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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2007

[Link to publication in University of Groningen/UMCG research database](#)

VALUE ORIENTATIONS AND ENVIRONMENTAL BELIEFS IN FIVE COUNTRIES
Validity of an Instrument to Measure Egoistic, Altruistic and Biospheric Value Orientations

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Various scholars argue that egoistic, altruistic, and biospheric value orientations are important for understanding environmental beliefs and behavior. However, little empirical evidence has been provided for the distinction between altruistic and biospheric values. This study examines whether this distinction is valid across different countries (i.e., Austria, Czech Republic, Italy, the Netherlands, and Sweden) by using a new value instrument. Relationships between these value orientations and behavior-specific beliefs (i.e., awareness of environmental consequences and personal norms) are investigated to further examine the validity of the value instrument. Results provide support for the generalization of the three-way distinction. Furthermore, value orientations were related to behavior-specific beliefs in all countries. The authors conclude that the distinction between the three value orientations is valid and useful for examining environmentally relevant behavior.

Keywords: value orientations; value instrument; environmental beliefs

There is a growing awareness that the quality of the environment is threatened by problems such as the greenhouse effect, depletion of the ozone layer, water pollution, decline of biodiversity, and desertification (Intergovernmental Panel on Climate Change [IPCC], 2001). These problems stem from human behavior (Gardner & Stern, 2002; Nickerson, 2003). Therefore, it is important to study the factors that influence environmental behavior. In the past decades, many scholars have emphasized the importance of studying relationships between human values and environmental behavior (Dunlap, Grieneeks, & Rokeach, 1983; Naess, 1989). Values are considered to be important because they are general in nature and therefore may affect various beliefs and behaviors simultaneously (Rohan, 2000; Rokeach, 1973).

Various studies have attempted to identify values that provide a basis for environmental attitudes and behavior (e.g., Karp, 1996; McCarty & Shrum, 1994; Stern, Dietz, Abel, Guagnano, & Kalof, 1999). We argue that three different value orientations may be relevant for understanding environmental beliefs and behavior, namely, egoistic, altruistic, and biospheric value orientations. This argument is based on results of a multinational study in which we examined whether these three value orientations could indeed be distinguished in different countries and cultures by using a newly developed value instrument. Finally, we investigate relationships between these value orientations and behavior-specific beliefs (i.e., awareness of environmental consequences and personal norms) to further examine the validity of the value instrument.

VALUES, BELIEFS, AND ENVIRONMENTAL BEHAVIOR

Relationships between values, behavior-specific beliefs, and environmental behavior have been studied extensively in social and environmental psychology (Corraliza & Berenguer, 2000; García Mira, Real Deus, Durán Rodríguez, & Romay Martínez, 2003; Gärling, Fujii, Gärling, & Jakobsson, 2003; Joireman, Lasane, Bennett, Richards, & Solaimani, 2001; Neuman, 1986; Thøgersen & Ölander, 2002; Verplanken & Holland, 2002). Schwartz (1992, 1994) defined a value as "a desirable transsituational goal varying in importance, which serves as a guiding principle in the life of a person or other social entity" (1992, p. 21). The total number of values that people possess is relatively small. Therefore, relative to other antecedents of behavior (e.g., attitudes), values provide an economically efficient instrument for describing and explaining similarities and differences between persons, groups, nations, and cultures (Rokeach, 1973).

A large number of studies concerning values in environmental research are based on Schwartz's Value Theory (1992, 1994). Schwartz proposes a general classification of 56 values. The importance of these values may differ across persons and cultures, but the structure of these values is believed to be universal. Indeed, studies conducted in different countries and cultures reveal that these values may be categorized into two dimensions (Schwartz, 1994; Schwartz & Bardi, 2001; Schwartz et al., 2001). The first dimension, openness to change versus conservatism, distinguishes values that stress independence, such as self-direction and stimulation, from values that emphasize tradition and conformity. The second dimension distinguishes a social or self-transcendent value orientation from an egoistic or self-enhancement value orientation. Whereas the first value orientation includes altruistic and biospheric values such as universalism and benevolence, the latter includes values that are related to pursuit of personal interests, such as power and achievement.

Research shows that especially the self-transcendent (i.e., altruistic or biospheric) versus self-enhancement (i.e., egoistic) dimension is related to different types of environmental beliefs and behaviors, because environmental behavior often involves a conflict between immediate individual gains and long-term collective interests (Nordlund & Garvill, 2002, 2003; Stern, 2000; Thøgersen & Ölander, 2002). Most studies have found that people with a dominating self-transcendent value orientation have stronger proenvironmental beliefs and are more likely to engage in proenvironmental behavior than people who strongly prefer self-enhancement values (Bardi & Schwartz, 2003; Cameron, Brown, & Chapman, 1998; Gärling et al., 2003; Karp, 1996; Nordlund & Garvill, 2002, 2003; Stern & Dietz, 1994; Stern, Dietz, & Guagnano, 1998; Van Vugt, Meertens, & Van Lange, 1995).

