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Published in:
Society & natural resources

DOI:
[10.1080/08941920903214116](https://doi.org/10.1080/08941920903214116)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

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

Publication date:
2011

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

Citation for published version (APA):

Steg, L., De Groot, J. I. M., Dreijerink, L., Abrahamse, W., & Siero, F. (2011). General Antecedents of Personal Norms, Policy Acceptability, and Intentions: The Role of Values, Worldviews, and Environmental Concern. *Society & natural resources*, 24(4), 349-367. <https://doi.org/10.1080/08941920903214116>

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General Antecedents of Personal Norms, Policy Acceptability, and Intentions: The Role of Values, Worldviews, and Environmental Concern

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Results of two studies are reported, in which we compare the predictive power of three general behavioral antecedents (i.e., values, worldviews, and environmental concern) in explaining personal norms, behavioral intentions (i.e., environmental activism), and acceptability of energy policies. Values—especially biospheric—appeared to be more powerful in explaining personal norms, intentions, and policy acceptability than were worldviews and environmental concern, although these differences were in some cases not statistically significant.

Keywords environmental activism, environmental concern, personal norms, policy acceptability, values, worldviews

Various studies have examined to what extent general behavioral antecedents influence behavior-related beliefs and norms, intentions, and environmental behavior (e.g., Bamberg 2003; De Groot and Steg 2007a, 2008; Gärling et al. 2003; Poortinga, Steg, and Vlek 2004; Nordlund and Garvill 2002, 2003; Nilsson, von Borgstede, and Biel 2004). Behavior-related beliefs and norms reflect opinions on, evaluations of, and norms regarding environmental behavior, such as personal norms (feelings of moral obligations to act pro-environmentally), behavioral and normative beliefs, attitudes, and awareness of the consequences of not acting pro-environmentally. Most studies focused on values, worldviews, and environmental concern. However, it is not clear which general antecedent is most predictive of beliefs and norms related to environmental behavior, intentions, and behavior. This information is highly relevant when deciding which general antecedents should be included in studies aimed to understand and change environmental behavior. Moreover, such information can assist the change agent in deciding which antecedents can best be targeted in environmental campaigns. General antecedents may influence what people attend to, what

Received 13 March 2008; accepted 25 January 2009.

We thank Matthijs Dicke for his assistance during the data collection for study 2.

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knowledge becomes cognitively most accessible, how people evaluate various aspects of the situation, and what alternatives are being considered. Therefore, by targeting general antecedents of behavior, various behavior-related beliefs and norms, intentions, and behaviors may be changed simultaneously.

We aim to examine to what extent different general antecedents predict personal norms, intentions, and policy acceptability. We compare the predictive value of three general antecedents that have extensively been studied in the environmental domain: values, worldviews, and environmental concern. First, we provide definitions of each factor and summarize research findings on the extent to which they predict behavior-related beliefs and norms, intentions, and environmental behavior.

Values, Worldviews, and Environmental Concern

Schwartz (1992, 21) defines *values* as “desirable transsituational goals varying in importance, which serve as a guiding principle in the life of a person or other social entity.” Values are considered to be relatively stable (Stern 2000). Values placed on different targets (e.g., the self, people in general, or the biosphere) direct attention toward value-congruent information, which in turn affects beliefs and norms related to environmental behavior, and willingness to support environmental protection (Stern and Dietz 1994). Three value orientations are relevant in the environmental domain: an egoistic value orientation, in which people try to maximize individual outcomes, an altruistic value orientation, reflecting apprehension for the welfare of other human beings, and a biospheric (or ecocentric) value orientation, in which people focus on interests of nonhuman species and the biosphere (De Groot and Steg 2007a, 2008; Steg, Dreijerink, and Abrahamse 2005; Stern 2000; Stern, Dietz, and Kalof 1993). In general, altruistic and biospheric values are positively related to pro-environmental beliefs and norms, policy acceptability, intentions, and behavior, while egoistic values appeared to be negatively related to these beliefs and norms, policy, acceptability, intentions, and behaviors (e.g., Gärling et al. 2003; Nordlund and Garvill 2002, 2003; Schultz and Zelezny 1998; Stern 2000; Stern et al. 1995; Stern et al. 1999; Thøgersen and Ölander 2002), probably because in many cases, acting pro-environmentally benefits others and the environment, while it is associated with high personal costs (e.g., driving less, reducing thermostat settings, or buying organic food).

