VALUES AND THEIR RELATIONSHIP TO ENVIRONMENTAL CONCERN AND CONSERVATION BEHAVIOR

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Recent research has examined the relationship between values and attitudes about environmental issues. Findings from these studies have found values of self-transcendence (positively) and self-enhancement (negatively) to predict general concern for environmental problems. Other recent findings have differentiated between environmental attitudes based on concern for self (egoistic), concern for other people (social- altruistic), and concern for plants and animals (biospheric). This article reports the results from a study of the relationship between values and environmental attitudes in six countries: Brazil, Czech Republic, Germany, India, New Zealand, and Russia. Results show strong support for the cross-cultural generalizability of the relationship between values and attitudes and on the structure of environmental concern. In addition, analyses of the relationship between values and environmental behavior show evidence for norm activation only for self-transcendence; results for self-enhancement show a consistently negative relationship.

Keywords: values; environmental attitudes; environmental concern; conservation

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There is an increasing awareness that the natural environment is being harmed by human actions. Polling data suggest that high percentages of people around the world believe that environmental problems are among the most important social problems of the day (Dunlap, 1991; Dunlap, Gallup, & Gallup, 1993; Kempton, Boster, & Hartley, 1995). In addition, there is a recognition that environmental problems are only beginning, and that in the coming years their severity will increase (Dunlap & Saad, 2001; Saad, 2002). Yet, this high level of endorsement can be misleading. Polling evidence is often based on broad questions about concerns for particular social problems or a general concern about the state of the environment. Recent psychological research has distinguished between different types of value-based environmental attitudes and developed psychological models to explain the link between values and environmental behavior. This article examines the generalizability of these models to six diverse international samples.

A sizeable amount of psychological research on environmental attitudes has focused on values, which are viewed as underlying determinants of more specific attitudes, behaviors, and beliefs (Olson & Zanna, 1993). Although there are several traditions of values research, particularly applied to the study of environmental issues, many studies in recent years have made use of Schwartz's model of human values. Schwartz (1992, 1994) has developed a broad model for classifying the dimensions of values, with 56 value items representing 10 universal value types. Cross-cultural research has revealed that the 10 value types can be further reduced to 4 value categories: openness to change, conservatism,[1] self-transcendence, and self-enhancement. Openness to change is described by values of self-direction, stimulation, and hedonism. Conservatism is defined by values of tradition, conformity, and security. Self-transcendence is characterized by values of universalism and benevolence. Finally, self-enhancement is defined by values of power and achievement.

A large number of cross-cultural studies have demonstrated the usefulness of Schwartz's organizational model for categorizing and measuring values across many different cultures (Oishi, Schimmack, Diener, & Suh, 1998; Schwartz, 1992, 1994; Spini, 2003). The most impressive data sets in this work come from Schwartz's cross-cultural studies of teachers. Values were measured by asking respondents to rate 56 values "as a guiding principle in my life" and analyses reduced these ratings to their core underlying dimensions. Although there were small deviations in the location of specific values within the predicted value type, the stability of the model and the similarity of the patterns among values across cultures is truly impressive (Schwartz & Sagiv, 1995).

1. Given the double meaning of the term *conservation* in the context of this article, we use the label *conservatism*.

VALUES AND ENVIRONMENTAL ATTITUDES

In recent years, a number of studies have examined the link between values and environmental attitudes (Grunert & Juhl, 1995; Nordlund & Garvill, 2002; Schultz & Zelezny, 2003; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Tankha, 1998). Yet, despite the growing number of studies, there is a lack of clarity to the conceptual language. Some of the terms that are widely used include *environmental attitudes*, *environmental concern*, and *environmental worldview* (Dunlap & Jones, 2002a, 2002b; Fransson & Gärling, 1999; Schultz & Zelezny, 2003). We use the term *environmental concern* to refer to the affect associated with environ- mental problems and the term *environmental attitude* to refer to the collection of beliefs, affect, and behavioral intentions a person holds regarding environmentally related activities or issues. From this perspective, environmental concern is one aspect of an environmental attitude. Finally, we use the term *environmental worldview* to refer to a person's belief about humanity's relationship with nature (cf. Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000).

Following on the work by Schwartz (1992) in classifying human values, Stern and his col- leagues began applying the model to the study of environmental attitudes and behavior. In an attempt to formulate a broad model to explain the link between values and environmental attitudes, Stern and Dietz (1994) proposed a value-basis theory (Stern & Dietz, 1994; Stern, Dietz, & Kalof, 1993; Stern et al., 1999). The theory focuses on environmental attitudes and behaviors derived from an awareness of the harmful consequences to valued objects. Valued objects are oriented around three basic sources: self, other people, or all living things. Egoistic concerns focus on the individual. People with egoistic environmental attitudes are concerned about the environment, but their concern is at a personal level. For example, those who hold egoistic environmental attitudes would be concerned about air pollution because of the effects it may have on their health. Social-altruistic attitudes describe an overall concern for all people. People with social-altruistic environmental attitudes care about environ- mental problems because the problems affect other people. Biospheric attitudes are based on all living species. Overall, each of the three types of attitudes implies concerns for the environment, but each is based on different underlying values.

Several recent studies have provided support for the three-factor structure of environmental attitudes. Schultz (2000, 2001) has used confirmatory factor analytic procedures and found strong evidence for the distinction between egoistic, biospheric, and altruistic concerns. The basic three-factor structure has been found in several U.S. samples (among both college students and the general public) as well as in cross-cultural research with samples from Spanish-speaking countries around the world. A recent multinational study examined the relationship between values and environmental concerns and worldview in 14 countries (Schultz, 2001; Schultz & Zelezny, 1999). Results strongly supported the notion that values

underlie environmental concerns and environmental worldview. Results showed that egoistic and biospheric environmental concerns significantly correlated with Schwartz's values scale. A positive correlation was found between the self-transcendent values and the altruistic and biospheric concerns. In contrast, self-enhancement correlated negatively with biospheric and altruistic concerns. In addition, self-enhancement correlated positively with egoistic concerns. Similar results were reported by Schwartz, Sagiv, and Boehnke (2000), where self-transcendent values (particularly universalism) correlated positively with macro- level environmental worries.

