 2.62***		(10, 143) = 1.10		(10, 175) = 5.20****		(11, 324) = 8.74****	

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

High and low groups of AR were generated by collapsing the response categories "not at all responsible" and "slightly responsible" into a low group and by collapsing the responses "moderately responsible" and "extremely responsible" into a high group. Results showed that for the activated respondents, the relationship between self-transcendence (nature) and proenvironmental behavior was .40 ($n = 92, p < .01$), whereas for participants with the lowest level of norm activation, the relationship was .10 ($n = 97, p > .05$). The difference between these two coefficients is statistically significant ($Z = 2.05, p < .05$).

DISCUSSION

The results from this study clearly indicate that values, particularly the nature subtype of self-transcendence, are important variables to consider in the prediction of environmental behavior. The regression analyses of self-reported behaviors showed the nature subtype of self-transcendence to be positively related to proenvironmental behavior—significantly so in all countries except Peru, where the relationship was positive but failed to reach conventional levels of statistical significance. In addition, our analyses showed a negative relationship between self-enhancement and proenvironmental behavior. A moderated regression analysis revealed partial support for the norm-activation model of altruism. Within the U.S. sample, participants with high AC and high AR showed a stronger relationship between self-transcendence (nature) and proenvironmental behavior.

Stern, Dietz, Kalof, et al. (1995) proposed that environmental behaviors can be based on three distinct value orientations: a concern for the welfare of others (termed *social-altruism*), a concern for self (termed *egoism*), and a concern for all living things (termed *biospherism*). Stern, Dietz, Kalof, et al.

(1995) operationalized the biospheric value orientation with items drawn from Schwartz's self-transcendent values. Thus, what we have referred to as self-transcendence (nature) reflects a biospheric value orientation. Our results indicate that proenvironmental behavior is positively associated with these biospheric values. This finding was consistent across our multinational sample. In addition, we found a norm-activation effect for the U.S. sample. Respondents with a biospheric value orientation were more likely to report acting in a proenvironmental manner when they perceived harmful consequences for environmental damage to the natural environment (which they value) and when they ascribed responsibility to themselves for this damage. It follows from the norm-activation model that proenvironmental behavior could be based on other underlying norms (e.g., egoism, social-altruism). This would lead to a predicted positive relationship between self-enhancement and proenvironmental behavior in certain conditions. However, our results found a negative relationship between self-enhancement (i.e., egoism) and proenvironmental behavior. This negative relationship could be interpreted as evidence that egoism is related to *less* proenvironmental behavior. An alternative interpretation focuses instead on our measurement of behavior. The behavioral items used in this study were general categories of proenvironmental behavior. For each item, no mention was made of the costs or rewards associated with the behavior. It seems likely that the behavior categories were perceived by respondents as requiring high effort for little reward-conditions under which we would expect less proenvironmental behavior by people with an egoistic orientation. If, instead, the behaviors were assessed with proenvironmental behaviors

associated with low cost and high reward (e.g., recycling for money, buying environmentally safe products that cost less), we would predict a positive relationship between self-enhancement and proenvironmental behavior. That is, self-enhancement may provide a value-basis (i.e., egoistic) for environmental behavior if the person perceives that acting in such a way will lead to personal gains (see Schultz & Oskamp, 1996).

The results from this study provide the largest multinational survey of environmental behaviors, attitudes, and values published to date. Our findings clearly show that values are important predictors of proenvironmental behavior; findings that support recent attempts to extend Schwartz's norm-activation model of altruism to include environmental behavior. However, several limitations in measurement need to be recognized. First, we used a single-item measure of ascribed responsibility. Second, as noted above, we did not use all of the items from Schwartz's values instrument. Third, our behavioral measure assessed outcomes and not specific actions. We asked respondents how often had they had engaged in types of behaviors (e.g., energy conservation, water conservation, recycling) and not how they had acted in specific ways (e.g., turned down the thermostat, installed low-flow shower heads, participated in a work site recycling program). This was necessary in order to generate items that could be used across cultures. However, it is possible that what we have called *proenvironmental behavior* may instead be *environmental intentions*.

