

University of Groningen

The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions

Steg, Linda; Perlaviciute, Goda; van der Werff, Ellen; Lurvink, Judith

Published in:
Environment and Behavior

DOI:
[10.1177/0013916512454730](https://doi.org/10.1177/0013916512454730)

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:
2014

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

Citation for published version (APA):

Steg, L., Perlaviciute, G., van der Werff, E., & Lurvink, J. (2014). The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions. *Environment and Behavior*, 46(2), 163-192. <https://doi.org/10.1177/0013916512454730>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions

Environment and Behavior

2014, Vol 46(2) 163–192

© 2012 SAGE Publications

Reprints and permissions:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/0013916512454730

eab.sagepub.com

Linda Steg¹, Goda Perlaviciute¹,
Ellen van der Werff¹, and Judith Lurvink¹

Abstract

This article aimed to demonstrate that hedonic values are important for understanding environmentally relevant beliefs, preferences, and actions, next to egoistic, altruistic, and biospheric values. In four studies, the authors found consistent support for their hypothesis that hedonic, egoistic, altruistic, and biospheric values can be distinguished empirically, suggesting that the distinction between the four types of values is not only theoretically meaningful but also recognized by individuals. Importantly, in line with the authors' expectations, hedonic values appeared to be significantly and negatively related to a range of environmentally relevant attitudes, preferences, and behaviors, even when the other values were controlled for. This suggests that it is indeed important to include hedonic values in environmental studies and that interventions aimed to promote proenvironmental actions should consider hedonic consequences of actions, as these may be important barriers for behavior change.

Keywords

values, hedonic values, attitudes, preferences, environmental behaviour

¹University of Groningen, Netherlands

Corresponding Author:

Linda Steg, Faculty of Behavioural and Social Sciences, Department of Psychology, University of Groningen, Grote Kruisstraat 2/1, 9712 TS Groningen, Netherlands.

Email: e.m.steg@rug.nl

Many proenvironmental actions are associated with individual costs in terms of time, money, effort, or comfort. For example, many believe that traveling by car is more comfortable than using public transport (e.g., Steg, 2005), and organic products are generally more expensive than regular produce. Yet, despite this, many people do act proenvironmentally. For example, many individuals recycle or try to reduce their energy use in some way. One important reason for engaging in proenvironmental actions may be that individuals value the environment and want to protect environmental quality (De Groot & Steg, 2008; Thøgersen & Ölander, 2003). However, in other situations, people may refrain from proenvironmental actions because they value their finances, comfort, or enjoyment higher than the environment. For example, people prefer to drive rather than to travel by public transport because they find driving more comfortable and pleasurable (Bamberg & Schmidt, 2003; Steg, 2003). Indeed, human values are believed to play an important role in proenvironmental actions (Crompton & Kasser, 2009; Dunlap, Grieneeks, & Rokeach, 1983; Maio, 2010; Naess, 1989). Some values may inhibit particular proenvironmental actions, whereas other values promote such actions.

We define environmental behavior by its impact: behavior that changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere (see Stern, 2000). Therefore, we follow an impact-oriented definition of environmental behavior. It has been suggested that three types of values are most important to understand environmentally relevant beliefs, preferences, and actions: egoistic, altruistic, and biospheric values. In the current article, we aim to demonstrate that hedonic values play an important role in the environmental domain as well, next to egoistic, altruistic, and biospheric values. Before we put forward our hypotheses, we first explain why we propose that hedonic values should be considered when explaining environmentally relevant attitudes, preferences, and actions.

Values, Environmentally Relevant Attitudes, Preferences, and Actions

Schwartz (1992) defined values as “desirable transsituational goals varying in importance, which serve as a guiding principle in the life of a person or other social entity” (p. 21). Values function as criteria or frameworks against which present experience can be tested (Feather, 1995). Values influence what people attend to, what knowledge becomes cognitively most accessible, how much importance people ascribe to different consequences of actions, how people evaluate various aspects of the situation, and what alternatives are

being considered. In the environmental domain, 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, attitudes, preferences, and norms related to environmental behavior, and willingness to support environmental protection (Stern & Dietz, 1994). Values may affect various beliefs, preferences, and behaviors simultaneously (Rohan, 2000; Rokeach, 1973) and are considered to be relatively stable in time (Stern, 2000), which makes it particularly relevant to study values. Moreover, values appeared to be more predictive of environmentally relevant beliefs, preferences, and behavior than other general beliefs, such as environmental concerns and worldviews (Steg, De Groot, Dreijerink, Abrahamse, & Siero, 2011). Values are culturally shared, and people may endorse the same values. However, different individuals are likely to prioritize various values differently. This implies that when people face conflicting values, they will base their choice on the values that they consider the most important to act on, resulting in different choices for people who prioritize their values differently.

Various studies examined which values provide a basis for environmentally relevant beliefs, attitudes, preferences, and behaviors (e.g., De Groot & Steg, 2007, 2008; Karp, 1996; McCarty & Shrum, 1994; Stern, Dietz, Abel, Guagnano, & Kalof, 1999). These studies were mostly based on Schwartz's (1992, 1994) value theory, which proposes that the structure of values is similar across countries and cultures. Indeed, Schwartz found extensive evidence for a general value system in which human values are plotted in a two-dimensional space. The first dimension distinguishes values reflecting openness to change versus conservatism, reflecting whether individuals are open to new things and ideas versus whether they have a preference for tradition and conformity. The second dimension distinguishes self-enhancement values, which reflect a concern with one's own interests, versus self-transcendence values, reflecting a concern with collective interests. Various environmental psychologists used this theory to explain environmentally relevant beliefs, preferences, and actions, and found that especially values from the self-transcendent versus self-enhancement dimension were relevant in the environmental domain: Individuals who strongly endorse self-transcendent values are more likely to have proenvironmental beliefs, attitudes, preferences, and to act proenvironmentally, whereas the opposite is true for those who strongly endorse self-enhancement values (e.g., Collins, Steg, & Koning, 2007; Dietz, Fitzgerald, & Shwom, 2005; Kalof, Dietz, Stern, & Guagnano, 1999; Nordlund & Garvill, 2002, 2003; Schultz et al., 2005; Stern, 2000; Stern, Dietz, & Guagnano, 1998; Stern, Dietz, Kalof, & Guagnano, 1995; Thøgersen & Ölander, 2002).