Although the findings are consistent with the value-basis theory, we have preferred a slightly different theoretical interpretation for these findings, which is based on a broad model of *inclusion*. Schultz (2000) has argued that there are individual differences in the degree to which people include nature within their cognitive representations of self. For individuals with a high degree of inclusion, self and nature are interconnected, and aspects of nature have inherent value. At low levels of inclusion, self and nature are separate, and nature is valued only to the extent that it affects self. From this perspective, self-transcendent values reflect a greater degree of inclusion—a valuing of goals and objects that are not directly tied to self-interest (equality, unity with nature, broad-mindedness, a world at peace). In contrast, self-enhancement values focus on goals and objects that are directly related to self (success, social power, wealth). Such an interpretation is an extension of Dunlap and Van Liere's (1978) new environmental paradigm (NEP). Whereas the NEP reflects an individual's belief about the interrelationship between humanity and nature, the inclusion model refers to beliefs about the interrelationship between self and nature.

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The research findings with respect to the structure of environmental attitudes, and to the link between different types of environmental concerns and values, is clear. However, the link between values and environmental behavior is less clear. Research examining the relationship between values and environmental behavior has focused primarily on two of Schwartz's value categories: self-transcendence and self-enhancement. Karp (1996) found that values of self-transcendence were positively correlated with self-reported environmental behavior. In contrast, self-enhancement values were negatively correlated with both environmental attitudes and self-reported behavior (see also Stern, Dietz, Kalof, & Guagnano, 1995).

However, the direct relationship between values and environmental behavior tends to be rather small (and in the case of self-enhancement, negative). One promising explanation for the weak link between values and behavior comes from Schwartz's norm-activation model of altruism (Schwartz, 1968, 1977; Schwartz & Howard, 1980). At its core, the norm-

activation model predicts that an altruistic behavior is more likely to occur when a person recognizes the possibility of harm to a valued other, and the person ascribes responsibility to himself or herself for these harmful consequences. So, if we value the welfare of another per- son, if we are aware of some potential harm that could befall that person (awareness of consequences [AC]), and if we take responsibility for this harm (ascription of responsibility [AR]), then we are more likely to act in a manner intended to help the other. Put more formally, the relationship between values and behavior is moderated by awareness of harmful consequences and ascription of responsibility.

A number of studies have successfully applied the norm-activation model to environmental behavior (Black, Stern, & Elworth, 1985; Fuhrer, 1995; Guagnano, Stern, & Dietz, 1995; Hopper & Nielsen, 1991; Noe, Hull, & Wellman, 1982; Stern, Dietz, & Black, 1986; Stern et al., 1995; Van Liere & Dunlap, 1978). However, several important questions remain. First, does the theoretical model hold across cultures? In our previous work, we found that although it did hold up reasonably well in U.S. samples, we found little evidence for a moderated effect in samples from Mexico, Nicaragua, Peru, or Spain (Schultz & Zelezny, 1998).

A second important question is whether the different value bases for environmental concern translate into action when activated. Presumably, different conditions would be needed to activate the different values. Our focus here is on self-enhancement and self- transcendence. Research findings have already been published demonstrating the possible activation of self-transcendence by AC and AR (at least in U.S. samples), but there is no evidence regarding the activation of self-enhancement. In the current study, we reasoned that self-transcendence is activated by a general awareness of harmful consequences resulting from environmental problems and a feeling of responsibility for these problems. Because self-transcendent values are broad, this broad level of activation makes sense. However, for self-enhancement, the focus should be on local issues. We predicted that self-enhancement would be *positively* related to environmental behaviors when the perceived level of local environmental problems was seen as serious and the individual felt a sense of responsibility for these local problems.

To summarize, the findings from previous studies suggest that values underlie environ- mental attitudes and behavior. Results show a moderate positive relationship between biospheric attitudes and self-transcendence and a smaller positive relationship between egoistic attitudes and self-enhancement. The next step is to generalize these findings to a range of other countries. The goals of this study were threefold:

First, we wanted to test the structure of attitudes about environmental issues. Recent articles have distinguished between different sets of environmental concerns, each oriented around different sets of valued objects (self, other people, and living organisms). Although some data have been published previously to substantiate the structure of these concerns, this article sought to generalize the model to a diverse set of cultures.

Second, we wanted to examine the relationship between values, environmental attitudes, and environmental behaviors across a set of diverse countries. Based on the previous research reviewed above, we predicted that self-transcendence (positive) and self- enhancement (negative) would explain the largest amount of variance in environmental attitudes. In our previous research examining the relationship between values and environ- mentalism, we used a shortened version of Schwartz's values items. In this study, we used the full 56-item version. In our analyses, we planned to divide the values within universalism into those that directly refer to the environment or nature and those that do not. We predicted that although the universalism values directly related to nature and the environment would be a significant predictor of attitudes and behaviors, the other universalism items would explain additional unique variance. We expected these relationships to hold across cultures, and our analyses were conducted on both the aggregate sample and separately by country.

Finally, we wanted to explore the relationship between values and environmental behavior within the framework of norm activation. Previous studies have demonstrated that self- transcendent values are central in understanding environmental behavior, particularly when activated by high levels of AR and perceived threats to the natural environment. With the current data set, we wanted to test the norm-activation effect for both self-transcendence values and for self-enhancement values. Previous studies have demonstrated the applicability of norm-activation for self-transcendent values, but only for U.S. samples. We sought to assess the extent to which this model will generalize across cultures. In addition, we wanted to examine the possibility for norm activation of self-enhancing values, a link that has not been empirically tested.

METHOD

PARTICIPANTS

Samples reported in this article were obtained from six countries: Brazil, the Czech Republic, Germany, India, New Zealand, and Russia. Participants in the study were university students enrolled in courses in the social or behavioral sciences. We sought to obtain a minimum sample size of 120 from each location in order to provide sufficient power (.80) to detect medium correlations and for regression coefficients with eight predictors (Cohen, 1992). The samples reported in this article were intended to provide a diverse set of countries. Our previous research (Schultz & Zelezny, 1999) focused exclusively on English- (U.S. and Canada) and Spanish-speaking countries, and our intent in this article was to test our hypotheses in other languages and cultures.