A fourth limitation revolves around the issue of statistical power. The results from the study showed that the norm-activation model was better supported in the U.S. sample (i.e., the expected two-way multiplicative effects were significant; the correlations between universalism and behavior were significant only in the norm-activated quadrants). This finding could be

interpreted as evidence that the norm-activation model applied to proenvironmental behavior does not generalize across countries. However, the U.S. sample had nearly 3 times as many participants. Indeed, the change in R due to the awareness of consequences by self-transcendence (nature) multiplicative effect in the Mexican, Nicaraguan, and Spanish samples was nearly as large or larger than that observed for the U.S. sample, but it failed to reach significance because of the smaller sample sizes.

Finally, the issue of meaning across cultures needs to be discussed. Proenvironmental behavior was measured with items selected from research conducted in the United States. Similarly, Schwartz's norm-activation model was developed with samples of participants drawn from the United States and Israel. It is possible that the meaning we attached to the constructs differed across cultures. Thus, what we have operationally defined as proenvironmental behavior may not be considered such in other countries—as was found for our assumption that riding public transportation would be considered proenvironmental. Our reliability analyses clearly showed this assumption to be incorrect, and we were able to exclude the item. However, it is possible that the meaning we attached to our other constructs may differ across cultures and that these differences were not detectable with a reliability analysis.

Despite these limitations, the results from this study provide the first cross-cultural evidence for the notion of *environmental altruism*. Cross-cultural research on proenvironmental values, attitudes, motives, and behavior is essential as psychologists attempt to develop models that predict behavior intended to help the natural environment. Environmental altruism is occurring worldwide, and psychologists can play an important role in understanding the factors that lead people to act in proenvironmental ways. However, almost without exception, research by psychologists on environ-

issues has been culture specific. This study is part of a few recent attempts to understand environmental attitudes, beliefs, and behaviors universally across cultures.

NOTES

1. Copies of the translated scales are available from the authors.
2. The excluded items were (a) When humans interfere with nature, it often produces disastrous consequences, (b) The earth has plenty of natural resources if we just learn how to develop them (reverse coded), and (c) Human destruction of the natural environment has been greatly exaggerated (reverse coded).

REFERENCES

- Allen, J. (Ed.). (1996). *Environment 96/97* (15th ed.). Guilford, CT: Dushkin.
- Black, J. S., Stem, P. C., & Elworth, J. T. (1985). Personal and contextual influences on household energy adaptations. *Journal of Applied Psychology, 70*, 3-21.
- Dunlap, R. E., Gallup, G., & Gallup, A. (1993). Of global concern: Results of a health of the planet survey. *Environment, 35*, 7-39.
- Dunlap, R. E., & Mertig, A. (1995). Global concern for the environment: Is affluence a prerequisite? *Journal of Social Issues, 51*, 121-138.
- Dunlap, R. E., & Van Liere, K. (1978). The new environmental paradigm. *Journal of Environmental Education, 9*, 10-19.
- Dunlap, R. E., Van Liere, K., Mertig, A., & Howell, R. (1992, August). *Measuring endorsement of an ecological worldview: A revised NEP scale*. Paper presented in the Annual Meeting of the Rural Sociology Society, State College, PA.

- Fuhrer, U. (1995). A social psychology-based theoretical framework for research on environmental concern. *Psychologische Rundschau*, 46, 93-103.
- Guagnano, G. (1995). Locus of control, altruism and agentic disposition. *Population and Environment: A Journal of Interdisciplinary Studies*, 17, 63-77.
- Guagnano, G., Dietz, T., & Stem, P. (1994). Willingness to pay for public goods: A test of the contribution model. *Psychological Science*, 5, 411-415.
- Hopper, J., & Nielsen, J. M. (1991). Recycling as altruistic behavior: Nonnative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*, 23, 195-220.
- Karp, D. G. (1996). Values and their effect on pro-environmental behavior. *Environment and Behavior*, 28, 111-133.
- Kempton, W., Boster, J., & Hartley, J. (1995). *Environmental values in American culture*. Cambridge, MA: MIT Press.
- Levy-Leboyer, C., Bonnes, M., Chase, J., Ferreira-Marques, J., & Pawlik, K. (1996). Determinants of pro-environmental behaviors: A five-countries comparison. *European Psychologist*, 1, 123-129.
- Milbrath, L. (1995). Psychological, cultural, and informational barriers to sustainability. *Journal of Social Issues*, 51(4), 101-120.
- Milbrath, L. (1996). *Learning to think environmentally: While there is still time*. Albany: State University of New York Press.
- Noe, F. P., Hull, R. B., & Wellman, J. D. (1982). Nonnative response and norm activation among ORV users within a seashore environment. *Leisure Sciences*, 5, 127-142.
- Noe, F. P., & Snow, R. (1990). Hispanic cultural influence on environmental concern. *Journal of Environmental Education*, 21, 27-34.
- Obregón-Salido, F., & Corral-Verdugo, V. (1997). Systems of beliefs and environmental conservation behavior in a Mexican community. *Environment and Behavior*, 29, 213-235.