Self-transcendence values imply that people consider the interests of the collective when making choices. Recent studies that build on Schwartz's (1992, 1994) value theory revealed that two types of self-transcendence values can be distinguished that may differ in their effects on environmentally relevant beliefs, attitudes, preferences, and behaviors: altruistic and biospheric values (De Groot & Steg, 2007, 2008, 2010; Grønhøj & Thøgersen, 2009; Nilsson, Von Borgstede, & Biel, 2004; Steg, Dreijerink, & Abrahamse, 2005; Steg et al., 2011). Biospheric values reflect a concern with the quality of nature and the environment for its own sake, without a clear link to the welfare of other human beings. As such, they differ from altruistic values that reflect a concern with the welfare of other human beings. Generally, both altruistic and biospheric values were positively related to proenvironmental beliefs, attitudes, preferences, and behaviors (e.g., De Groot & Steg, 2008, 2010; Honkanen & Verplanken, 2004; Nilsson et al., 2004; Nordlund & Garvill, 2002, 2003; Schultz & Zelezny, 1998; Steg et al., 2005, 2011; Stern, 2000; Stern et al., 1995, 1999; Thøgersen & Ölander, 2002). In addition, altruistic and biospheric values were obviously correlated (as both reflect self-transcendence values), but generally, biospheric values were more predictive of proenvironmental beliefs, attitudes, preferences, and behaviors than altruistic values (De Groot & Steg, 2007, 2008; Nilsson et al., 2004; Steg et al., 2005). More importantly, when altruistic and biospheric values were in conflict, they appeared to predict preferences and behaviors in the opposite direction. For example, biospheric values were positively related, whereas altruistic values were negatively related to the likelihood of donating money to environmental rather than humanitarian organizations (De Groot & Steg, 2008). Such a conflict between biospheric and altruistic values may also occur, for example, when choosing whether to buy organic or fair trade products, or whether to vote for a social or a green party. This implies that it is important to distinguish altruistic and biospheric values as two separate clusters of self-transcendence values.

Self-enhancement values imply that individuals focus on their personal costs and benefits when making choices: People with strong self-enhancement values act proenvironmentally when the perceived individual benefits of such actions exceed the perceived costs (and vice versa). In environmental studies, self-enhancement values have mostly been conceptualized as egoistic values, focusing on costs and benefits of choices that influence the resources people have, such as wealth, power, and achievement (e.g., De Groot & Steg, 2007, 2008; Nordlund & Garvill, 2002). Self-enhancement and egoistic values typically correlated negatively with proenvironmental beliefs, attitudes, preferences, and behaviors (e.g., De Groot & Steg, 2008, 2010; Honkanen &

Verplanken, 2004; Nordlund & Garvill, 2002; Schultz & Zelezny, 1998; Steg et al., 2005, 2011; Stern et al., 1995), suggesting that individuals are less concerned about the environment when they care much about personal gains as reflected in strong egoistic values.

However, sometimes people refrain from proenvironmental actions although it actually promises more personal gains and increases in individual resources, for example, in terms of money (e.g., energy savings result in financial savings as well), or time (e.g., people keep on driving their car although traveling by public transport or cycling would save time). We suggest that this is because proenvironmental actions threaten other types of personal benefits that are not represented by egoistic values, in particular, pleasure and comfort. These benefits are rooted in hedonic values, which are mainly focused on improving one's feelings and reducing effort. Therefore, we propose that hedonic concerns, rooted in hedonic values, play an additional role in understanding environmentally relevant beliefs, attitudes, preferences, and behaviors, next to egoistic, altruistic, and biospheric values. More specifically, we argue that to better understand environmental actions, we should distinguish not only two types of self-transcendence values (altruistic and biospheric values) but also two types of self-enhancement values: egoistic values, reflecting costs and benefits that affect individual resources (such as money and power), and hedonic values, reflecting a concern with improving one's feelings and reducing effort.¹ Hedonic values may be particularly related to environmentally relevant beliefs, attitudes, preferences, and actions when acting proenvironmentally requires effort or reduces comfort. For example, turning down the thermostat benefits the environment, but may reduce comfort, and driving may be more pleasurable although other modes of transport are less polluting.

Two lines of research support our proposition on the significance of hedonic values. First, various scholars acknowledged the significance of hedonic consumption, and stressed that affective motives and hedonic aspects play a key role in consumption behavior (Dittmar, 1992; Hirschman & Holbrook, 1982). The purchase and use of consumer goods may elicit emotions, and individuals anticipate these emotions when making choices. As many consumer behaviors have environmental impact, and thus can be considered as environmental behaviors (following our impact-oriented definition), hedonic aspects should play a key role in predicting environmental behavior as well. Indeed, research suggests that material products with environmental impact, such as cars, are purchased and used because of their hedonic value (e.g., Dittmar, 1992; Hirschman & Holbrook, 1982), and because people derive pleasure from using these products (Ellaway, Macintyre, Hiscock, & Kearns, 2003; Gatersleben, 2007; Hiscock, Macintyre, Kearns, & Ellaway, 2002;

Mann & Abraham, 2006; Steg, 2005; Steg, Vlek, & Slotegraaf, 2001). In addition, hedonic values appeared to be positively related to the intention to buy genetically modified food (e.g., Honkanen & Verplanken, 2004). The significance of these hedonic aspects is likely to be rooted in hedonic values.