MATERIALS

Participants answered a four-page questionnaire designed to measure environmental attitudes, behaviors, values, and demographics.

Environmental behavior. Self-reported environmental behaviors were measured using Likert-type scale ratings of past behavior. Participants were asked to indicate "how often you have done each of the following in the past year." Behaviors covered a variety of domains and ranged from easy to difficult. The items included the following: looked for ways to reuse things, recycled newspapers, recycled cans or bottles, encouraged friends or family to recy- cle, purchased products in reusable containers, picked up litter that was not your own, com- posted food scraps, conserved gasoline by walking or bicycling, wrote a letter supporting an environmental issue, voted for a candidate who supported environmental issues, donated money to an environmental group, and volunteered time to help an environmental group.

Response categories were *never, rarely, sometimes, often*, and *very often*. A "not applicable" response was provided "if there was no opportunity for the action."

NEP. This instrument was originally composed of 12 items (Dunlap & Van Liere, 1978); the version used in this study was a revised one (Dunlap et al., 2000) containing 15 items, each rated on a 5-point Likert-type scale ranging from 1 (*strongly agree*) to5 (*strongly dis- agree*). It is designed to measure the degree to which people view humans as part of nature rather than as consumers or protectors of nature.

Environmental concerns. This instrument measures concern about the environmental problems caused by human behavior. The scale produces measures of egoistic, altruistic, and biospheric environmental concerns (Schultz, 2001). The item reads,

> People around the world are generally concerned about environmental problems because of the consequences that result from harming nature. However, people differ in the consequences that concern them the most. Please rate the following items from 1 (*not important*) to 7 (*supreme importance*) in response to the question: I am concerned about environmental problems because of the consequences for___.

Egoistic items were me, my future, my lifestyle, and my health. Altruistic items were humanity, children, people in the community, and future generations. Biospheric items were trees, animals, marine life, and birds.

Schwartz Value Survey. The full 56-item version of this instrument was used (Schwartz, 1992, 1994). Each of the value items was rated "as a guiding principle in my life" from 0 (*not important*) to7 (*extreme importance*). The respondents were given the option of using a –1 score to

indicate that the value was contrary or opposed to their own set of values. Participants were instructed to use the –1 and 7 scores as little as possible. The Brazilian version of Schwartz's questionnaire was provided by Tamayo and Schwartz (1993); they confirmed the construct validity of this instrument, having obtained results consistent with that observed in other cultures (see also Schwartz & Sagiv, 1995; Spini, 2003). This is an improvement over previous work by Schultz and Zelezny (1998, 1999), which used an abbreviated version of Schwartz's scale.

Components of norm activation. In recent years, a number of studies have examined environmental behaviors within the norm-activation framework for altruistic behaviors. The questionnaire contained measures of norm activation pertinent to values of self- transcendence and self-enhancement. AC was operationalized at two levels—the local level, which we expected to be relevant to values of self-enhancement, and the global level, which we expected to be relevant to values of self-transcendence. Participants were asked to rate the seriousness of six environmental problems (deforestation, water pollution, air pollution, land pollution, overpopulation, global warming) in their community, and also the seriousness of these six environmental problems worldwide. Participants were also asked to rate the extent to which they felt responsible for environmental problems in their community (a single item) and for environmental problems worldwide (a single item).

TABLE 1
Demographic Characteristics of the Sample

Country	*Gender (% female)*	*Age*	*Relative SES*[a]	*Size of Community*[b]	n
Brazil	73	27 (6.99)	4.69 (1.48)	3.41 (1.05)	208
Czech Republic	66	24 (2.40)	5.98 (1.33)	4.03 (1.53)	113
Germany	75	26 (5.48)	5.71 (1.41)	4.56 (1.10)	120
India	66	20 (2.99)	6.22 (1.48)	2.76 (1.42)	210
New Zealand	67	25 (7.31)	6.26 (1.38)	3.75 (1.38)	217
Russia	16	18 (0.71)	5.47 (1.56)	3.30 (1.18)	120

NOTE: SES = socioeconomic status. Means are reported, with standard deviations in parentheses.
a. Question read, "Relative to the people in your country, would you say that your family is" with options from 1 (lower class) to 10 (upper class).
b. Question read, "How large is the community in which you currently live?" Response categories were 1 (< 10,000), 2 (10,000-100,000), 3 (100,001-500,000), 4 (500,001-1,000,000), 5 (1,000,000+)

Demographic attributes. Respondents in the study were asked several demographic questions, including gender and age. There were also asked to provide a relative assessment of social economic status: "Relative to the people in your country, would you say that your family is:" rating from 1 (lower class) to 10 (upper class). Finally, participants indicated the size of the city in which they grew up and the size of the city in which they currently resided.

The items on the questionnaire were originally in English or Spanish (Schultz & Zelezny, 1999). The Spanish versions were translated into Portuguese by two native Brazilian psychologists who had been living in Spain, using a back-translation procedure. The Czech, German, and Russian questionnaires were produced using a back-translation procedure of the English version. The English version of the questionnaire was used in New Zealand and India.

Procedure. The questionnaires were administered to groups of students who completed them in a classroom setting. Participation was voluntary and confidential. It took approximately 30 minutes for participants to complete the questionnaire.

RESULTS

A total of 988 completed questionnaires were analyzed from the six countries: Brazil (n = 208), the Czech Republic (n = 113), Germany (n = 120), India (n = 210), New Zealand (n = 217), and Russia (n = 120). The demographic characteristics of the six samples are shown in Table 1.

Measure equivalence and reliability. The issue of equivalence of measures in cross- cultural research has attracted considerable attention in recent years (Byrne & Watkins, 2003; Spini, 2003; van de Vijver & Leung, 1997; van de Vijver & Poortinga, 2002). Prior to testing our hypothesis about the relationships among the measures, we tested the structural equivalence of our scales, as well as their reliability. The essence of our analysis was to deter- mine if the latent structures of our constructs were invariant across cultural context. Our analyses were based on multigroup confirmatory factor analyses (CFA) in which we simultaneously fit a predefined factor structure to the six samples. We further refined the model by constraining the factor loadings across the samples. This analysis was performed for the Environmental Concerns scale (three factors), the AC scale (two factors), and the Environmental Behavior scale (one factor). The AR consisted of only two items (one local, and one global) and was not subjected to CFA. Analyses were performed using Amos 3.6.