Ecological worldviews refer to general beliefs on relationships between humans and the environment. Ecological worldviews are less stable and less general than are values (Stern 2000), as they do not reflect egoistic or altruistic considerations. The most popular measure of ecological worldviews is the New Environmental Paradigm or NEP (Dunlap and Van Liere 1978; Dunlap, Van Liere, Mertig, and Jones 2000), which reflects people’s beliefs about humanity’s ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity’s right to rule over the rest of nature. Mostly, NEP is considered to be a unidimensional measure of ecological worldviews (Dunlap et al. 2000), although some scholars found that NEP reflects multiple dimensions (e.g., anthropocentric and ecocentric beliefs; Bechtel, Corral-Verdugo, Asai, and Gonzalez Riesle 2006; Scott and Willits 1994). NEP appeared to be positively related to beliefs and norms, intentions, policy acceptability, and behavior in the environmental domain, although relationships were generally not strong (e.g., Dunlap et al. 2000; Poortinga, Steg, and Vlek 2002; Poortinga et al. 2004; Schultz and Zelezny 1999; Scott and Willits 1994; Stern,

Dietz, and Guagnano 1995), probably because people do not act out of environmental reasons only.

Environmental concern is defined as the evaluation of the seriousness of environmental problems. Like worldviews, environmental concern focuses on environmental issues only. Schultz (2000, 2001) argued that environmental concern is rooted in a person's value system (see also Stern and Dietz 1994)—that is, people are concerned about environmental problems when these problems threaten things they value. He distinguishes three types of environmental concern reflecting the importance of consequences of environmental problems for oneself, other people, and the biosphere, respectively. Thus, Schultz's scale reflects to what extent people are concerned about environmental problems, and which types of consequences are most worrisome to them. Biospheric concerns appeared to be positively related to environmental behavior, while egoistic and altruistic concerns were hardly related to environmental behavior (Schultz 2001).

Predictive Power of Values, NEP, and Environmental Concern in Explaining Personal Norms, Policy Acceptability, and Intentions

The studies just reviewed indicate that all three general antecedents predict behavior-related beliefs and norms, intentions, and behavior. Most theories assume that general antecedents influence behavior indirectly, via behavior-related beliefs and norms. However, according to the value-belief-norm theory of environmentalism (VBN theory) (Stern et al. 1999; Stern 2000), general antecedents can affect behavior directly as well, although less strongly. We think it is important to examine direct relationships between the general antecedents and intentions and behavior, because this reveals whether changes in general antecedents may result in changes in intentions and behavior, even though this effect may be mediated by behavior-related beliefs and norms.

Values, the NEP, and environmental concern reflect the extent to which people value or are concerned about collective interests and the biosphere, and will therefore probably be particularly related to personal norms. Indeed, Schwartz (1977) argued that personal norms are rooted in internalized values. Similarly, the VBN theory (Stern et al. 1999; Stern 2000) proposes that personal norms are influenced by both values and the NEP. Therefore, we examined relationships between the general antecedents and personal norms. In addition, we examined relationships between general antecedents and the acceptability of environmental policies and intention to engage in environmental activism.

In sum, this article aims to examine which general antecedent, that is, values, the NEP, or environmental concern, is most successful in explaining personal norms, policy acceptability, and environmental activism. Based on the present literature, two competing hypotheses can be put forward. On the one hand, we can hypothesize that the NEP is more successful in explaining personal norms, acceptability of environmental policies, and environmental activism than values are, because the NEP is less general and focuses on environmental issues, while values reflect a wider range of motivations. Less general antecedents mostly better predict intentions and behavior than do more general antecedents (cf. Ajzen 1985; Eagly and Chaiken 1993). In a similar vein, VBN theory (Stern 2000) proposes that values are less strongly related to behavior-specific beliefs and norms (i.e., awareness of consequences, ascription of responsibility, personal norms), intentions, and behavior than is the NEP.

A similar line of reasoning can be followed when comparing the predictive power of values and environmental concern, as environmental concern is less general than values, and even supposed to be rooted in values (Schultz 2000, 2001). Thus, the NEP and environmental concern may better predict personal norms, policy acceptability, and environmental activism than values do (hypothesis 1).

On the other hand, some scholars argue that people do not act out of environmental reasons only (e.g., Stern 2000). In many cases, behavior results from multiple motivations (e.g., Frederik, Loewenstein, and O'Donoghue 2002; Lindenberg and Steg 2007). Following this line of reasoning, values should be more powerful in explaining personal norms, policy acceptability, and intentions, because values reflect a wider range of motivations (e.g., egoistic, altruistic, and biospheric), while the NEP and environmental concern focus on environmental considerations only (hypothesis 2). We expect no differences in the predictive power of the NEP and environmental concern, because both reflect general beliefs on environmental problems (hypothesis 3).