Typically, values influence environmental behavior indirectly, via behavior-specific beliefs, attitudes, and norms (Gärling et al., 2003; McCarty & Shrum, 1994; Nilsson, Von Borgstede, & Biel, 2004; Nordlund & Garvill, 2002, 2003; Poortinga, Steg, & Vlek, 2004; Steg, Drijerink, & Abrahamse, 2005; Stern, 2000). Personal norms in particular seem important in this respect. Personal norms refer to feelings of moral obligations to behave proenvironmentally (Gärling et al., 2003; Nordlund & Garvill, 2002, 2003; Stern, 2000). Personal norms originate from values (Schwartz, 1977), that is, people feel morally obliged to act in accordance with their prevalent values. In fact, Nordlund and Garvill (2003) found that self-transcendent values were positively related to personal norms toward willingness to reduce car use. Moreover, personal norms mediated the effects of values on willingness to reduce car use.

Values may also affect the extent to which people are aware of environmental problems associated with their behavior (i.e., awareness of consequences). Awareness of consequences

will increase if important environmental values are threatened, and people may adjust their behavior in accordance to reduce this threat. A number of studies have validated the relationship between values and awareness of consequences (Nordlund & Garvill, 2002, 2003; Schultz & Zelezny, 1998, 1999; Stern & Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995; Stern et al., 1999).

EGOISTIC, ALTRUISTIC, AND BIOSPHERIC VALUE ORIENTATIONS

Several scholars have argued that the self-transcendent value orientation includes both altruistic and biospheric values. For example, Stern and colleagues (Stern, 2000; Stern & Dietz, 1994; Stern, Dietz, & Kalof, 1993; Stern et al., 1998) have proposed that three different value orientations may affect environmental beliefs and behavior, namely, an egoistic (i.e., values focusing on maximizing individual outcomes), a social-altruistic (i.e., values reflecting concern for the welfare of others), and a biospheric value orientation (i.e., values emphasizing the environment and the biosphere).

Most studies related to environmental behavior do not show a distinction of biospheric and altruistic value orientations (Bardi & Schwartz, 2003; Corraliza & Berenguer, 2000; McCarty & Shrum, 1994; Nordlund & Garvill, 2002; Stern & Dietz, 1994; Stern et al., 1998). Studies that did reveal a distinction between biospheric and altruistic values used exploratory principal component analyses or similar methods (Karp, 1996; Nilsson et al., 2004; Schultz et al., 2005; Stern et al., 1998). However, empirical studies have thus far failed to validate the distinction between these egoistic, altruistic and biospheric value orientations via confirmatory factor analysis (CFA). To draw solid conclusions about the distinction of egoistic, altruistic and biospheric values, CFA should be used, because this method is specifically aimed at validating distinctions between factors defined on theoretical grounds.

De Groot and Steg (in press) constructed a brief value instrument that was composed of values from Schwartz's value taxonomy that are most relevant for understanding environmental beliefs and behavior (i.e., values related to the self-enhancement versus self-transcendent dimension). Like Stern and colleagues (Stern et al., 1998), they added some biospheric values because these values were underrepresented in Schwartz's original value scale. In three different studies, the distinction between three value orientations was validated through CFA (i.e., multiple group method). Each value scale had sufficient internal consistency. It appeared that the altruistic and the biospheric value orientation were indeed related differently to behavioral intentions when altruistic and biospheric goals conflicted (i.e., when people had to decide whether to donate to humanitarian or environmental organizations), suggesting that it is useful to distinguish altruistic from biospheric value orientations. However, the study did not reveal whether the difference between three instead of two value orientations can be generalized to other countries and cultures. Consequently, the universal applicability of the distinction of egoistic, altruistic and biospheric value orientations remains unknown for now.

AIM OF THE STUDY

This study aims to examine whether the distinction between egoistic, altruistic, and biospheric value orientations is valid in five countries across Europe that have been found to differ in values (Inglehart, 1995) as well as in environmental attitudes (European

Commission, 2005, 2006). These countries represent five different parts of Europe: Czech Republic represents Eastern Europe, the Netherlands represents Western Europe, Italy represents Southern Europe, Sweden represents Northern Europe, and finally, Austria represents Central Europe. In line with cross-cultural research of Schwartz and colleagues (e.g., Schwartz, 1994; Schwartz & Bardi, 2001; Schwartz et al., 2001), we hypothesize that the structure of values is universal, despite differences in cultures. More specifically, we assume that a distinction between egoistic, altruistic, and biospheric value orientations will be found in all countries.