The proposed structure of the Environmental Concerns scale was tested by analyzing the 12 items. The CFA procedure tested the fit of a three-factor model, with four items on each factor (Figure 1 in Schultz, 2001).

The results from this analysis showed that the three-factor model fit the data reasonably well (χ^2 = 767.62; *df* = 306; χ^2 / *df* = 2.51; Goodness-of-Fit Index (GFI) = .89; root-mean-square error of approximation (RMSEA) = .04). In this first analysis, we allowed the factor loadings to vary across sample; in a second analysis, we con- strained the factor loadings to be equivalent. The results showed only a minor decrement in the fit of the model (χ^2 = 927.56; *df* = 351; = 2.64; GFI = .89; RMSEA = .04). Given the reasonable fit of the model, we proceeded to generate factor loadings by collapsing across the samples. The results from this final CFA showed an acceptable fit (χ^2 = 290.48; *df* = 51; GFI = .95; RMSEA = .07). Standardized factor loadings for the egoistic concerns were me (.79), my future (.79), my lifestyle (.74), and my health (.79). Standardized loadings for altruistic concerns were humanity (.67), children (.69), people in the community (.69), and future generations (.58). For biospheric concerns, the standardized coefficients were trees (.69), marine life (.75), birds (.89), and animals (.85). The factors were moderately correlated: egoistic with altruistic (.69), altruistic with biospheric (.42), and egoistic with biospheric (.20). Cronbach's alpha reliabilities for the three scales were reasonable across the six samples: Brazil (egoistic .79, altruistic .79, and biospheric .92), Czech Republic (egoistic .87, altruistic .83, biospheric .95), Germany (egoistic .84, altruistic .73, biospheric .93), India (egoistic .75, altruistic .61, biospheric .73), New Zealand (egoistic .91, altruistic .82, biospheric .90), and Russia (egoistic .90, altruistic .70, biospheric .87). These findings provide support for our first hypothesis and replicate previous results showing a three-factor structure for environmental concern.

A similar analytic procedure was followed for the AC measure. Responses were obtained to 12 items about the perceived seriousness of six environmental problems at the global level and at the local level. The structural equivalence of AC (local) and AC (global) were tested with a two-factor CFA, with six items loading on a local factor and six items loading on a global factor. The two factors were allowed to correlate. The two-factor model was simultaneously fit across the six samples, and the results showed a reasonable fit (χ^2 = 727.88; *df* = 322; χ^2 / *df* = 2.26; RMSEA = .036; GFI = .89). A second model was then tested in which the factor loadings and correlation between the two factors were constrained across the six samples. The results from this analysis showed only a small reduction in the fit of the model (χ^2 = 890.21; *df* = 373; χ^2 / *df* = 2.39; GFI = .87; RMSEA = .038). Cronbach's alphas were calculated on AC at the local (six items) and global levels (six items), and results showed consider- able consistency across the samples: Brazil (local α = .87; global α = .90), Czech Republic (local = .72; global = .72), Germany (local = .81; global = .69), India (local = .69; global =.69), New Zealand (local = .80; global = .80), and Russia (local = .64; global = .66).

The 12-item Environmental Behavior scale was intended to measure a single factor. How- ever, preliminary item analyses revealed that 2 of the items (donated time to an environmental organization and wrote a letter in

favor of an environmental issue) were both negatively correlated with the item total. To allow for comparable analyses across the samples, these 2 items were removed for all samples. The fit of a single-factor structure for the remaining 10 items was tested with CFA. In the first analysis, we tested the fit of the model across the six samples but allowed the factor loadings to vary. This model fit reasonably well ($\chi^2 = 549.82$; $df = 210$; $\chi^2 / df = 2.62$; GFI = .89; RMSEA = .04). The model was further constrained by fixing the factor loadings across the six samples. This model showed only a slight reduction in fit ($\chi^2 = 691.79$; $df = 255$; $\chi^2 / df = 2.71$; GFI = .87; RMSEA = .04). The resulting 10-item scale had a reliability of .75 in Brazil, .66 in Germany, .65 in the Czech Republic, .71 in India, .74 in New Zealand, and .60 in Russia. Mean scale scores are shown in Table 2.

Previous research using the NEP has found a complex factor structure for the 15 items (cf. Dunlap et al. 2000), and factor structures and loadings have varied across samples. To date, no CFA has been published on the NEP items. Because no clear factor structure has emerged from single samples, we proceeded to evaluate the scale through reliability coefficients separately across the six samples. The NEP scale, which has yielded low reliabilities for translated versions in previous research, showed marginal internal consistency: Brazil ($\alpha = .56$), Czech Republic ($\alpha = .74$), Germany ($\alpha = .64$), India ($\alpha = .60$), New Zealand ($\alpha = .72$), and Russia ($\alpha = .68$). Item analyses conducted separately for each country showed two low item- total correlations: Item 10 ("The so-called ecological crisis facing humankind has been greatly exaggerated") in Brazil, and Item 6 ("The earth has plenty of natural resources, if we just learn how to develop them") in India. However, in order to keep the scale scores comparable across the samples, these items were retained in the scale scores. Mean NEP scores for the six countries are shown in Table 2.

Schwartz's values items are considered to be universal across cultures, and previous research has demonstrated a fair degree of equivalence across many diverse samples (cf. Spini, 2003). For this reason, we did not test the structural equivalence of the scales and proceeded to create individual-level values scores by averaging the items within each of the 10 value types: universalism, benevolence, power, achievement, self-direction, stimulation, hedonism, tradition, conformity, and security. Mean scores are reported in Table 2. These 10 value types were further aggregated into self-enhancement, self-transcendence, openness to change, and conservatism by averaging the specific items within each.