This Article

Results of two studies are reported to test these hypotheses. As our hypotheses concern the predictive power of egoistic, altruistic, and biospheric values in comparison to NEP, and egoistic, altruistic, and biospheric concerns (and not the predictive power of single values and single types of environmental concern), for each dependent variable, we compared the amount of variance (R^2) explained by the general antecedents in two ways. First, for each regression analysis, we computed the confidence interval around R^2 , following the procedure proposed by Olkin and Finn (1995). We consider the R^2 values of regression models to be significantly different when the confidence intervals around the squared multiple correlation of these regression models overlap no more than half of the distance of one side on a confidence interval (see Masson and Loftus 2003). Second, we computed confidence intervals around the differences in squared multiple correlations of regression models, following Alf and Graf (1999). When the confidence interval for the difference between two squared multiple correlations excludes zero, we can conclude with 95% certainty that the regression models differ significantly. In both studies, the three value orientations and the three types of environmental concern were entered in the regression analysis simultaneously (via the Enter method).

In order to examine the robustness of our findings, we investigated general as well as specific personal norms (that is, feelings of moral obligation to engage in specific environmental behaviors as well as to engage in environmental actions in general), policy acceptability, and intention (i.e., environmental activism). Moreover, in study 1, we included a sample of the general population, while study 2 included students. Thus, we aimed to replicate our findings in two studies, using different dependent variables and samples.

Study 1

The first study aimed to examine to what extent values, the NEP, and environmental concern are related to feelings of moral obligation to reduce household energy use and acceptability of energy policies. A more extensive description of the study,

including details on the psychometric properties of relevant measures (except environmental concern), can be found in Steg, Dreijerink, and Abrahamse (2005).

Method

Respondents and Procedure

In 2003, individuals who passed by different locations (e.g., shopping street, train station, department stores) in the city of Groningen, the Netherlands, were asked to participate in a questionnaire study on energy policies. In total, 300 questionnaires were distributed at different times, together with a reply-paid envelope. Of these, 118 were returned (response rate 39%). Since 6 questionnaires were not fully completed, 112 were used in the analysis. Participants were 52 males and 58 females ranging in age from 19 to 81 years ($M = 39.8$, $SD = 16.4$); 33% of participants indicated that their net salary per month was "less than 1200 Euro," 32% "between 1200 and 2500 Euro," and 34% "more than 2500 Euro"; for one respondent these data were missing. Fifteen percent had completed primary, technical, or vocational secondary school education, 39% had completed the highest level of secondary education, and 46% had attained a college or university degree or equivalent. Younger respondents and higher income groups were somewhat overrepresented compared to the population of Groningen and the Netherlands.

Measures

To avoid negative order effects, respondents first completed the values scale, then the environmental concern scale. The NEP scale was included at the end of the questionnaire, after respondents judged the acceptability of environmental policies and completed questions on personal norms. We assumed that judgments of importance of environmental values may change after completing the environmental concern and NEP scale, because people may be tempted to provide socially desirable answers, while completing the value scale first does not have such negative order effects.

Values. Values were assessed using an adapted version of Schwartz's (1992) Value Scale (see Steg et al. 2005). Twelve values were included: authority, wealth, social power, influential (egoistic values), social justice, equality, a world at peace, helpful (altruistic values), preventing pollution, protecting the environment, respecting the earth, and unity with nature (biospheric values). Subjects rated the importance of these 12 values as a guiding principle in their lives on a scale ranging from 0 ("not at all important") to 7 ("of supreme importance"). Participants could also indicate that they were opposed to the value (-1). The multiple group method (MGM) supported the groupings of value items into three value orientations. Three scales were constructed by computing mean scores of values that correlated strongest with each of these three factors; Cronbach's alpha was .65 for the egoistic ($M = 1.6$, $SD = 1.1$), .72 for the altruistic ($M = 5.2$, $SD = 1.0$), and .83 for the biospheric value scale ($M = 4.4$, $SD = 1.2$). Egoistic values were negatively correlated with altruistic ($r = .24$) and biospheric values ($r = -.11$), while altruistic and biospheric values were positively correlated ($r = .48$).

NEP. Respondents completed the revised NEP scale (Dunlap et al. 2000), on a scale ranging from 1 ("fully disagree") to 5 ("fully agree"). Mean scores on the 15 NEP items were computed ($M = 3.5$, $SD = 0.4$; $\alpha = .73$); high scores on NEP reflect that people think humanity is able to upset the balance of nature, that there are

limits to growth for human societies, and that humanity does not have the right to rule over the rest of nature.