Second, and related to the previous argument, goal-framing theory proposes that behavior is governed by three overarching goals: hedonic goals “to feel better right now,” gain goals “to guard and improve one’s resources,” and normative goals “to act appropriately” (Lindenberg & Steg, 2007). A priori, hedonic goals are strongest, whereas normative goals are weakest. Like values, goals steer or “frame” the way people process information and act on it. However, whereas values are general and transcend situations, goals are situation specific as they are activated in a particular situation. Values influence the chronic accessibility of these goals, that is, when someone strongly endorses a particular value, it is more likely that goals aligning to that value will be relatively strong (and thus focal) in a given situation. Lindenberg and Steg (2007) proposed that hedonic goals may strongly influence environmental behavior as these goals are a priori strongest. Therefore, on the basis of goal-framing theory, we may also expect that hedonic values influence environmentally relevant beliefs, attitudes, preferences, and behavior, as they are likely to influence the strength of hedonic goals.

In sum, theories on hedonic consumption and goal-framing theory suggest that it may indeed be important to distinguish two types of self-enhancement values to understand environmentally relevant beliefs, attitudes, preferences, and actions: hedonic and egoistic values. In general, both values are likely to be negatively related to proenvironmental beliefs, attitudes, preferences, and actions. Hedonic values are likely to make people focus on possible hedonic aspects of environmental behavior, such as pleasure, discomfort, or effort. Accordingly, hedonic values may be particularly relevant to environmental behaviors that have evident hedonic consequences. A study by Thøgersen and Ölander (2002) provides some initial evidence for the significance of hedonic values in the environmental domain. They found a weak negative correlation between hedonic values and sustainable consumption patterns; however, the reliability of the hedonic value scale was low in their study.

This study aimed to examine whether it is indeed useful to include hedonic values in environmental research. More specifically, we examined whether we can reliably distinguish a separate hedonic value cluster as a specific type of (self-enhancement) values,² and additionally whether hedonic values predict attitudes, preferences, and behavior in the environmental domain. First, we hypothesized that hedonic values can be distinguished empirically from

egoistic, altruistic, and biospheric values. Second, we hypothesized that hedonic values are significantly and mostly negatively related to environmentally relevant attitudes, preferences, and behaviors, and, importantly, we expect that this is even true when egoistic, altruistic, and biospheric values are controlled for. Therefore, we first report bivariate correlations between values and the variables of interest, and next report results of regression analyses to examine the unique contribution of each value type in explaining these variables. To test the robustness of our findings, we conducted four studies in which we included attitudes, preferences, and actions in different environmental domains, including travel behavior, consumer preferences, and household energy use.

Study I

Study I aimed to examine whether we can empirically distinguish hedonic, egoistic, altruistic, and biospheric values. Moreover, we tested the reliability of the value scales.

Method

Respondents and procedure. A total of 142 randomly selected residents in different neighborhoods in a city in the Netherlands were visited and asked to participate in the study. The questionnaires were later picked up by the interviewer on agreement. The questionnaire aimed to examine the effects of different neighborhood characteristics on quality of life in the neighborhood (not to be discussed here). After evaluating the effects of different neighborhood designs on quality of life, all respondents completed the value scale.

In total, 100 valid questionnaires were collected (response rate 70%); 43% of the respondents were male. Age ranged from 18 to 80 ($M = 36$, $SD = 15.3$). About 36% had completed primary, technical, or vocational secondary school education, 39% had completed the highest level of secondary education, and 23% had attained a college or university degree or equivalent, whereas 2% attained an “other” type of education. In all, 30% of the participants indicated that their income per month was “less than 1,000 euro,” 27% “between 1,000 and 2,000 euro,” 27% “between 2,000 and 3,000 euro,” and 14% earned more than 3,000 euro per month; for one respondent, this information was missing.

Measures. Values were assessed by means of a short version of Schwartz’s value scale (1992) developed by De Groot and Steg (2008). The scale has extensively been tested and validated in various studies (De Groot & Steg,

Table 1. Corrected Correlations Between Value Items and Value Clusters via Multiple Group Method (Study 1).

	Value cluster			
	Hedonic	Egoistic	Altruistic	Biospheric
Hedonic values				
1. Pleasure	.53	.29	.19	.25
2. Enjoying life	.54	.24	.15	.21
3. Gratification for oneself	.61	.45	.19	.14
Cronbach's alpha = .73				
Egoistic values				
4. Social power	.18	.57	-.26	-.16
5. Wealth	.43	.55	-.11	-.14
6. Authority	.16	.47	-.06	.02
7. Influential	.28	.57	.05	.16
8. Ambitious	.42	.48	-.06	.02
Cronbach's alpha = .76				
Altruistic values				
9. Equality	.14	-.12	.58	.48
10. A world at peace	.32	-.15	.55	.53
11. Social justice	.13	-.06	.73	.54
12. Helpful	.11	-.00	.57	.45
Cronbach's alpha = .79				
Biospheric values				
13. Respecting the earth	.16	-.15	.67	.85
14. Unity with nature	.16	-.08	.50	.77
15. Protecting the environment	.38	-.01	.58	.83
16. Preventing pollution	.27	.05	.57	.75
Cronbach's alpha = .91				

Note: Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are in bold.

2007, 2008, 2010; Steg et al., 2005, 2011). To the initial scale, we added three hedonic value items proposed by Schwartz (1992). The resulting scale included 16 values (see Table 1). Following Schwartz (1992), respondents rated the importance of these 16 values "as guiding principles in their lives" on a 9-point scale ranging from $-1 =$ *opposed to my principles*, $0 =$ *not important* to $7 =$ *extremely important*. Respondents were urged to vary the scores and to rate only few values as extremely important.