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Our second goal was to examine the relationship between values and environmental attitudes. These analyses were conducted separately for each of the six samples. We began by examining scores on the NEP. Scores on the NEP were regressed onto the 10 value types, controlling for the mean of all the value items. By entering the mean value rating on the first step of the analysis (the mean value score was the average of all 56 value

items), we con- trolled for individual differences in response style. To examine the effects of universalism independent of the environmental items included in the scale, we created two separate universalism scores—one for the two environmental items (environmental protection, unity with nature), and one for the remaining 7 items. The scores were entered into the analyses hierarchically: On the first step, the mean value response score was entered, and then on the second step the 11 value scores were entered using a forward stepwise procedure. The final equations were highly significant in each of the samples.

- Brazil, $F(3, 204) = 7.48$; $p < .001$. Significant betas from the final regression equation were universalism (.23) and security (–.27).
- Czech Republic, $F(4, 108) = 12.75$; $p < .001$. Significant final betas were power (–.18), universalism-environment (.36), and benevolence (.33).
- Germany, $F(3, 116) = 6.23$; $p < .001$. Significant final betas were power (–.28) and achievement (–.32).
- India, $F(3, 197) = 8.24$; $p < .001$. Significant final betas were power (–.32) and security (.28).
- New Zealand, $F(4, 206) = 17.40$; $p < .001$. Significant final betas were universalism- environment (.34), tradition (–.26), and power (–.24).

TABLE 2

Means and Standard Deviations for Values, Environmental Attitudes, and Environmental Behaviors Across the Six-Country Sample

	Brazil		*Czech Republic*		*Germany*		*India*		*Russia*		*New Zealand*	
	*(*n = *208)*		*(*n = *113)*		*(*n = *120)*		*(*n = *210)*		*(*n = *120)*		*(*n = *217)*	
Value	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Universalism	5.60	(0.79)	5.56	(0.89)	5.53	(0.81)	5.94	(0.89)	5.44	(1.15)	5.42	(0.94)
Benevolence	5.54	(0.82)	5.68	(0.74)	5.60	(0.76)	5.91	(0.79)	5.71	(0.88)	5.51	(0.79)
Power	2.96	(1.33)	2.92	(1.17)	3.11	(1.25)	5.44	(1.07)	5.00	(1.38)	3.95	(1.28)
Achievement	4.70	(1.04)	4.39	(0.98)	4.87	(0.92)	5.93	(0.86)	5.56	(1.17)	5.47	(0.85)
Self-direction	4.94	(1.04)	5.51	(0.93)	5.72	(0.77)	5.86	(1.02)	5.75	(1.15)	5.56	(0.90)
Stimulation	3.12	(1.62)	4.27	(1.31)	4.87	(1.06)	5.41	(1.20)	5.51	(1.13)	5.07	(1.18)
Hedonism	4.28	(1.60)	5.12	(1.14)	5.66	(0.99)	5.77	(1.30)	5.98	(1.29)	5.97	(0.97)
Tradition	4.72	(1.04)	2.96	(1.06)	2.83	(1.09)	5.14	(1.09)	3.45	(1.26)	3.58	(1.31)
Conformity	5.07	(1.14)	4.37	(1.05)	3.87	(1.24)	6.03	(0.95)	5.18	(1.17)	4.97	(1.12)
Security	5.02	(1.00)	4.66	(0.89)	4.58	(1.00)	5.89	(0.83)	5.61	(0.90)	5.18	(0.84)
Environmental behaviors	2.27	(0.68)	2.94	(0.62)	3.29	(0.65)	2.87	(0.67)	1.87	(0.65)	3.18	(0.66)
Ascription of responsibility for local problems	2.46	(0.78)	2.78	(0.70)	2.74	(0.64)	2.88	(0.72)	2.77	(0.71)	2.50	(0.81)
Ascription of responsibility for global problems	2.19	(0.78)	2.58	(0.65)	2.47	(0.72)	3.00	(0.77)	2.64	(0.68)	2.27	(0.81)
Seriousness of local environmental problems	2.53	(0.75)	2.88	(0.58)	2.82	(0.61)	3.06	(0.52)	3.03	(0.41)	2.53	(0.67)
Seriousness of global environmental problems	3.44	(0.62)	3.67	(0.37)	3.68	(0.33)	3.56	(0.38)	3.65	(0.33)	3.62	(0.40)
Environmental measures												
Egoistic concerns	6.04	(1.12)	4.48	(1.56)	4.48	(1.48)	4.95	(1.44)	6.05	(1.33)	4.95	(1.64)
Altruistic concerns	6.35	(0.91)	5.63	(1.24)	5.72	(1.02)	5.59	(1.13)	5.88	(1.23)	5.56	(1.26)
Biospheric concerns	6.27	(1.03)	5.85	(1.30)	5.86	(1.09)	5.68	(1.16)	5.12	(1.30)	5.42	(1.19)
New environmental paradigm	3.55	(0.36)	3.80	(0.42)	4.02	(0.34)	3.50	(0.40)	3.64	(0.40)	3.74	(0.44)

TABLE 3
The Relationship Between Values and Environmental Concern

		Egoistic	*Altruistic*	*Biospheric*
Self-transcendence	Brazil	–.05	.06	**.33****
	Czech Republic	**–.18***	.07	**.35****
	Germany	–.10	–.05	**.18***
	India	**–.22****	–.11	**.14***
	New Zealand	**–.21****	**.21***	**.24****
	Russia	–.12	**.41****	**.26***
	Total sample	**–.28****	.05	**.24****
Self-enhancement	Brazil	.07	–.11	**–.21****
	Czech Republic	**.21***	.01	**–.31****
	Germany	.13	.01	**–.23***
	India	.02	–.05	–.12
	New Zealand	**.14***	**–.19***	**–.15***
	Russia	.05	**–.48****	–.16
	Total sample	**.16****	–.05	**–.12****
Conservatism	Brazil	–.04	–.07	**–.21****
	Czech Republic	**.21***	–.01	–.07
	Germany	–.08	.05	.04
	India	.04	–.02	–.07
	New Zealand	.12	–.08	.08
	Russia	.03	**–.22***	–.13
	Total sample	**.09***	–.03	**–.07***
Openness	Brazil	.11	.05	.02
	Czech Republic	–.11	–.08	–.02
	Germany	–.01	.03	.01
	India	.08	.08	.03
	New Zealand	–.01	–.03	–.11
	Russia	–.09	.18	–.01
	Total sample	–.02	.03	–.00

NOTE: Coefficients are partial correlations, controlling for the grand mean of all 56 value items. Significant coefficients are in bold. Maximum sample sizes are Brazil (n = 208), Czech Republic (n = 113), Germany (n = 120), India (n = 210), New Zealand (n = 217), and Russia (n = 120).
*p < .05. **p < .01.