Environmental Concern. Participants rated the importance of 12 items reflecting why they are concerned about environmental problems (see Schultz 2000, 2001) on a scale ranging from 1 (“not important at all”) to 7 (“very important”). Schultz has reported different versions of the measure of altruistic concerns. In this study, we did not include the items “my children” and “children,” which were included in some of the versions of this measure. The items included in our questionnaire reflect egoistic concerns (me, my future, my lifestyle, my well-being), altruistic concerns (all people, people in my community, people in the Netherlands, future generations), and biospheric concerns (animals, plants, marine life, and birds). MGM revealed that the altruistic item “people in my community” correlated most strongly with the egoistic concerns scale (which was also found in a study by De Groot and Steg 2007b), while the altruistic item “future generations” correlated most strongly with the biospheric concerns scale. Therefore, these two items were not included in the analyses. All other items correlated most strongly with the scales they belonged to on theoretical grounds. Scores for egoistic, altruistic, and biospheric concerns were created by averaging the relevant items; Cronbach’s alpha was .91 for egoistic concerns ($M = 5.1$, $SD = 1.1$), .73 for altruistic concerns ($M = 5.5$, $SD = 1.0$), and .93 for biospheric concerns ($M = 5.6$, $SD = 0.9$). The three dimensions of environmental concern were positively correlated: $r = .69$ (egoistic and altruistic), $r = .40$ (egoistic and biospheric), and $r = .52$ (altruistic and biospheric).

Personal Norms. Personal norms were measured on a behavior-specific level by means of nine items reflecting feelings of moral obligation to reduce household energy use (e.g., “I feel personally obliged to save as much energy as possible”; “I feel guilty when I waste energy”). Responses were given on a 5-point Likert scale, ranging from 1 (“fully disagree”) to 5 (“fully agree”). We computed the mean score on the nine items ($M = 3.4$, $SD = 0.6$; $\alpha = .84$).

Acceptability of Energy Policies. Respondents evaluated the acceptability of 16 pricing measures aimed to reduce household CO₂ emissions on a scale ranging from 1 (“not acceptable at all”) to 5 (“very acceptable”). Example measures are: “Increase prices of appliances that are not energy efficient by 10%. Revenues are used to reduce national debts”; “Decrease prices of green electricity by 10%. Subsidies are paid from an eco-tax charged on regular energy.” Mean scores of acceptability ratings of the 16 policy measures were computed ($\alpha = .90$; $M = 3.5$, $SD = 0.7$).

Results

Relationships Between General Antecedents, Personal Norms, and Acceptability of Energy Policies. All predictors were significantly related to personal norms (see Table 1). Personal norms were most strongly and positively related to biospheric and altruistic values, and, to a lesser extent, to the NEP. The NEP and values were also significantly related to the acceptability of energy policies. Egoistic values were negatively related to personal norms and acceptability judgments, but these relationships were not strong. Relationships between environmental concern and acceptability judgments were not statistically significant.

Table 1. Correlations between values, NEP, environmental concern, personal norms and acceptability of energy policies (study 1)

	Alt values	Bio values	NEP	Ego concerns	Alt concerns	Bio concerns	Personal norms	Acceptability
Ego values	-.24*	-.11	-.31***	.17	-.01	.02	-.22*	-.27**
Alt values		.48***	.10	.22*	.34***	.30***	.47***	.26**
Bio values			.38***	.30**	.37***	.50***	.59***	.35***
NEP				.09	.10	.35***	.37***	.42***
Ego concerns					.69***	.40***	.28**	.12
Alt concerns						.52***	.31***	.15
Bio concerns							.25***	.02
Personal norms								.54***

Note. Ego: egoistic; Alt: altruistic; Bio: biospheric. Significance: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2. Regression of behavior-specific personal norms on values, NEP, and environmental concern (study 1)

	β	95% CI β	t	R^2	Adj. R^2	95% CI R^2	df	F	f^2
Egoistic values	-.11	-.26, .05	-1.35	.41	.39	.27, .55	3,102	23.80***	.69
Altruistic values	.21	.03, .39	2.33*						
Biospheric values	.49	.32, .66	5.60***						
NEP	.37	.17, .50	4.07***	.13	.13	.01, .25	1,107	16.57***	.15
Egoistic concerns	.11	-.14, .35	.88	.15	.13	.03, .27	3,102	6.12***	.18
Altruistic concerns	.11	-.16, .37	.81						
Biospheric concerns	.25	.04, .46	2.34*						

Note. Significance: * $p < .05$, ** $p < .01$, *** $p < .001$. 95% CI β : 95% confidence interval around β . 95% CI R^2 : 95% confidence interval around R^2 .

Regression of Personal Norms on Values, NEP, and Environmental Concern. Values explained 41% of the variance in personal norms (see Table 2). Stronger altruistic and biospheric values were associated with stronger personal norms. The NEP explained 13% of the variance in personal norms: A higher score on the NEP was associated with stronger feelings of moral obligation to reduce energy use. Environmental concern explained 15% of the variance in personal norms: Higher scores on biospheric concerns were associated with stronger personal norms.