Results

The multiple group method (MGM), a simple and effective type of confirmatory factor analysis (e.g., Guttman, 1952; Nunnally, 1978; Stuijve, 2007), was used to verify whether the data supported the groupings of aspects into the four types of values that were identified on theoretical grounds. We first defined the theoretical components (i.e., the four value scales) by computing the mean score on value items supposedly related to the value scales. Next, we computed the correlations between all value items and the four components (i.e., value scales). 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 whether the value items indeed correlated strongest with the value scale to which they were assigned on theoretical grounds. It is assumed that the factor structure (i.e., the grouping of value items into the four types of values) is supported when items correlate strongest with the value scale they are assigned to on theoretical grounds (see Nunnally, 1978).

Table 1 shows that each item indeed correlated strongest with the value scale with which it was supposed to be associated. The Cronbach’s alpha of the value scales ranged from .73 to .91. Altruistic value items appeared to be substantially correlated with the biospheric values and biospheric value items with the altruistic values. Although one hedonic value item (i.e., gratification for oneself) correlated relatively strongly with the egoistic values as well, and two egoistic value items (i.e., wealth and ambitious) correlated relatively strongly with the hedonic values too, the value items correlated most strongly with the value cluster they were assigned to on theoretical grounds, supporting our first hypothesis.

As may be expected, the value scales were correlated. Hedonic values correlated positively with egoistic values ($r = .42, p < .001$), and somewhat weaker with altruistic values ($r = .21, p = .037$) and biospheric values ($r = .24, p = .018$). Altruistic values correlated positively with biospheric values ($r = .63, p < .001$), whereas egoistic values did not significantly correlate with altruistic and biospheric values.

Discussion

As expected, the MGM supported the distinction between the four types of values, suggesting that hedonic values can empirically be distinguished from egoistic, altruistic, and biospheric values. Therefore, in line with Schwartz’s (1992, 1994) original work, we found that hedonic values form a coherent

and separate value cluster. More specifically, we managed to empirically distinguish hedonic values within a set of values most important in the environmental domain and when including more biospheric values than in Schwartz's original scale. As in previous studies (e.g., De Groot & Steg, 2007, 2008, 2010; Steg et al., 2005), altruistic value items were substantially correlated with biospheric values and biospheric value items with altruistic values. In addition, one hedonic value item correlated relatively strongly with egoistic values as well, and two egoistic value items correlated substantially with hedonic values too. Yet, importantly, the value items correlated most strongly with the value cluster they were assigned to on theoretical grounds, and the internal consistency of the scales was high, providing support for Hypothesis 1. In line with Schwartz's (1992, 1994) theory, the value scales were correlated. As expected, strongest correlations were found between both types of self-enhancement values (viz., hedonic and egoistic values), and between both types of self-transcendence values (viz., altruistic and biospheric values).

Study 1 showed that we can empirically distinguish hedonic values from egoistic, altruistic, and biospheric values. But is it worthwhile to include hedonic values in environmental research? Do hedonic values predict environmentally relevant attitudes, preferences, and behaviors, even when egoistic, altruistic, and biospheric values are controlled for? These questions will be addressed in the next studies.

Study 2

Study 2 aimed to replicate the findings of Study 1. Second, we tested the predictive power of hedonic values by examining whether hedonic values are related to attitudes and choices in the environmental domain. We focused on an environmental behavior that has evident positive hedonic and egoistic consequences: car use. Previous studies revealed that individuals believe that car use has many instrumental as well as affective advantages (Steg, 2003, 2005), and that the purchase and use of cars is positively associated with egoistic values (see, for example, De Groot & Steg, 2007, 2008, 2010). Therefore, we expected that both hedonic and egoistic values would be positively related to car attitudes and car use, and that both hedonic and egoistic values would uniquely contribute to the explanation of car attitudes and car use. Moreover, we expected that altruistic and biospheric values would not be strongly related to car attitudes and car use, as previous studies suggest that self-transcendence values were not strongly related to beliefs and norms related to car use (Nordlund & Garvill, 2003), and that

environmental considerations do not play a key role in travel choices (e.g., Bamberg & Schmidt, 2003).

Method

Respondents and Procedure. An online questionnaire study was conducted in 2011. Participants were recruited by an online survey company who approached a representative sample of the Dutch population from their panel. In total, 305 respondents participated, of which 155 were females. One participant did not report his or her gender. The mean age of participants was 43.9 years ($SD = 13.63$).

Measures

Values. We used the same value instrument as in Study 1.

Car attitude and car use. Respondents indicated to what extent they see themselves as a car lover. Responses could vary from 1 = *absolutely not* to 7 = *absolutely yes*. Furthermore, respondents indicated how often they drive their car. Responses could vary from 1 = *a few times per year*, 2 = *a few times per month*, 3 = *once per week*, 4 = *a few times per week*, and 5 = *daily*. Finally, respondents were asked to indicate how many kilometers they drove in a car in the year preceding the study.

Results

Table 2 shows that again, the four clusters of values could be distinguished empirically, with one exception: The altruistic item "A world at peace" correlated slightly higher with the biospheric value scale than with the altruistic value scale. Otherwise, the pattern of results was similar to the results of Study 1. This time, the hedonic value items correlated most strongly with hedonic values and only weakly with egoistic values, whereas the opposite was true for egoistic value items. The Cronbach's alpha of the four value scales was good, ranging from .76 to .89. Hedonic values correlated positively with egoistic values ($r = .33, p < .001$), altruistic values ($r = .30, p < .001$), and biospheric values ($r = .19, p < .001$). In addition, altruistic values correlated positively with biospheric values ($r = .66, p < .001$), whereas egoistic values correlated negatively with altruistic ($r = -.16, p = .004$) and biospheric values ($r = -.17, p = .002$).