- Russia, $F(3, 106) = 4.32$; $p < .01$. Significant final betas were power (–.48) and achievement (–.39).

Although there was considerable variability in the value correlates of NEP scores, one consistent finding emerged: Power correlated negatively (and significantly in five of the six samples).

Our next set of analyses examined the relationship between values and egoistic, altruistic, and biospheric environmental concerns. Our focus in these analyses was on the four higher order value types, and given previously published research, we were particularly interested in self-transcendence and self-enhancement. We began by examining the partial bivariate correlations between values and concern, controlling for the mean response value. As before, we conducted this analysis separately for each of the six samples. The results, shown in Table 3, yielded a clear and generally consistent pattern across the samples. In all six samples, biospheric concerns correlated positively and significantly with self-transcendence, and negatively with self-enhancement (significantly so in four of the six samples). For egoistic concerns, the correlations were smaller and in the opposite direction, with self-transcendence correlating negatively and self-enhancement positively. Because of the consistency across samples, we conducted additional analyses on the aggregate sample. Given that values are considered to be universal across culture, and given the consistent pattern of correlations with egoistic and biospheric concerns, we reasoned that the relationships are universal. When collapsed across the samples, egoistic concerns were negatively correlated with self-transcendence ($r = –.28$) and positively correlated with self-enhancement ($r = .16$). Biospheric concerns showed the opposite pattern—they were negatively correlated with self-enhancement ($r = –.12$) and positively correlated with self-transcendence ($r = .24$).

To further explore the specific value types within self-enhancement and self-transcendence responsible for the correlation coefficients with egoistic and biospheric concerns, we con- ducted additional analyses on the aggregated sample. Using hierarchical multiple regression, we regressed egoistic and biospheric concerns onto the five relevant value types (universalism-environment, universalism excluding environment, benevolence, power, and achievement). On the first step, the mean value response was entered. Then on the second step, universalism (environment), universalism (excluding environment), benevolence, power, and achievement were entered using a stepwise procedure. This analysis was done once with egoistic concerns as the criterion and once using biospheric concerns as the criterion. The results for egoistic concerns yielded a significant final equation, $F(4, 934) = 26.75$; $p < .001$; $R = .32$. The predictors in the equation were the mean value response, universalism ($\beta = –.34$), universalism (environment; $\beta = –.16$) and benevolence ($\beta = –.12$). The results for biospheric concerns also yielded a significant final equation, $F(3, 939) = 26.14$; $p < .001$; $R = .30$. The significant predictors were the mean value response, universalism (environment; $\beta = .30$) and

universalism (excluding environment; β = .20).

VALUES, ATTITUDES, AND ENVIRONMENTAL BEHAVIOR

Our third hypothesis focused on the relationship between values and environmental behavior and was tested within the framework of norm activation. We predicted that values of self-transcendence would be positively related to environmental behavior when activated by AC for the seriousness of *global* environmental problems and AR for *global* problems. For self-enhancement, we predicted a positive relationship between values and environmental behavior when activated by perceived seriousness of *local* environmental problems and AR for *local* environmental problems. Thus, we expected the relationship between values and behavior to be moderated by AC and AR. Two hierarchical multiple regression analyses were conducted, one for self-transcendence and one for self-enhancement.

The variables were entered into the regression equation using a hierarchical procedure. On the first step, the mean response value was entered. On the second step, the value (either self-enhancement or self-transcendence), AC, and AR were entered. On the third step, the two-way multiplicative effects of AC X AR, Value X AC, and Value X AR were entered.[2] Finally, on the third step, the three-way multiplicative effect of AC X AR X Value was entered. The multiplicative effects are tests of moderation (Aiken & West, 1991), and the purpose of this regression analysis was to test for norm activation. Specifically, we predicted that the relationship between values and behavior would be moderated by AC and AR. Based on this theory, we predicted a significant three-way multiplicative effect.

We initially conducted this analysis separately by country, and the results showed a high degree of cross-cultural generalizability. The main effect for self-transcendence was positive across all six samples (β: Brazil = .24; Czech Republic = .33; India =.23; Germany = .21; New Zealand =.26; Russia =.16), as was AC global (β: Brazil = .15; Czech Republic = .15; Germany = .26; India = .18; New Zealand = .22; Russia = .07) and AR (β: Brazil = .15; Czech Republic = .30; Germany = .33; India = .03; New Zealand = .15; Russia = .25). The norm- activation model held across four of the six samples (Brazil, India, New Zealand, and Russia) wherein the relationship between self-transcendence and behavior was stronger for participants high in AC and AR (activated) than for participants low in AC and AR. In Germany and the Czech Republic, the correlations showed an overall positive relationship for both high- and low-activated respondents.

Given the general level of consistency across cultures, we conducted the moderated regression analysis on the aggregated sample. The analyses revealed a number of significant effects and evidence for norm activation. On the first step, self-transcendence was a positive predictor of

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

environmental behavior (β = .18; $p < .001$), as was AC for global issues (β = .18; $p < .001$) and AR for global issues (β = .15; $p < .05$). On the second step, none of the two-way multiplicative effects were significant, and on the third step, the three-way multiplicative effect was significant ($p < .05$). To directly test for norm activation, groups of activated (high AC and high AR) and nonactivated respondents (low AC and AR) were created using median splits.[3] Within each group, the partial correlation between self-transcendence and environmental behavior was calculated, controlling for the mean value response. For the high-activated group, the relationship was .24 ($n = 222$; $p < .001$). For the low-activation group, the relationship was .07 ($n = 304$; $p = .21$). For the middle two groups, the relationship was $r = .18$ and $r = –.06$. Of interest, if we define the high activation group more stringently (only respondents who stated that they were "extremely" responsible and that environmental problems worldwide were "extremely serious"), the relationship between self-transcendence and behavior (controlling for mean response value) was $r = .49$ ($n = 50$; $p < .001$).