The confidence intervals around R^2 revealed that NEP and environmental concern were significantly less successful in explaining personal norms than values were; the confidence intervals around NEP and environmental concern do not or hardly overlap with the confidence interval around values. Moreover, the difference in explained variance by values and NEP was .28 (95% CI: .10, .46), and the difference in variance explained by values and environmental concern was .26 (95% CI: .11, .41). The explanatory power of NEP and environmental concern did not differ significantly (difference in $R^2 = .05$, 95% CI: -.09, .05).

Regression of Acceptability of Energy Policies on Values, NEP, and Environmental Concern. Values explained 19% of the variance in acceptability judgments (see Table 3). Those who more strongly endorse egoistic values evaluated energy policies as less acceptable, while respondents more strongly endorsing biospheric values evaluated these policies as more acceptable. NEP explained 18% of the variance in acceptability of energy policies; a higher score on NEP was associated with evaluating energy policies as more acceptable. Environmental concern explained only 3% of the variance in acceptability judgments. This model was not statistically significant, and none of the three types of environmental concern made a significant contribution to this model.

Table 3. Regression of acceptability of energy policies on values, NEP, and environmental concern (study 1)

	β	95% CI β	t	R^2	Adj. R^2	95% CI R^2	df	F	f^2
Egoistic values	-.22	-.45, -.05	-2.43*	.19	.16	.06, .32	3,102	7.70***	.23
Altruistic values	.05	-.18, .29	.48						
Biospheric values	.31	.11, .57	2.95**						
NEP	.42	.24, .59	4.79***	.18	.17	.05, .31	1,108	22.97***	.22
Egoistic concerns	.03	-.25, .32	.25	.03	.00	-.03, .09	3,104	.97	.03
Altruistic concerns	.17	-.12, .48	1.16						
Biospheric concerns	-.08	-.33, .16	-.71						

Note. Significance: * $p < .05$, ** $p < .01$, *** $p < .001$. 95% CI β : 95% confidence interval around β . 95% CI R^2 : 95% confidence interval around R^2 .

Both values and NEP explained a significant higher proportion of the variance in acceptability judgments than did environmental concern; the confidence intervals hardly overlap. Moreover, the difference in explained variance by values and environmental concern was .16 (95% CI: .02, .30), and the difference in R^2 by NEP and environmental concern was .15 (95% CI: .06, .24). The amount of variance explained by values and NEP did not differ significantly; the confidence intervals overlap considerably and the difference in R^2 was 1% (95% CI: -.16, .18).

Conclusion

Values were most strongly related to personal norms and acceptability of energy policies. The NEP was as successful as values in explaining acceptability judgments, but was less successful in explaining personal norms. Environmental concern appeared to be less successful in explaining personal norms and acceptability judgments than values. Also, the NEP explained more variance in acceptability judgments than environmental concern, while the explanatory power of the NEP and environmental concern in explaining personal norms did not differ.

These results provide some initial support for hypothesis 2, in which we argued that values would be most successful in explaining personal norms, intentions, and policy acceptability, because values reflect a wider range of motivations (egoistic, altruistic and biospheric), while the NEP and environmental concern mainly focus on environmental considerations. The results do not support hypothesis 1. Partial support was found for hypothesis 3: The NEP and environmental concern explained about the same proportion of variance in personal norms. However, the NEP was more successful in explaining acceptability judgments than was environmental concern.

Study 2

The second study aimed to validate the findings of the first study in another sample (i.e., university students) with different dependent variables.

Method

Respondents and Procedure

Participants in the study were undergraduates at a Dutch University. They were recruited from the Psychology Department's Human Participant Pool in 2005 and received course credits for participation. In total, 298 respondents completed the questionnaire, of whom 24.5% were male and 75.5% female. Mean age was 20 years ($SD = 3.5$).

Measures

Respondents completed questions on values, environmental concern, NEP, personal norms, and environmental activism (items measuring the latter two constructs were combined and presented in random order), respectively. The first and last parts of the questionnaire focused on comprehensibility of traffic signs and route choice and were not related to environmental issues.

Values. We slightly adapted the value instrument used in study 1. To increase the internal consistency of the egoistic value scale, one additional egoistic item was included, "ambitious: hard-working, aspiring." Previous research revealed that this item was strongly correlated with the other egoistic items (see De Groot and Steg 2008). Thus, we included 13 values: five egoistic, four altruistic, and four biospheric values. Again, MGM supported the grouping of value items into three value orientations. Mean scores of values belonging to each scale were computed; Cronbach's alpha was .76 for egoistic ($M = 2.5$, $SD = 1.3$), .71 for altruistic ($M = 5.4$, $SD = 1.0$), and .85 for biospheric values ($M = 4.6$, $SD = 1.3$). Altruistic values were negatively correlated with egoistic values ($r = -.13$), and positively with biospheric values ($r = .43$). Egoistic values were not significantly related to biospheric values ($r = -.11$).