Next, we first examined correlations between the four values, car attitudes and car use. The stronger the respondents' hedonic ($r = .30, p < .001$) and egoistic values ($r = .37, p < .001$), the more they see themselves as a car lover.

Table 2. Corrected Correlations Between Value Items and Value Clusters via Multiple Group Method (Study 2).

	Value cluster			
	Hedonic	Egoistic	Altruistic	Biospheric
Hedonic values				
1. Pleasure	.69	.25	.26	.17
2. Enjoying life	.70	.24	.25	.13
3. Gratification for oneself	.71	.36	.28	.21
Cronbach's alpha = .84				
Egoistic values				
4. Social power	.16	.54	.00	.04
5. Wealth	.37	.53	.05	.03
6. Authority	.15	.64	.12	.16
7. Influential	.22	.61	.20	.28
8. Ambitious	.36	.49	.15	.09
Cronbach's alpha = .79				
Altruistic values				
9. Equality	.24	.09	.56	.46
10. A world at peace	.25	.16	.56	.63
11. Social justice	.24	.16	.65	.49
12. Helpful	.16	.06	.44	.39
Cronbach's alpha = .76				
Biospheric values				
13. Respecting the earth	.10	.10	.61	.73
14. Unity with nature	.20	.14	.49	.76
15. Protecting the environment	.23	.17	.58	.80
16. Preventing pollution	.14	.17	.59	.75
Cronbach's alpha = .89				

Note: Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are in bold.

Moreover, those with strong hedonic values use their car more frequently ($r = .16, p = .003$) and have a higher mileage ($r = .16, p = .004$). Similarly, those with strong egoistic values drive more frequently ($r = .18, p < .001$) and longer distances ($r = .22, p < .001$). Altruistic and biospheric values were not significantly related to any of these variables.

Finally, we examined which values contributed most to the prediction of car attitudes and car use, as to examine to what extent hedonic values predict

car use when the other values are controlled for. Values predicted 19% of the variance in the extent to which respondents see themselves as a car lover, $F(4, 324) = 18.43, p < .001$. The stronger one's hedonic ($\beta = .21, p < .001$) and egoistic values ($\beta = .32, p < .001$) are, the more the person sees himself or herself as a car lover. Altruistic values were marginally and negatively related to seeing oneself as a car lover ($\beta = -.13, p = .053$). Furthermore, values predicted 5% of the variance in driving frequency, $F(4, 328) = 4.59, p = .001$. Stronger hedonic ($\beta = .14, p = .023$) and egoistic values ($\beta = .15, p = .008$) were associated with driving more frequently. Values explained 6% of the variance in mileage, $F(4, 303) = 4.79, p = .001$. Stronger egoistic values were associated with a higher mileage ($\beta = .19, p = .001$). Stronger hedonic values were associated with a higher mileage as well, although this relationship was marginally significant only ($\beta = .12, p = .060$).

Discussion

The MGM largely supported the distinction between the four types of values, although the altruistic item "A world at peace" was slightly stronger related to the biospheric value scale rather than the altruistic value scale. Again, the internal consistency of the scales was good, supporting our first hypothesis.

Our second hypothesis was supported as well: Both hedonic and egoistic values correlated positively with the amount of car use, and positive car attitudes (i.e., seeing yourself as a car lover), and thus inhibited proenvironmental behaviors. Importantly, as expected, both hedonic and egoistic values predicted car use when all other values were controlled for; egoistic values appeared to be the strongest predictor. Therefore, hedonic values were related to car attitudes and behavior, even when the other values (including egoistic values) were controlled for. This suggests that it is indeed important to include hedonic values in environmental studies.

Interestingly, altruistic and biospheric values were mostly not significantly related to the extent to which one sees himself or herself as a car lover and car use. Previous studies also revealed that considerations beyond one's self-interest do not play a key role in car preferences and use (Abrahamse, Steg, Vlek, & Gifford, 2009; Bamberg & Schmidt, 2003), although significant relationships between altruistic and biospheric values, and car-related beliefs and norms have been reported (see, for example, Nordlund & Garvill, 2003). Therefore, the significance of altruistic and biospheric values may differ across different types of car-related beliefs, norms, and car use.

Study 2 showed that car use, which has clear hedonic and egoistic consequences, was particularly related to hedonic and egoistic values that align

with these consequences. However, on the basis of this study, we cannot conclude that hedonic and egoistic values indeed make people focus on different aspects of the situation, and as a consequence affect choices differently. Do values affect which aspects play a role in choices people make? Is it indeed true that values affect which consequences consumers particularly consider when making choices, and that those with strong hedonic values find hedonic aspects most important? These issues will be addressed in the next study.

Study 3

As mentioned in the introduction, many consumer choices can be considered to be environmental choices. Often, one may need to choose between products and services that are either more environmentally friendly, or are better in terms of one's own welfare or, in some cases, the welfare of others. An example is the choice for a restaurant. The number of restaurants offering organic meals has been growing, enabling consumers to make a proenvironmental choice when going out for dinner. However, even when presented with such an opportunity, not everyone chooses it. We propose that this is due to the fact that there may be more important aspects to consider when choosing a restaurant, such as price or tastiness of the food. The importance of different aspects, we argue, depends on values. Thus, Study 3 aimed to examine relationships between values and preferences for restaurants with different hedonic, egoistic, altruistic, and biospheric features. We expected that individuals with strong hedonic values particularly consider hedonic aspects of a restaurant, and focus less on egoistic, altruistic, and biospheric aspects. In addition, we expected that the hedonic features of restaurants are less important for those who strongly endorse egoistic, altruistic, or biospheric values, as they will focus on aspects that align with their values. Furthermore, Study 3 aimed to replicate the findings of Studies 1 and 2 regarding the structure of values.