Furthermore, we hypothesize that relationships between the three value orientations and behavior-specific beliefs, that is, personal norms (PN) and awareness of consequences (AC), are similar across cultures. As an illustration of proenvironmental beliefs, we focus on beliefs related to car use. Reducing car use is seen as a type of proenvironmental behaviour, because car use causes environmental problems such as environmental pollution, extensive land use, and congestion (Eriksson, Garvill, & Nordlund, 2006). We expect that awareness of negative consequences of car use and personal norms toward reducing car use will be positively related to biospheric value orientations and negatively to egoistic value orientations in all countries. We anticipate that the altruistic value orientation shows moderately positive relationships with AC beliefs and PN.

METHOD

PROCEDURE AND RESPONDENTS

In May 2004, an Internet survey was started in five European countries (Austria, Czech Republic, Italy, the Netherlands, and Sweden). Among other things, the survey included questions about values, AC and PN. The questions focused on car use and the (negative) environmental impact of cars. Questionnaires were distributed via e-mail. A link to the questionnaire was sent to acquaintances, family, students, and colleagues with the request to fill out the questionnaire and to send the link to as many other persons as possible (snowball method).[1] We explicitly tried to approach a heterogeneous sample. As planned, our convenience samples showed substantial variation in social demographic variables, such as age, gender, and income. Therefore, we consider the sample appropriate for examining similarities in value structures across countries.

A total of 490 completed questionnaires were returned from the five countries: 94 respondents were from Austria, 106 from Czech Republic, 71 from Italy, 150 from the Netherlands, and 69 from Sweden. One respondent did not fill out the 13 value items and was therefore excluded from further analyses. Because the survey was conducted through the Internet, no exact response rate is known. Respondents' age ranged from 17 to 72 years ($M = 38.21$ and $SD = 12.75$). Forty-five percent of the respondents were male and 55% were female. Data for age and gender for each country are shown in Table 1.

MEASURES

Value orientations. Value orientations were assessed by means of a short version of Schwartz's value scale (1992) developed by De Groot and Steg (in press). This value scale consists of 13 values that belong to the self-enhancement versus self-transcendent dimension. Eleven values are from the original Schwartz value scale, and 2 extra biospheric value items were included, because these were underrepresented in Schwartz's original scale

TABLE 1
Age and Gender of Respondents for Each Country

		Age				Gender		
	N	M	SD	Min-Max	Missing	Percentage Male	Percentage Female	Missing
Austria	94	41.2	10.6	25-65	3	40.4	58.5	1
Czech Republic	106	35.3	12.2	20-66	1	51.9	47.2	1
Italy	71	38.6	13.1	23-70	2	49.3	49.3	1
Netherlands	150	35.7	13.3	17-72	0	48.3	51.0	1
Sweden	69	44.2	11.9	25-67	2	59.4	37.7	2

(cf. Stern et al., 1998). This scale aims to distinguish between egoistic, altruistic and biospheric value orientations. The following values were included: social power, wealth, authority, influential, ambitious (egoistic value orientation), equality, a world of peace, social justice, helpful (altruistic value orientation), preventing pollution, respecting the earth, unity with nature, and protecting the environment (biospheric value orientation). Respondents indicated to what extent these values were important "as a guiding principle in their lives" on a 9-point scale ranging from -1 = *opposed to my values*, 0 = *not important*, to 7 = *extremely important*. Following Schwartz, respondents were urged to vary scores as much as possible and to rate no more than two values as extremely important.

Awareness of consequences (AC) and personal norms (PN). AC was measured with the following 5 items reflecting the extent to which respondents thought car use would be a problem for society: "Car use causes exhaustion of scarce resources, such as oil"; "Car use takes up a lot of space resulting in less space for cyclists, pedestrians and children"; "Car use is an important cause of traffic-related accidents"; "Car use reduces urban quality of life due to traffic noise and odor nuisance"; and "By reducing car use the level of air pollution will decrease." Respondents indicated to what extent they agreed with these items on a 7-point scale ranging from *totally disagree* (1) to *totally agree* (7). Mean scores were computed on items included in the AC scale. Cronbach's alpha for this scale of the full sample was .81 ($M = 5.3$, $SD = 1.2$) and varied from .75 in Czech Republic to .85 in Austria and Sweden.