For self-enhancement, there was no evidence of norm activation, either at the aggregate level or when conducted separately by country. In the aggregate sample, AR for local issues (β = .19) and AC for local issues (β = .07) were significantly related to environmental behavior. None of the multiplicative effects were significant. Despite the lack of a significant multiplicative effect, we proceeded to calculate the partial correlation coefficient between self-enhancement and behavior (controlling for mean response value) for the activated and nonactivated groups. To test directly for norm activation, groups of high and low activation were created using the same procedure summarized above. For high activation, the partial correlation between self-enhancement and environmental behavior was –.07 ($n = 76$; $p = .53$); for the low-activation group it was –.04 ($n = 409$; $p = .40$). Across all levels of activation, the relationship between self-enhancement and environmental behavior was negative (but not significant). We also conducted the regression analyses separately by country, and the results showed the same overall pattern. AR for local issues was positively related to proenvironmental behaviors (significantly so in Russia, New Zealand, Germany, and the Czech Republic). Similarly, awareness of local consequences was positively related to proenvironmental behavior (significantly so in India and the Czech Republic).

Finally, we wanted to examine the relationship between environmental concern and self- reported environmental behavior. Previous research has reported inconsistent results with respect to egoistic and biospheric concerns and behavior. Our results show that egoistic concerns are negatively related to environmental behaviors ($r = –.26$; $n = 949$; $p < .001$),

[3] We recognize that this is not the ideal procedure to follow a significant multiplicative effect. Following Aiken and West (1991), we also analyzed the data using a simple slopes analysis of centered scores. The conclusions reached from a regression analysis of centered data were identical to that of the uncentered data reported in the text, and our simple slopes analysis of the aggregated sample revealed the same pattern reported in the text.

whereas biospheric environmental concerns are positively correlated with behavior ($r = .21$; $n = 949$; $p < .001$). We conducted the correlational analyses again, separately by country; the results showed the same pattern of correlations, but stronger in Germany, India, and New Zealand and not statistically significant in Brazil, the Czech Republic, or Russia.

DISCUSSION

The results of this study attest to the importance of values in understanding attitudes about environmental issues. Several of the findings replicate results reported previously in studies of environmental attitudes, and several are new. With respect to previously reported findings, our results show considerable evidence for the generalizability of the structure of environmental attitudes across cultures. Consistent with our first hypothesis, results from CFA pro- vided strong support for our three-factor structure, which corresponds to egoistic, altruistic, and biospheric concerns. Previous research has also shown these sets of concerns to be linked to values: That values of self-transcendence tend to be positively correlated with measures of biospheric environmental concerns and negatively with egoistic environmental concerns, whereas values of self-enhancement tend to correlate negatively with biospheric concerns and positively with egoistic concerns (Schultz, 2001). The results reported in this article add additional support for the link between values and attitudes about environmental issues.

There are several possible explanations for the relationship between values and environmental concern identified in this article. First, let us address a methodological issue. Previous studies using Schwartz's values items to study environmental attitudes and behaviors have tended to focus primarily on self-transcendence (Karp, 1996; Nordlund & Garvill, 2002; Schultz, 2001; Schultz & Zelezny, 1999; Stern et al., 1995, Stern et al., 1999), and within self-transcendence to values of universalism. However, the claim that self- transcendent values (particularly universalism) underlie environmental concern is partially artificial. In Schwartz's measure, universalism is composed of nine items: protecting the environment, a world of beauty, unity with nature, broad-minded, social justice, wisdom, equality, a world at peace, and inner harmony. Note that two of the items included within the universalism dimension (protecting the environment and unity with nature) pertain directly to environmental issues. It is not surprising, therefore, that universalism is a strong predictor of other environmental attitudes.

Our results suggest that there is more to the relationship between self-transcendence and environmental attitudes than item similarity. In our analyses, we created separate scales for the universalism (environment) items and the universalism (without the environment) items. Our results show that although universalism (environment) is a significant predictor of biospheric and egoistic environmental concerns, universalism (without the

environment) also provides a unique contribution to the prediction of environmental concerns. We conclude from these analyses that although including the environmental items in the measure of universalism can explain why it tends to be the strongest predictor of environmental concern, the relationship is more than a methodological artifact.

So, the question remains: Why are values of self-transcendence and self-enhancement predictive of environmental concern? In Schwartz's theory of values, self-transcendence means valuing beyond the self. This means a concern for "the welfare and interests of others" (Schwartz et al., 2000, p. 317). But if self-transcendent values were focused solely on other people, we would have found it to correlate with altruistic concerns, which we generally do not see (see Table 3). Rather, we see self-transcendence to be correlated positively with biospheric environmental concerns but negatively with environmental concerns that orient around the self. This suggests that self-transcendent values are broader than other people and incorporate other living things. In contrast, values of self-enhancement lead to concerns for self-interest. We suggest that it is not the values per se that lead to these types of concerns but rather construal of self (Schultz, 2002). People who include aspects of nature within their cognitive representation of self tend to be concerned about more than just *me*. Self-enhancement reflects a narrow construal of self, one that is less inclusive of other people or of other aspects of the living world. Such a self construal leads to more egoistic concerns and a focus on the threats to self posed by environmental problems.

Let us turn now to an examination of the findings reported for the NEP. In previous research (Schultz & Zelezny, 1999), we found three value-types that were predictive of NEP scores: universalism (positively), power (negatively), and tradition (negatively). It is interesting that when universalism is parsed into two scores (one for environment and one without environment), both are significant predictors of NEP scores. In addition, we find that NEP scores are positively related to values of openness (i.e., self-direction and stimulation). Such results are consistent with Dunlap and Van Liere's (1978) conceptualization of the NEP (see also Dunlap et al., 2000). The NEP is proposed to be a reaction against existing values and culture and a recognition that a new view of the relationship between humans and nature will be required for long-term human survival. Thus, although we often conceptualize the NEP as a reaction against Western culture (or even restricted to the United States), these findings suggest that a greater openness and rejection of tradition is linked with NEP scores in other countries as well. Often we believe that low traditional values in other countries out- side the U.S. are linked to an acceptance of Western ideology, a focus on self-interest, personal consumption. These data suggest that greater openness can lead to other outcomes.