- Olson, R. (1995). Sustainability as a social vision. *Journal of Social Issues*, 51(4), 15-36.
- Oskamp, S., Burkhardt, R., Schultz, P. W., Hurin, S., & Zelezny, L. (1998). Predicting three dimensions of residential curbside recycling: An observational study. *Journal of Environmental Education*, 29(2), 37-42.
- Pedhazur, E. (1997). *Multiple regression in behavioral research* (3rd ed.). Fort Worth, TX: Harcourt Brace.
- Pierce, J., Steger, M.A., Steel, B., & Lovrich, N. (1992). *Citizens, political communication and interest groups: A study of environmental organizations in Canada and the United States*. Westport, CT: Praeger.
- Schultz, P. W., & Oskamp, S. (1996). Effort as a moderator of the attitude-behavior relationship. *Social Psychology Quarterly*, 59, 375-383.
- Schultz, P. W., Oskamp, S., & Mainieri, T. (1995). Who recycles and when: A review of personal and situational factors. *Journal of Environmental Psychology*, 15, 105-121.
- Schultz, P. W., & Zelezny, L. (1996, May). *Values and concern for the natural environment: A cross-cultural study*. Paper presented at the meeting of the Society for the Psychological Study of Social Issues, Ann Arbor, MI.
- Schwartz, S. H. (1968). Words, deeds, and the perception of consequences and responsibility in action situations. *Journal of Personality and Social Psychology*, 10, 232-242.
- Schwartz, S. H. (1977). Nonnative influences on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 221-279). New York: Academic Press.
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1-66). San Diego, CA: Academic Press.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50, 19-45.
- Schwartz, S. H., & Howard, J. (1981). A nonnative decision-making model of altruism. In J. P. Rushton & R. M.

- Som:ntino (Eds.), *Altruism and helping behavior*(pp. 189-211). Hillsdale, NJ: Lawrence Erlbaum.
- Sloan, T. (1990). Psychology for the third world. *Journal of Social Issues*, 46(3), 1-20.
- Steel, B. (1996). Thinking globally and acting locally? Environmental attitudes, behavior and activism. *Journal of Environmental Management*, 47, 27-36.
- Stem, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 56,121-145.
- Stern, P. C., Dietz, T., & Black, J. S. (1986). Support for environmental protection: The role of moral norms. *Population and Environment: Behavioral and Social Issues*, 8, 204-222.
- Stern, P. C., Dietz, T., & Guagnano, G.(1995). The new ecological paradigm insocial-psychological context. *Environment and Behavior*, 27, 723-743.
- Stem, P. C., Dietz, T., & Kalof, L. (1993). Value orientation, and environmental concern. *Environment and Behavior*, 25, 322-348.
- Stem, P. C., Dietz, T., Kalaf, L., & Guagnano, G. (1995). Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology*, 25, 1611-1636.
- Stem, 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.
- Triandis, H. (1990). Toward cross-cultural studies of individualism and collectivism in Latin America. *Inter-American Journal of Psychology*, 24, 199-210.
- Van Liere, K., & Dunlap, R. (1978). Moral norms and environmental behavior: An application of Schwartz's norm-activation model to yard burning. *Journal of Applied Social Psychology*, 8, 174-188.
- Vining, J., & Ebreo, A. (1990). What makes a recycler? A comparison of recyclers and nonrecyclers. *Environment and Behavior*, 22, 55-73.

P. Wesley Schultz, Ph.D., is an assistant professor of psychology at California State University, San Marcos. At the time this article was first written, he was in the Department of Psychology at St. Lawrence University. His research interests are in applied social psychology, individual differences in social cognition, and environmental psychology. He is coauthor of Applied Social Psychology (Prentice Hall, 1998) and an active researcher of interventions designed to address many social problems

Lynnette C. Zelezny, Ph.D., is an assistant professor in the Department of Psychology at California State University, Fresno. Her research interests include environmental, cross-cultural, and applied social issues.