Furthermore, eight items were included to measure PN, among which "I feel personally obliged to travel in an environmentally sound way, such as by using the bike or public transport"; "I would be a better person if I more often used other transport modes instead of the car"; and "I don't feel guilty when I use the car even though there are other feasible transport alternatives available" (recoded). Mean scores were computed for items belonging to the PN scale. The internal consistency of this scale was good for the full sample (Cronbach's alpha = .83, $M = 4.4$, $SD = 1.1$); Cronbach's alpha's ranged from .74 in Italy to .88 in Sweden.

RESULTS

The multiple group method (MGM), a simple and effective type of confirmatory factor analysis (e.g., Nunnally, 1978; Stuive, Kiers, Timmerman, & Ten Berge, 2006; Ten

TABLE 2
Corrected Correlations Between Value Items and Value Orientations
via Multiple Group Method for Total Sample (N = 489)

	Egoistic Value Orientation	Altruistic Value Orientation	Biospheric Value Orientation
Egoistic values			
1. Social power	**.50**	−.09	−.02
2. Wealth	**.50**	−.05	−.07
3. Authority	**.59**	−.10	−.14
4. Influential	**.52**	.09	.07
5. Ambitious	**.45**	.10	.01
Altruistic values			
6. Equality	−.09	**.51**	.30
7. A world at peace	.03	**.44**	.43
8. Social justice	−.05	**.63**	.35
9. Helpful	.08	**.49**	.30
Biospheric values			
10. Preventing pollution	−.11	.44	**.71**
11. Respecting the earth	.00	.31	**.68**
12. Unity with nature	.00	.41	**.76**
13. Protecting the environment	−.05	.43	**.72**

SOURCE: Adapted from de Groot and Steg (in press).
NOTE: For each item, the highest correlation is printed in bold. Correlations are corrected for "self-correlations."

Berge & Siero, 2001) was used to validate whether the data supported the categorization of value items into the three components (i.e., value orientations) that were identified on theoretical grounds. Here, these components were egoistic, altruistic, and biospheric value orientations. In the MGM, we first defined components on theoretical grounds. For this purpose, we computed the mean score on value items supposedly related to the value orientations. Next, correlations were computed between value items and the three components. For items included in a scale, the correlation coefficients were corrected for "self-correlation," that is, the fact that items automatically correlate high with components in which they take part. Finally, we verified that the value items indeed correlated strongest with the component (i.e., value orientation) to which they were assigned on theoretical grounds. It is assumed that factor structures (i.e., the grouping of value items into the three value orientations) are supported when items correlate strongest with the value orientation they are assigned to on theoretical grounds (see Nunnally, 1978).[2]

Results of the complete sample of 489 respondents confirmed the division of the value items into three value orientations (see Table 2), that is, all value items correlated strongest with the value orientation they belonged to theoretically. Thus, egoistic, altruistic, and biospheric value orientations could be clearly distinguished. Cronbach's alpha was .74 for the egoistic (M_{ego} = 2.5, SD = 1.2), .73 for the altruistic (M_{alt} = 5.1, SD = 1.1) and .86 for the biospheric value orientation (M_{bio} = 5.0, SD = 1.3), respectively. Altruistic value items correlated positively with the biospheric value orientation, whereas biospheric value items correlated positively with the altruistic value orientation (Table 2). Furthermore, altruistic and biospheric value orientations were positively correlated (r = .46, p < .001). Neither the correlation between the egoistic and altruistic value orientation (r = −.02) nor the correlation between the egoistic and biospheric value orientation (r = −.05) was significant.

TABLE 3

Corrected Correlations Between Value Items and Components
via Multiple Group Method for Five Countries