NEP. The NEP was measured in the same way as in study 1 ($M = 3.6$, $SD = .5$, $\alpha = .81$).

Environmental Concern. Again, we employed Schultz's instrument for measuring environmental concern. To further examine the dimensionality of the scale and the reliability of the altruistic concerns scale, we included six altruistic concern items: all people, people in my community, people in the Netherlands, future generations, children, my children. As in study 1, MGM revealed that the altruistic item "future generations" did not correlate most strongly with the altruistic concerns scale. Therefore, this item was not included in further analyses. All other items correlated most strongly with the scales they were assigned to on theoretical grounds. Scores for egoistic, altruistic, and biospheric concerns were created by averaging the relevant items; Cronbach's alpha was .88 for egoistic concerns ($M = 5.4$, $SD = 1.0$), .84 for altruistic concerns ($M = 5.7$, $SD = .8$), and .92 for biospheric concerns ($M = 5.5$, $SD = 1.1$). Again, the three dimensions of environmental concern were positively correlated: $r = .59$ (egoistic and altruistic), $r = .27$ (egoistic and biospheric), and $r = .52$ (altruistic and biospheric).

Personal Norms. Respondents rated six items reflecting their moral obligation to act pro-environmentally on a scale ranging from 1 (“fully disagree”) to 5 (“fully agree”). Example items were “I feel morally obliged to act pro-environmentally” and “I would feel guilty if I would pollute the environment.” Mean scores were computed ($M = 3.5$, $SD = .6$, $\alpha = .83$).

Environmental Activism. Respondents indicated to what extent they agreed with the following six items: “I would vote for a party that is in favor of strong environmental protection”; “I would give money to an environmental organization”; “I would sign a petition in support of more stringent environmental policies”; “I would become a member of an environmental organisation”; “I would agitate in favor of more stringent environmental policies, e.g., demonstrate or boycott products”; “I regularly read about environmental issues in newspapers, magazines and books.” These items were adapted from Stern and colleagues (1999) and reflect the intention to engage in non-activist movement support. Scores could range from 1 “fully disagree” to 5 “fully agree.” We computed the mean scores on these items ($M = 3.1$, $SD = .8$, $\alpha = .84$).

Results

Relationships Between General Antecedents, Personal Norms, and Environmental Activism. All predictors were significantly related to personal norms and environmental activism (see Table 4). Both personal norms and environmental activism were most strongly and positively related to biospheric values and, to a lesser extent, to NEP. Egoistic values were negatively (albeit weakly) related to personal norms and environmental activism.

Regression of Personal Norms on Values, NEP, and Environmental Concern. Values explained 28% of the variance in personal norms (see Table 5). Higher scores on biospheric values were associated with stronger personal norms. NEP explained 19% of the variance in personal norms, and environmental concern explained 18% of the variance in personal norms. Those who scored higher on NEP felt a stronger moral obligation to act pro-environmentally, and higher scores on egoistic and biospheric concerns were associated with stronger personal norms.

The amount of variance explained by values, NEP, and environmental concern did not differ significantly. First, the confidence intervals overlap more than half of the distance of one side of the confidence intervals. Second, the difference in R^2 between values and NEP is .09 (95% CI: $-.08$, $.26$), the difference in R^2 between values and environmental concern is .10 (95% CI: $-.04$, $.24$), while the difference in R^2 between NEP and environmental concern is .01 (95% CI: $-.10$, $.12$).

Regression of Environmental Activism on Values, NEP, and Environmental Concern. Table 6 shows that values explained 36% of the variance in environmental activism. Those who more strongly endorse egoistic values are less likely to engage in environmental activism, while those who more strongly endorse biospheric values are more likely to do so. The NEP explained 21% of the variance and was positively related to environmental activism. Environmental concern explained 21% of the variance in environmental activism as well. Stronger egoistic and biospheric concerns were associated with higher levels of engagement in environmental activism.