Method

Respondents and Procedure. Students at different departments and locations of a Dutch university were approached by a research assistant, and asked to fill out a questionnaire on their preferences for restaurants. In total, 106 students completed the questionnaire, of which 38% were male. Age varied from 17 to 27 years ($M = 22$, $SD = 1.99$). About 36% of the respondents studied arts, 25% social and behavioral sciences, 16% law, 14% economics, and 9% spatial sciences.

Table 3. Dimensions Varied in the Description of the Restaurants (Study 3).

Feature	Negative	Positive
Taste	The restaurant is known for its unsavoury meals.	The restaurant is known for its tasty meals.
Price	This restaurant does not give students discount on their bill.	This restaurant gives students 15% discount on their bill.
Working conditions	The restaurant received a reprimand for their poor working conditions, and the personnel are paid badly.	The restaurant received an award for their excellent working conditions and the personnel are paid well.
Environmental impact	The restaurant does not use any organic products.	The restaurant only uses organic products.

Measures

Values. We used the same value instrument as in Studies 1 and 2.

Preference for restaurants. We presented respondents with 16 different descriptions of restaurants. These restaurants systematically differed on four dimensions: the taste of the food (a hedonic aspect), the price of the food (an egoistic aspect), the working conditions (an altruistic aspect), and environmental impact (a biospheric aspect) of the restaurant. For each dimension, two levels were distinguished: The restaurant scored either negatively or positively on the particular aspect (see Table 3). The restaurants were presented in random order. For each restaurant, respondents indicated how likely it is that they would go to the particular restaurant if they would go out for dinner (1 = *very unlikely*, 7 = *very likely*).

We examined to what extent the four features of the restaurants contributed to the explanation of the likelihood of having dinner at the restaurants via conjoint analysis. Conjoint analysis estimates the structure of individual preferences in an indirect way (Green & Srinivasan, 1978; Louviere, 1988; Luce & Tukey, 1964). The basic idea is that preferences for a particular stimulus (here, likelihood of visiting a restaurant) is built up by the independent contributions of different attributes (in this case, features of the restaurant), each with a limited number of levels that are systematically varied in the stimuli judged by the respondents. We used an additive part-worth function model, which means that the evaluation of the likelihood of visiting a restaurant was taken to be the sum of contributions of the four features (Green & Srinivasan, 1978; Louviere, 1988).

Conjoint analysis reveals part-worth scores for each aspect for each respondent. These reflect the contribution of each attribute level to the overall likelihood of visiting the restaurants; the difference between the highest and the lowest part-worth score reflects the importance of the attribute. As we used two levels for each attribute, in our case, a higher part-worth score means that the relevant attribute is more important for one's overall preferences, with a positive part-worth score indicating that respondents were more likely to visit a restaurant when the food was tasty, relatively cheap, organic, and when the working conditions were good, whereas the opposite is true for negative part-worth scores. To test our hypotheses, we correlated the values with the part-worth scores of each product attribute.

Results

Table 4 shows that again, the four values could be distinguished empirically. The pattern of results was similar to the results of Studies 1 and 2. The Cronbach's alpha of the scales was good, ranging from .81 to .90. Hedonic values correlated positively with egoistic ($r = .44, p < .001$) and, to a lesser extent, with altruistic ($r = .22, p = .026$) and biospheric values ($r = .25, p = .011$). Altruistic and biospheric values correlated positively as well ($r = .60, p < .001$). Egoistic values were not significantly correlated with altruistic and biospheric values.

Table 5 shows that, as expected, respondents who strongly endorsed hedonic values particularly considered the hedonic features of the restaurants: The stronger one's hedonic values were, the more information about tasty food influenced participants' choice of restaurant. Hedonic values were not significantly related to the importance of the other features for the likelihood of visiting a restaurant. In addition, none of the other values were significantly related to the importance of the hedonic feature for restaurant preferences.

Egoistic values were not significantly correlated to any of the part-worth scores, suggesting that egoistic values did not predict restaurant preferences well. The more strongly one endorses altruistic values, the more one considered the working conditions of employees of the restaurant, as well as the environmental impact of the restaurant when deciding to visit a restaurant. Being able to eat organic food was particularly considered by participants who strongly endorse biospheric values. Those who strongly endorse biospheric values were also more likely to choose a restaurant with good working conditions, but this correlation was less strong so this feature was less important for their preferences. Both altruistic and biospheric values were negatively related to preference for restaurants that offer price discounts.

Table 4. Corrected Correlations Between Value Items and Value Clusters via Multiple Group Method (Study 3).

	Value cluster			
	Hedonic	Egoistic	Altruistic	Biospheric
Hedonic values				
1. Pleasure	.73	.42	.17	.18
2. Enjoying life	.81	.42	.27	.20
3. Gratification for oneself	.68	.33	.14	.27
Cronbach's alpha = .86				
Egoistic values				
4. Social power	.22	.58	-.30	-.11
5. Wealth	.49	.66	-.22	-.10
6. Authority	.28	.75	-.15	-.14
7. Influential	.23	.57	.04	.14
8. Ambitious	.41	.42	.05	-.02
Cronbach's alpha = .81				
Altruistic values				
9. Equality	.23	-.06	.62	.55
10. A world at peace	.33	-.05	.69	.63
11. Social justice	.10	-.18	.78	.47
12. Helpful	.02	-.26	.60	.27
Cronbach's alpha = .84				
Biospheric values				
13. Respecting the earth	.16	-.14	.60	.80
14. Unity with nature	.21	-.11	.32	.68
15. Protecting the environment	.25	.04	.61	.84
16. Preventing pollution	.25	-.03	.59	.84
Cronbach's alpha = .90				

Note: Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are in bold.