	Austria			Czech Republic			Italy			Netherlands			Sweden		
	Ego	Altr	Bio	Ego	Altr	Bio	Ego	Altr	Bio	Ego	Altr	Bio	Ego	Altr	Bio
Social power	**.52**	−.05	−.07	**.51**	.17	.06	**.57**	−.01	−.08	**.54**	−.27	−.17	**.42**	−.03	.13
Wealth	**.39**	−.10	−.15	**.51**	−.05	−.08	**.51**	−.11	−.14	**.58**	−.05	−.03	**.47**	.04	−.04
Authority	**.52**	−.06	−.19	**.72**	.05	−.11	**.65**	.00	−.17	**.61**	−.12	−.19	**.55**	−.28	−.02
Influential	**.43**	.00	−.03	**.63**	.17	.07	**.37**	.11	.21	**.58**	−.08	.04	**.60**	.27	.19
Ambitious	**.38**	−.05	.13	**.40**	.36	.01	**.38**	.12	.04	**.53**	−.08	−.01	**.46**	.22	.07
Equality	−.13	**.29**	.05	.17	**.59**	.44	−.03	**.32**	.20	−.28	**.56**	.36	−.08	**.54**	.33
A world at peace	−.10	**.32**	.25	.12	.46	**.47**	.06	**.42**	.31	−.05	**.51**	.47	.19	**.50**	.44
Social justice	−.11	**.51**	.27	.09	**.67**	.47	−.05	**.62**	.53	−.11	**.67**	.32	−.07	**.59**	.25
Helpful	.08	**.39**	.17	.19	**.57**	.41	.13	.33	**.60**	−.05	**.55**	.27	.20	**.33**	.20
Respecting the earth	−.21	.16	**.61**	−.09	.50	**.82**	−.03	**.54**	.53	−.12	.49	**.73**	.00	.40	**.72**
Unity with nature	−.09	.25	**.77**	.08	.54	**.85**	−.04	.36	**.53**	−.04	.29	**.62**	.20	.18	**.55**
Protecting the environment	.06	.25	**.73**	.00	.53	**.85**	.03	.54	**.56**	−.09	.38	**.78**	.04	.42	**.74**
Preventing pollution	−.01	.23	**.57**	−.05	.52	**.80**	−.07	.53	**.75**	−.10	.41	**.68**	.07	.46	**.74**
Cronbach's alpha	.69	.59	.83	.78	.77	.93	.73	.63	.78	.79	.77	.85	.73	.70	.84

NOTE: For each item, by country, the highest correlation is printed in bold. Correlations are corrected for "self-correlations." Ego = egoistic value orientation; Altr = altruistic value orientation; Bio = biospheric value orientation. *p < .05. **p < .01.

Subsequently, separate analyses for each country were conducted to examine if the distinction between three value orientations was confirmed within countries. Table 3 reveals that results per country are similar to the overall analysis, that is, as expected egoistic values correlated strongest with the egoistic value orientation, altruistic values with the altruistic value orientation and biospheric values with the biospheric value orientation. Some minor discrepancies were found for the Czech and Italian sample. For the Czech Republic, the altruistic item "a world at peace" correlated somewhat more with the biospheric value orientation after correction for self-correlations. For Italy, the same was true for the altruistic item "helpful," that correlated stronger with the biospheric value orientation, whereas the biospheric item "respecting the earth" correlated slightly stronger with the altruistic value orientation. Again, altruistic and biospheric value orientations were positively correlated, ranging from .27 in Austria to .62 in Italy. Correlations between the egoistic and altruistic value orientation were much lower and not significant (ranging from $r = −.16$ and $r = .07$). An exception was Czech Republic with a correlation that almost reached significance ($r = .19$, $p = .053$). Correlations between the egoistic and biospheric value orientation were close to zero and not significant in all countries (ranging from $r = −.10$ and $r = .10$). Cronbach's alpha's ranged between .69 and .79 for the egoistic, .59 and .77 for the altruistic, and between .78 and .93 for the biospheric value orientation (see Table 3).

TABLE 4

Correlation Coefficients Between Egoistic, Altruistic, and Biospheric Value Orientations, Awareness of Consequences, and Personal Norms in Five Countries

	Austria			Czech Republic			Italy			Netherlands			Sweden		
	Ego	Altr	Bio	Ego	Altr	Bio	Ego	Altr	Bio	Ego	Altr	Bio	Ego	Altr	Bio
AC	−.33**	.09	.06	−.17	.11	.32**	−.15	.04	.19	−.26**	.13	.32**	−.11	.45**	.33**
PN	−.17	.12	.31**	−.28**	.19	.52**	−.21	.17	.34**	−.31**	.18*	.35**	−.00	.32**	.55**

NOTE: PN = personal norms; AC = awareness of consequences.
*$p < .05$. **$p < .01$.

RELATIONSHIPS BETWEEN VALUE ORIENTATIONS, AWARENESS OF CONSEQUENCES, AND PERSONAL NORMS

To further validate the value instrument, relationships between egoistic, altruistic, and biospheric value orientations and awareness of consequences of the impact of car use (AC) and personal norms toward reducing car use (PN) were investigated. First, correlations were computed between value orientations, AC and PN (see Table 4). In general, value orientations show weaker correlations with AC than with PN. Biospheric value orientation correlated positively with AC, although weakly in Austria (Austria: $r = .06$, Italy: $r = .19$, Czech Republic: $r = .32$, the Netherlands: $r = .32$ and Sweden: $r = .33$, respectively). With the exception of Sweden ($r = .45$), correlations between the altruistic value orientation and AC were positive but nonsignificant. The egoistic value orientation showed negative correlations with AC in all countries ranging from −.11 in Sweden to −.33 in Austria. All correlations were in the expected direction.