THE LINK WITH BEHAVIOR

The findings with respect to environmental behavior were generally

consistent with prior research. Overall, we found that values and environmental concerns explained only a small amount of variance in environmental behaviors. However, analyses of self-transcendence showed a moderated effect, wherein self-transcendence was positively predictive of environmental behavior when activated. For self-enhancement, the analyses showed no evidence of moderation: Self-enhancement tended to be negatively correlated with environmental behavior. A sizeable number of studies have utilized the norm-activation model to explain environmental behavior (Black et al., 1985; Fuhrer, 1995; Guagnano, 1995; Guagnano, Dietz, & Stern, 1994; Hopper & Nielsen, 1991; Noe et al., 1982; Stern et al., 1986; Stern et al., 1995; Van Liere & Dunlap, 1978). Overall, these studies have tended to support the application of the norm-activation model to environmental behavior. However, the bulk of the data applying the norm-activation model to environmental behavior has been collected in the United States. Schultz and Zelezny (1998) found that although the norm-activation model did a good job of predicting environmental behavior in a U.S. sample, it did not work when applied to samples from other countries. The results reported in this article provide clear evidence for norm activation—at least with respect to values of self-transcendence.

In recent years, several researchers have speculated on a possible positive relationship between self-enhancement and environmental behavior under the right conditions (Schultz & Zelezny, 2003; Stern et al., 1993; Stern et al., 1995). However, to date there is little evidence to support such a relationship, and the current findings suggest an unmoderated negative relationship. There are several possible explanations for this finding. First, and the one we tend to favor, is that environmental behaviors are structured and marketed in such a way that they are incompatible with self-interest. It is unclear at this point if the incompatibility is due to the way in which the programs are created (the behaviors are often difficult, requiring effort and commitment on the part of the individual with little or no tangible reward) or whether environmental problems themselves result from individuals acting in their self-interest (as a social-dilemmas approach might suggest). Consistent with the latter, Schwartz et al. (2000) suggest that "because the environment is an object external to self and self- extensions, worries about it may be inherently macro worries" (p. 327).

Another possible explanation for the consistently negative relationship between self- enhancement and environmental behaviors has to do with the activating conditions. In this study, we proposed that seriousness of local environmental problems and AR for these problems is enough to activate self-enhancement and lead to environmental behavior. But perhaps the seriousness of environmental problems has not reached a sufficiently malignant level to activate self-interest. In looking at the mean scores for the seriousness of environ- mental problems in the six samples, it is interesting to note that across all samples, global problems are rated as more serious than local problems (the same finding was reported by

Dunlap et al., 1993, and also by Uzzell, 2000). Respondents are indicating that although environmental problems are serious worldwide, the effects are not yet readily apparent in local communities. If this explanation is correct, then we would expect self-interest to become positively related to environmental attitudes only in situations where there is a direct, perceptible threat to the individual posed by an environmental problem.

Finally, let us comment on the size of the effects reported in this article. Overall, the effects are in the small-to-moderate range. However, given the modest level of reliability for our measures (αs ~ .80 for most measures), these findings are respectable. Adjusting for measurement error to create estimates of the true relationship in the population yields effects that are substantially larger. For example, let us consider the relationship between self- enhancement and behavior in the norm-activated condition (r = .49). The reliability of self- transcendence was .76, and for the behavior scale it was .71. Correcting for these reliability coefficients yields a population estimate of r = .67, which corresponds to 45% of the variance in reported environmental behavior.

COMPARING ACROSS SAMPLES

It is tempting to compare the mean scores on the values and attitudes scales across the samples. However, because these samples are based on university students, they are not representative of the countries, or for that matter even the cities or regions, from which they were obtained. For this reason, we cannot interpret the mean scores as evidence that people in one country are more concerned or score higher on a particular value than people from another. Despite this caution, we do believe that looking at the pattern of mean scores within the samples is warranted. For example, there were clear patterns of environmental concerns within each sample. First, respondents in Brazil and New Zealand were most concerned about the consequences of environmental problems for other people (altruistic environmental concern). We have found this pattern quite often in our international samples. Schultz (2001) reported higher altruistic environmental concerns in 9 of 11 international samples. A second point with respect to the pattern of environmental concerns is the relative preference for biospheric over egoistic concerns. Schultz (2001) reported that the United States and west- ern European countries (England, Germany, Spain) tended to score higher on egoistic concerns than biospheric concerns, whereas many Latin American countries tended to show the opposite pattern: more biospheric than egoistic concerns.

Among the current samples, we find that five (Brazil, India, Germany, New Zealand, and the Czech Republic) score higher on biospheric concerns than egoistic concerns. It is interesting that the Russian sample has a very different pattern of concerns from the other reported samples in this article. The Russian sample was *most* concerned for the harmful

consequences of environmental problems to self, second for other people, and third for the biosphere. However, when we look at the value pattern within the Russian sample, we find a relatively high score on universalism and benevolence (self-transcendence) and a relatively low score on power and achievement (self-enhancement). This pattern is inconsistent with the self construal explanation we provided above for the link between values and environ- mental concern. Given the high level of self-transcendence, we would have predicted higher biospheric concerns and lower egoistic concerns. Yet, at the individual level, we find that self-transcendence is positively related to biospheric concerns and negatively related to egoistic concerns.

CONCLUSIONS

Overall, the data reported in this article provide additional cross-cultural evidence for the link between values, environmental attitudes, and environmental behaviors. Values and culture provide the lens through which our understanding of environmental problems is framed, the aspects of these problems that concern us, and the solutions that seem reasonable and will be effective at addressing these problems. In the past 20 years, cross-cultural research on values has flourished, and the findings have provided a useful framework for psychological research on environmental issues. Yet, such studies are only beginning, and already we as psychologists are being called upon to develop interventions, structure environmental pro- grams, and craft effective environmental messages. Such applied work can only be effective with empirically tested psychological theories and principles, and in the area of environ- mental issues, these theories must be tested cross-culturally.

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