The four values predicted 15% of the variance in the importance of taste for the likelihood of choosing a restaurant, $F(4, 82) = 3.73, p = .008$. As expected, good taste was more likely to guide restaurant preferences among those with strong hedonic values than among those with weak hedonic values ($\beta = .44, p < .001$). Those who strongly endorse egoistic values were less likely to consider taste when choosing a restaurant ($\beta = -.24, p = .041$) than those with weaker egoistic values. This may be a suppressor effect

Table 5. Correlations Between Hedonic, Egoistic, Altruistic, and Biospheric Values and Importance of Hedonic, Egoistic, Altruistic, and Biospheric Aspects for Likelihood of Visiting a Restaurant (Study 3).

	Value cluster			
	Hedonic	Egoistic	Altruistic	Biospheric
Importance of				
Taste	.29**	-.04	-.01	-.09
Price	.01	.08	-.28**	-.25*
Working conditions	.01	-.11	.38***	.37**
Environmental impact	.02	-.08	.35***	.53***

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

(MacKinnon, Krull, & Lockwood, 2000), or imply that, when we control for the influence of other values, those with strong egoistic values are *less* likely to base their restaurant choice on the tastiness of the food served.

The four values explained only 10% of the variance in the importance of price for the preference for restaurants. The model was marginally significant, $F(4, 82) = 2.21, p = .075$; none of the values contributed significantly to the model.

Values explained 19% of the variance in the importance of working conditions of employees for preferences for restaurants, $F(4, 82) = 4.82, p = .002$. As expected, altruistic values contributed significantly to this model ($\beta = .27, p = .038$), whereas the contribution of biospheric values was marginally significant only ($\beta = .23, p = .066$): The stronger one's altruistic and biospheric values were, the more important working conditions were for respondents' preferences.

Finally, the four values explained 30% of the variance in the importance of being able to eat organic products for restaurant preferences, $F(4, 82) = 8.73, p < .001$. Only biospheric values contributed significantly to this model ($\beta = .52, p < .001$): The stronger one's biospheric values were, the more important environmental impact was for one's preferences for a restaurant.

Discussion

Again, MGM supported the distinction between the four types of values, and the internal consistency of the scales was good, supporting our first hypothesis. Our second hypothesis was supported as well. As expected, the tastiness

of food was particularly considered by those who strongly endorse hedonic values. Interestingly, those with strong egoistic values were less likely to base their choice for a restaurant on the tastiness of the food when hedonic values were controlled for. This may suggest that hedonic and egoistic values may in some cases affect preferences in the opposite direction; future research is needed to test this. Hedonic values were not significantly related to the importance of any of the other restaurant features, suggesting that those with strong hedonic values base their preferences mainly on the tastiness of the food (and thus on hedonic features), and that they were not more likely to attend restaurants that serve cheap or organic food, or that have good working conditions.

Our results indicated that people tend to have value-congruent preferences. Taste was particularly considered by those who strongly endorse hedonic values, whereas environmental impact was especially considered by respondents with strong biospheric values, and working conditions of employees were most important to those with strong altruistic values. Those who strongly endorse altruistic values also considered the environmental impact when making choices, and those who strongly endorse biospheric values also considered the working conditions in the restaurant, again demonstrating that altruistic and biospheric values are related, which may be expected as both reflect self-transcendence values. Egoistic values were not systematically related to the importance of different attributes for the likelihood of visiting a restaurant. This may be due to negative associations with restaurants that provide discounts to students: It may be that students expect poor quality in this case, and high quality is also likely to be important for those with strong egoistic values. A trade-off may be assumed not only between prices and quality but also between prices and working conditions, and between prices and environmental impact. This may explain why those endorsing stronger altruistic and biospheric values were less likely to be attracted by student discounts. However, our data do not allow us to explore this explanation further.

In conclusion, those who strongly endorse hedonic values based their choices on different aspects than those who strongly endorse altruistic and biospheric values. This again suggests that it is important to include hedonic values in environmental studies to better understand individual preferences and behavior related to environmental issues.

Study 3 shows that people with strong hedonic values focus on hedonic aspects of choice options. This suggests that hedonic values should be particularly important to understand behavior with salient hedonic consequences. Would both hedonic and egoistic values predict such behaviors, or would

only hedonic values play a significant role in such cases? We addressed this question in Study 4.

Study 4

Study 4 aimed to replicate the findings of the previous studies and examined relationships between values and environmental behaviors with clear hedonic consequences: showering time, meat consumption, number of motorized vehicles (cars and motors) in the household, and leaving appliances on standby. In line with Hypothesis 2, we expected that those with strong hedonic values are more likely to take longer showers, eat more meat, have more motor vehicles in their household, and more often leave appliances on standby.

Method

Respondents and Procedure. In total, 468 inhabitants of a municipality in the north of the Netherlands participated in this study, of which 50% were male. Age varied from 18 to 89 ($M = 52$, $SD = 14.68$). About 18% did not complete formal education, or completed primary education or vocational secondary school, 38% had completed the highest level of secondary school or a vocational education, and 45% finished university. Around 7% of the sample indicated that their monthly household net income was less than 1,000 euros, 23% between 1,000 and 2,000 euros, 30% between 2,000 and 3,000 euros, and 39% earned more than 3,000 euros per month.

Measures

Values. We used the same value instrument as in Studies 1, 2, and 3.