As expected, in all countries, PN was most strongly and positively correlated with the biospheric value orientation (ranging from $r = .31$ to $r = .55$). PN was positively related with altruistic value orientation as well (ranging from $r = .12$ to $r = .32$), and negatively with the egoistic value orientation (ranging from $r = .00$ to $r = −.31$).

Next, PN and AC were regressed on egoistic, altruistic, and biospheric value orientations. Overall, the three value orientations were able to explain 21% of the variance in PN, $R^2 = .21$, $F(3, 486) = 42.94$, $p < .001$; and 11% of the variance in AC, $R^2 = .11$, $F(3, 386) = 20.20$, $p < .001$. Only egoistic and biospheric value orientations contributed significantly to the explanation of both AC and PN. A stronger egoistic value orientation was related to lower levels of personal norms ($\beta = −.20$, $p < .001$) and lower levels of awareness of consequences ($\beta = −.19$, $p < .001$). As expected, the opposite pattern was found for the biospheric value orientation, that is, the more people valued the biosphere and environment, the stronger their personal norms to reduce car use ($\beta = .40$, $p < .001$) and the more they thought that car use is a problem ($\beta = .25$, $p < .001$).

Table 5 shows the results for the five countries separately. Results were consistent across countries. The proportion of explained variance in PN was higher than for AC in all countries. Value orientations explained 12% to 35% of the variance in PN, and 6% to 25% of the variance in AC. Value orientations were most successful in explaining PN and AC in Czech Republic ($R^2_{PN} = .35$, $F[3, 102] = 18.55$, $p < .001$ and $R^2_{AC} = .14$, $F[3, 102] = 5.29$, $p < .001$), the Netherlands ($R^2_{PN} = .20$, $F[3, 146] = 11.982$, $p < .001$ and $R^2_{AC} = .16$,

TABLE 5
Multiple Regression Analyses for Explaining Personal Norms and Awareness
of Consequences With Values Orientations in Five Countries

	Austria		Czech Republic		Italy		Netherlands		Sweden	
	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β
DV: PN	.12*		.35***		.15**		.20***		.31***	
Ego		−.14		−.25**		−.19		−.28***		−.07
Altruist		.03		−.10		−.04		−.02		.11
Bio		.28**		.58***		.35**		.33***		.50***
DV: AC	.11*		.14**		.06		.16***		.25***	
Ego		−.32**		−.15		−.14		−.23**		−.15
Altruist		.06		−.07		−.10		−.05		.38**
Bio		.02		.36**		.25		.33***		.19

NOTE: DV = dependent variable; PN = personal norms; AC = awareness of consequences.
*$p < .05$. **$p < .01$. ***$p < .001$.

$F[3, 146] = 9.01$, $p < .001$), and Sweden ($R^2_{PN} = .31$, $F[3, 65] = 9.86$, $p < .001$ and $R^2_{AC} = .25$, F[3, 65] = 7.04, $p < .001$).

The biospheric value orientation made the strongest contribution in explaining PN in all countries, with significant betas ranging from .28 in Austria to .58 in the Czech Republic. The more respondents value the environment and biosphere, the stronger they feel morally obliged to reduce their car use. In Czech Republic and the Netherlands, the egoistic value orientation contributed significantly to the explanation of PN as well ($\beta = -.25$ for the Czech Republic and $\beta = -.28$ for the Netherlands). As expected, the more respondents subscribed to egoistic values, the lower were their feelings of moral obligations to reduce car use. The altruistic value orientation did not contribute significantly to the explanation of PN in all countries.

The biospheric value orientation provided the largest positive contribution to the explanation of the variance in AC in Czech Republic ($\beta = .36$, $p < .001$) as well as in the Netherlands ($\beta = .32$). For Austria and the Netherlands, the egoistic value orientation contributed significantly (negatively) to the explanation of AC ($\beta = -.32$, $p < .001$ for Austria and $\beta = -.23$, $p < .01$ for the Netherlands). Finally, the altruistic value orientation did not make a significant contribution to the regression models in four out of five countries (betas ranging from −.06 for Austria to .10 for Italy). The exception is Sweden, where the altruistic value orientation is the only significant predictor of AC ($\beta = .38$, $p < .001$).

DISCUSSION

Various scholars have argued that three different value orientations may be relevant for understanding environmental beliefs and behavior: an egoistic, an altruistic, and a biospheric value orientation. They assume that the self-transcendent value orientation includes both altruistic and biospheric values (Dietz, Stern, & Guagnano, 1998; Stern, 2000; Stern & Dietz, 1994; Stern et al., 1993, 1998). However, most empirical studies thus far failed to validate the distinction between egoistic, altruistic and biospheric value orientations.