Values were significantly more successful in explaining environmental activism than the NEP and environmental concern. First, the confidence intervals overlap less

Table 4. Correlations between values, NEP, environmental concern, personal norms, and environmental activism (study 2)

	Alt values	Bio values	NEP	Ego concerns	Alt concerns	Bio concerns	Personal norms	Environmental activism
Ego values	-.13*	-.11	-.17**	.09	-.11	-.17**	-.15**	-.17**
Alt values		.43***	.26***	.32***	.46***	.28***	.30***	.27***
Bio values			.49***	.42***	.44***	.48***	.51***	.59***
NEP				.19***	.29***	.41***	.44***	.46***
Ego concerns					.59***	.27***	.35***	.35***
Alt concerns						.52***	.35***	.37***
Bio concerns							.31***	.36***
Personal norms								.66***

Note. Ego: egoistic; Alt: altruistic; Bio: biospheric. Significance: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5. Regression of general personal norms on values, NEP, and environmental concern (study 2)

	β	95% CI β	t	R^2	Adj. R^2	95% CI R^2	df	F	f^2
Egoistic values	-.09	-.19, .01	-1.73	.28	.27	.20, .36	3,294	37.80***	.39
Altruistic values	.08	-.02, .19	1.53						
Biospheric values	.47	.36, .58	8.49***						
NEP	.44	.33, .54	8.37***	.19	.19	.11, .27	1,296	70.10***	.23
Egoistic concerns	.23	.11, .36	3.55***	.18	.17	.10, .26	3,294	21.71***	.22
Altruistic concerns	.11	-.04, .26	1.50						
Biospheric concerns	.19	.07, .32	3.12**						

Note. Significance: * $p < .05$, ** $p < .01$, *** $p < .001$. 95% CI β : 95% confidence interval around β . 95% CI R^2 : 95% confidence interval around R^2 .

Table 6. Regression of environmental activism on values, NEP, and environmental concern (study 2)

	β	95% CI β	T	R^2	Adj. R^2	95% CI R^2	df	F	f^2
Egoistic values	-.11	-.23, -.01	-2.22*	.36	.35	.28, .44	3,294	55.25***	.56
Altruistic values	.00	-.12, .12	.04						
Biospheric values	.58	.56, .81	11.17***						
NEP	.46	.42, .65	8.79***	.21	.20	.13, .29	1,296	77.27***	.27
Egoistic concerns	.22	.11, .41	3.42***	.21	.20	.13, .29	3,294	25.75***	.27
Altruistic concerns	.12	-.03, .31	1.58						
Biospheric concerns	.24	.14, .43	3.95***						

Note. Significance: * $p < .05$, ** $p < .01$, *** $p < .001$. 95% CI β : 95% confidence interval around β . 95% CI R^2 : 95% confidence interval around R^2 .

than half of the distance of one side of the confidence intervals. Second, the difference in R^2 between values and the NEP is .15 (95% CI: .05, .25). The difference in R^2 between values and environmental concern is .15 as well (95% CI: .06, .24). No significant difference was found between the explanatory power of the NEP and environmental concern; the confidence intervals fully overlap, and the difference in R^2 is zero (95% CI: $-.07$, $.07$).

Conclusion

We found no significant differences in the explanatory power of the three general antecedents in explaining general personal norms. Values explained a significantly higher proportion of the variance in environmental activism than did the NEP and environmental concern. The NEP and environmental concern explained the same proportion of variance in environmental activism. Again, these results provide partial support for hypothesis 2, while hypothesis 1 is not supported. Moreover, hypothesis 3 was supported: The NEP and environmental concern explained about the same proportion of variance in general personal norms and environmental activism.

Discussion

This article examined to what extent values, worldviews (i.e., NEP), and environmental concern predict personal norms, policy acceptability, and intentions. The pattern of results is consistent: Values generally explained more variance in personal norms, policy acceptability, and intentions (i.e., environmental activism), although the differences were not always statistically significant. More specifically, values explained a higher proportion of the variance in general and behavior-specific personal norms than the NEP and environmental concern did. This difference was statistically significant in study 1, in which we included behavior-specific personal norms, but not in study 2, in which we included a general measure of personal norms. This suggests that behavior-specific personal norms are more strongly influenced by multiple motivations (in this case: values) than are general personal norms. This may be explained by the fact that general personal norms are less binding—that is, they do not specify which environmental behaviors one should perform. In contrast, behavior-specific personal norms clearly reflect which behavior one should engage in. In this case, people will probably be aware of the consequences of this behavior for egoistic, altruistic, and biospheric values, and consequently, personal norms are more likely to be rooted in multiple motivations. Values explained a substantial portion of the variance in general as well as behavior-specific personal norms. These results corroborate Schwartz's (1977) conceptualization of personal norms as internalized values (see also Thøgersen 2002). As expected, NEP and environmental concern explained about the same proportion of the variance in personal norms in both studies.

Furthermore, as expected, values were more strongly related to environmental activism than were the NEP and environmental concern, while the NEP and environmental concern explained about the same amount of variance in environmental activism. The NEP appeared to be as successful in explaining policy acceptability as values, whereas environmental concern was significantly less successful in doing so. We have no plausible explanation for the latter finding. Overall, our studies provide partial support for hypothesis 2, while hypothesis 1 is not confirmed. Moreover, partial support was found for hypothesis 3: In most cases, no differences were found

in the explanatory power of the NEP and environmental concern. However, the NEP appeared to be somewhat more successful in explaining policy acceptability judgments than environmental concern.