Moreover, it yet remains unknown whether a distinction between three value orientations is universal. This study aimed to examine whether the distinction between these three value orientations is valid across different countries and cultures. Our results confirmed the three-way distinction for the overall sample as well as for five countries separately. MGM revealed that, as expected, each value correlated strongest with the value orientation to which it was assigned on theoretical grounds. Therefore, this study validates the distinction between three value orientations instead of two value orientations in different EU countries via CFA.

Our results show that the internal consistencies of the scales were acceptable or good in all countries, although the internal consistency of the altruistic value orientation in the Austrian sample (.59) as well as in the Italian sample (.63) could be improved. Especially the biospheric value orientation showed high internal consistency, followed by the egoistic and the altruistic value orientations. These results provide further support for the three-way distinction of value orientations.

The findings are in line with earlier research of Schwartz and colleagues (e.g., Schwartz, 1994; Schwartz & Bardi, 2001; Schwartz et al., 2001), who also found a universal structure of value orientations despite differences in countries. However, Schwartz did not find a distinction between altruistic and biospheric values. Similarly, other researchers who explicitly examined whether a biospheric value orientation could be distinguished from an altruistic value orientation were not able to validate this distinction (Stern & Dietz, 1994; Stern et al., 1995). At least two explanations for this apparent discrepancy are possible. First, like Stern and colleagues (Stern et al., 1998), we added some biospheric values because these values were underrepresented in Schwartz's value research (1994). Consequently, it is more likely to find a separate biospheric value orientation via CFA.

Second, environmental awareness is relatively high in EU countries (European Commision, 2005, 2006; Franzen, 2003). Stern and Dietz (1994) hypothesized that it is likely that the emerging of a separate biospheric value orientation depends on "an ideological struggle in cultures over whether non-human aspects of the environment should be valued in their own right, and that the proponents of biospheric values have not yet succeeded in generating a clear distinction in general public consciousness between valuing nature in itself and valuing nature because of the human benefits it provides" (p. 78). It may be that this ideology is more developed in the countries included in our study than it was in the United States in 1993 and 1994 (when the research by Stern and colleagues was carried out; Stern & Dietz, 1994; Stern et al., 1995, 1998). However, the level of environmental concern and environmental development also differs between the countries included in this study (Esty, Levy, Srebotnjak, & De Sherbinin, 2005; European Commission, 2005, 2006; Franzen, 2003). Despite these differences, we were still able to find the three-way structure of value orientations. It would be interesting to further validate this short value scale in countries in which nonhuman aspects of the environment are valued less in their own right (perhaps including the United States) to test Stern and Dietz's hypothesis in more detail. To do so, we need clear definitions of which constructs reflect this ideology, and similar methods to measure these constructs should be used in the cultures of interest.

In each country, altruistic and biospheric values were correlated. However, as expected, altruistic values correlated stronger with the altruistic value scale and biospheric values with the biospheric value scale. These findings may be expected based on Schwartz's value theory, because the altruistic and biospoheric values all belong to the self-transcendence cluster. Furthermore, seven out of eight of the altruistic and biospheric value items

included in this study may be typified as "universalism" values according to Schwartz (1992, 1994). Only one item of the altruistic value orientation (i.e., helpful) is associated with the benevolence motivational type, which is closely (positively) related to universalism. There is empirical evidence to suggest that universalism values of the self-transcendent dimension are more closely related to prosocial and proenvironmental behavior than are benevolence values (Axelrod, 1994; Gärling, 1999). This feature makes the results of the cross-national study reported here even more compelling, because an empirical distinction was consistently found between altruistic and biospheric values belonging to one and same motivational type of Schwartz's value scale.

The distinction between three value orientations was further validated by relating the value orientations to behavior-specific beliefs (i.e., AC and PN) that are believed to be related to values and environmental behavior. As expected, relationships between the three value orientations and AC and PN were similar across countries. Value orientations made a significant contribution to the explanation of variance in AC as well as PN in all countries. The only exception was Italy, where none of the value orientations contributed significantly to the explanation of AC. Excluding this exception, the total proportion of variance explained of AC and PN by the three value orientations was relatively high for all countries.