Not surprisingly, in line with results from earlier studies (e.g., Karp 1996; see introduction), in general, biospheric values contributed most strongly to the explanation of personal norms, policy acceptability, and intentions. However, in most cases, egoistic or altruistic values played a role as well. Altruistic values were positively related to specific personal norms (study 1), while egoistic values were negatively related to policy acceptability (study 1) and environmental activism (study 2). In sum, values appear to be more predictive of different types of personal norms, policy acceptability, and intentions than worldviews and environmental concern. Moreover, different types of values, and not only biospheric values, played a role. This suggests that personal norms, intentions, and policy acceptability indeed result from multiple motivations (cf. Frederik et al. 2002; Lindenberg and Steg 2007), as values reflect a wider range of motivations than NEP and environmental concern.

A limitation of our studies is that we used convenience samples that were not fully representative of the Dutch population. However, we explicitly approached different samples in order to replicate our findings. Indeed, the same pattern of results was found using different samples and different dependent variables, suggesting that our results are robust.

Regarding the instruments used to assess environmental concern, we found that the distinction between the types of environmental concern was not fully supported in our studies. In study 1, two altruistic concern items did not correlate strongest with the factor they were assigned to on theoretical grounds. Study 2 revealed that the item “future generations” was more strongly related to biospheric concerns than to altruistic concerns. Apparently, at least Dutch respondents associate future generations with biospheric concerns, probably because both are related to sustainable development. Altruistic concerns seem to reflect concerns about the current population only. Furthermore, the three types of environmental concern were strongly correlated in both studies, which corroborates earlier studies (Schultz et al. 2004; 2005). This suggests that the three types of environmental concern may best be seen as subdimensions of a unidimensional measure of environmental concern (as is the NEP; see introduction; see also Schultz et al. 2004).

Implications

Our findings have important theoretical as well as practical implications. Theoretically, our results indicate that values are more predictive of personal norms, policy acceptability, and intentions than are general antecedents that more specifically focus on environmental problems (i.e., NEP and environmental concern). This suggests that future studies aimed to understand and change behavior-related beliefs and norms, policy acceptability, intentions, and behavior can best focus on the role of values, and examine how values can best be changed or how people can be motivated to act upon their (biospheric) values. Our results challenge assumptions included VBN theory, which proposes that the NEP is more strongly related to personal norms, intentions, and policy acceptability than are values because the NEP focuses on environmental issues only (Stern 2000). VBN theory assumes that values precede NEP, and NEP precedes personal norms, intentions, and policy acceptability. All variables are supposed to influence variables further down the

causal chain indirectly as well as directly, but relationships are expected to be weaker as variables are further apart in the causal chain. However, our results indicate that values are more strongly related to personal norms, intentions, and policy acceptability than is the NEP. We found further support for this reasoning in a series of mediation analyses aimed to examine whether the NEP and environmental concern mediate the influence of values on the dependent variables. Generally, the NEP and environmental concern did not significantly contribute to the explanation of the variance in the dependent variables (general and specific personal norms, policy acceptability, and environmental activism) when values were controlled for. However, egoistic concerns significantly contributed to the explanation of the variance in general personal norms (study 2), next to egoistic and altruistic values, while the NEP significantly contributed to the explanation of the variance in policy acceptability (study 1) when values were controlled for. We did not report these results in detail due to space restriction.

The value instrument used in this study appears to be a parsimonious, reliable, and valid instrument that is useful for understanding relationships between values, personal norms, policy acceptability, and intentions. Our studies revealed that values can explain a substantial proportion of the variance in these variables. The predictive power of this value instrument is comparable to, and sometimes even better than, that of more extended scales based on Schwartz's value scale (e.g., Karp 1996; Nilsson et al. 2004; Schultz and Zelezny 1999).

Practically, our results indicate that personal norms, policy acceptability, and intentions can best be promoted by strengthening biospheric and altruistic values, or by weakening egoistic values (e.g., via education or communication strategies). Changing values is not easily accomplished. However, our results reveal that biospheric values are important for many people. This suggests that people should be motivated to act upon their values as to make sure that biospheric values play a more significant role in their decisions. Also, the cognitive accessibility of biospheric and altruistic values can be increased: it is more likely that people act in line with these values when they are made more salient (cf. Maio and Olson 1998; Verplanken and Holland 2002). When the role of altruistic and biospheric values in decision making is strengthened or when these values are cognitively better accessible, various types of behavior-related beliefs and norms, intentions, and behaviors can change simultaneously.

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