As hypothesized, the egoistic value orientation was, in general, negatively related to AC and PN, whereas the biospheric value orientation was positively related to AC and PN, and the altruistic value orientation was weakly positive or not at all related to AC and PN. The extent to which the three value orientations made a unique contribution to the explanation of AC and PN differed somewhat between countries. This was especially true for AC. For PN, a more consistent pattern of results was found. In each country, the biospheric value orientation was the most significant predictor of PN; that is, the more people thought biospheric values were important guiding principles in their lives, the stronger their feelings of moral obligations were to reduce their car use. The egoistic value orientation made a significant contribution to the explanation of PN only in the Czech Republic and the Netherlands. The more people emphasized the importance of egoistic values, the weaker their personal norms become to reduce car use. It may be that different values are activated in these countries due to differences in their cultural and structural characteristics. For example, differences in structural characteristics of countries, such as the availability and quality of various travel modes, level of congestion, or spatial structure, may activate different values when considering (the problems of) car use. Reductions in car use may more significantly threaten egoistic values when car dependence is high or when less feasible alternatives are available. Biospheric values may be activated more when people are confronted with environmental problems. Therefore, we would expect that which value orientation contributes most to the explanation of behavior-specific beliefs will depend on such country-specific factors. Further research should examine *how* differences between countries may be explained, because proenvironmental behavior, such as reductions in car use, may imply different things for people from different countries.

In all countries, with the exception of Sweden, the altruistic value orientation did not contribute significantly and uniquely to the explanation of AC and PN when the biospheric and egoistic value orientations were controlled for. This result may be due to the fact that altruistic and biospheric value orientations were correlated. In this study, we only focused on behavior-specific beliefs related to (reductions in) car use. Apparently, altruistic and biospheric values play a similar role in this case. Both value orientations are related to PN and AC, but the relationship between biospheric values and these beliefs are stronger.

Biospheric value orientations therefore seem more important when it comes to explaining beliefs regarding car use compared to altruistic value orientations. Different results may be found when altruistic and biospheric values are in conflict. For example, when people are forced to choose between donating either to a humanitarian or an environmental organization, both altruistic and environmental value orientations appeared to contribute to the explanation of donating intentions (De Groot & Steg, in press). The more people were altruistically oriented, the more they intended to donate to humanitarian organizations; and the more people valued the biosphere and environment, the more they preferred to donate to environmental movements. Therefore, in some cases, there may be no unique contribution of both value orientations to the explanation of behavior-specific beliefs, whereas in other cases altruistic and biospheric value orientations may both be differently related to such beliefs. Future research should further examine the construct validity of the value instrument.

Strictly speaking, as we examined self-selected samples of Internet users, we should be careful in generalizing our findings to the population at large in the five countries. Two comments should be made in this respect. First, the only valid way to generalize findings to the population at large is by questioning a true random sample of the population of interest. Social (and cross-cultural) scientists typically do not succeed in doing so. A recent study by Gosling and colleagues (Gosling, Vazire, Srivastava, & John, 2004) revealed that self-selected Internet samples are in no way inferior to alternative sampling methods commonly used in psychological research. Their study further suggests that Internet-based findings are consistent with results based on traditional sampling methods. Thus, our sampling method has similar deficits to any other commonly-used sampling methods that do not yield true random samples (see Gosling et al., 2004) or that use selective samples (such as students or teachers; see for example Schwartz, 1992; Schwartz & Sagie, 2000). Second, since we were especially interested in correlations and did not compare mean scores, a sample that is not fully representative is less problematic (Schultz et al., 2005). Therefore, we think that the method was sufficient for the aim of this study, that is, to validate an instrument to measure the three-way distinction of value orientations in different countries. Based on these comments, it seems reasonable to conclude that the distinction between three value orientations found in the five samples suggests that value structures do not differ across cultures. Of course, our conclusions remain tentative until the value instrument is further validated in different samples and countries to examine whether the distinction between three value orientations is universal.

Results of this study provide support for the distinction of egoistic, altruistic, and biospheric value orientations in different countries. The value orientations appeared to be related to behavior-specific beliefs that have been shown to be important predictors of environmental intentions and behavior (Schwartz, 1977; Stern et al., 1999; Van Liere & Dunlap, 1978). The value instrument used in this study may therefore be a valuable tool to study relationships between values, attitudes, and beliefs related to environmental behavior across different countries and cultures.

NOTES

1. The snowball method may not yield fully representative samples for countries. This should be kept in mind when interpreting results. This would be a problem when considering cross-country comparisons in importance ratings of values, awareness of consequences, and personal norms. However, this is not the purpose of present

study. Furthermore, social demographics (i.e., income, gender, and age) were hardly related to value orientations, awareness of consequences, or personal norms. Thus, it is not likely that the sampling procedure seriously affected the results of this study.

2. We did not report results of maximum-likelihood factor analysis, because the multiple group method (MGM) is a more robust method and is less sensitive for small sample sizes (e.g., MacCallum, Widaman, Zhang, & Hong, 1999; Stuive, Kiers, Timmerman, & Ten Berge, 2006; for a discussion of the serious problems encountered with hypothesis testing in factor analysis, see McCrae, Zonderman, Costa, Bond, & Paunonen, 1996).

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