Energy use behaviors. Showering time was assessed by asking respondents how many times per week they take a shower, and how long (in minutes) their average shower takes. Total showering time was computed by multiplying both scores. Meat consumption was assessed by multiplying the average number of times per week respondents consumed meat at their main meal of the day with the average amount of grams of meat they normally eat when they consume meat with their meal. Furthermore, respondents indicated the number of (nonbusiness) cars and motorcycles they own. Finally, respondents indicated on a 7-point scale how often they leave appliances (such as the television, VCR, PC, etc.) on standby.

Results

Again, the grouping of the values in the four value scales was supported (see Table 6), although, as in Study 2, the altruistic value item "A world at peace" correlated slightly higher with the biospheric value scale. Therefore, the pattern of results was similar to what we found in the other studies. Hedonic values correlated positively with egoistic values ($r = .39, p < .001$), and to a lesser extent with altruistic ($r = .20, p = .001$) and biospheric values ($r = .25, p = .001$). Altruistic and biospheric values correlated positively as well ($r = .68, p < .001$). Egoistic values were weakly correlated with altruistic ($r = .10, p = .037$) and biospheric values ($r = .11, p = .024$).

Table 7 shows the correlations between the four values and energy-related behaviors. Importantly, as expected, hedonic values correlated positively with all behaviors: Stronger hedonic values were associated with longer showering times, a higher meat consumption, owning more motor vehicles, and more often leaving appliances on standby. Interestingly, stronger egoistic values were only significantly associated with longer showering times. In contrast, altruistic and particularly biospheric values were negatively related to the energy-related behaviors. Those with strong biospheric values consumed less meat, took shorter showers, owned less motor vehicles, and less often left appliances on standby. The same was true for those with strong altruistic values, although altruistic values were not significantly related to leaving appliances on standby.

The four values predicted 7% of the variance in meat consumption, $F(4, 403) = 7.07, p < .001$: Those who strongly endorse hedonic values consumed more meat than those with weak hedonic values ($\beta = .13, p = .01$), whereas strong biospheric values were associated with consuming less meat ($\beta = -.17, p = .01$). Values explained 9% of the variance in showering, $F(4, 428) = 10.22, p < .001$. The stronger one's hedonic values were, the more one showered ($\beta = .21, p < .001$), whereas stronger biospheric values were associated with showering less ($\beta = -.22, p < .001$). Values explained 9% of the variance in the number of motor vehicles owned, $F(4, 427) = 10.09, p < .001$. The stronger one's hedonic values were, the more motor vehicles one owned ($\beta = .23, p < .001$), whereas strong altruistic values were associated with owning less motor vehicles ($\beta = -.19, p < .01$). Finally, values explained 3% of the variance in leaving appliances on standby. Those who strongly endorse hedonic values left appliances more often on standby than those with weak hedonic values ($\beta = .16, p < .01$), whereas those who strongly endorse biospheric values left appliances less often on standby than those with weak biospheric values ($\beta = -.14, p = .03$).

Table 6. Corrected Correlations Between Value Items and Value Clusters via Multiple Group Method (Study 4).

	Value Cluster			
	Hedonic	Egoistic	Altruistic	Biospheric
Hedonic values				
1. Pleasure	.68	.38	.16	.22
2. Enjoying life	.74	.32	.19	.22
3. Gratification for oneself	.66	.32	.16	.24
Cronbach's alpha = .83				
Egoistic values				
4. Social power	.16	.42	-.07	-.03
5. Wealth	.39	.42	.03	.01
6. Authority	.15	.55	.12	.10
7. Influential	.22	.50	.19	.20
8. Ambitious	.44	.49	.07	.08
Cronbach's alpha = .72				
Altruistic values				
9. Equality	.16	.07	.56	.48
10. A world at peace	.26	.04	.47	.54
11. Social justice	.08	.07	.70	.57
12. Helpful	.12	.13	.54	.49
Cronbach's alpha = .77				
Biospheric values				
13. Respecting the earth	.21	.08	.66	.73
14. Unity with nature	.27	.11	.46	.66
15. Protecting the environment	.21	.09	.58	.76
16. Preventing pollution	.15	.07	.60	.74
Cronbach's alpha = .87				

Note: Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are in bold.

Discussion

Again, MGM supported the distinction between the four types of values, and the internal consistency of the scales was good, supporting our first hypothesis. Our second hypothesis was supported as well. Hedonic values predicted energy-related behaviors that have clear hedonic consequences in the expected direction: The stronger one's hedonic values were, the more often one engaged in behaviors associated with higher energy consumption. Indeed, it seems that

Table 7. Correlations Between Hedonic, Egoistic, Altruistic, and Biospheric Values and Meat Consumption, Showering Time, Number of Motor Vehicles, and Leaving Appliances on Standby (Study 4).

	Value cluster			
	Hedonic	Egoistic	Altruistic	Biospheric
Meat consumption	.11*	.07	-.19**	-.20**
Showering time	.19**	.15**	-.09*	-.15**
Number of motor vehicles	.15**	.06	-.19**	-.15**
Leaving appliances on standby	.12*	.04	-.05	-.10*

* $p < .05$. ** $p < .01$.

those who strongly endorse hedonic values are less likely to reduce their comfort or pleasure to reduce their energy consumption. In contrast, those with strong altruistic values and particularly those with strong biospheric values were more likely to sacrifice their comfort or pleasure to reduce their energy consumption. Egoistic values were only significantly and negatively correlated with showering time, but did not significantly predict showering time when the other values were controlled for. Most likely, the hedonic aspects of the behaviors we selected were indeed more evident than the egoistic aspects, such as financial costs. These results again demonstrate that it is relevant to include hedonic values in studies on environmental issues.

General Discussion

This article aimed to study relationships between values and environmentally relevant attitudes, preferences, and actions. We were particularly interested in the role of hedonic values. Previous studies on environmentally relevant beliefs, attitudes, norms, and behaviors focused on egoistic, altruistic, and biospheric values. Based on goal-framing theory and theories on hedonic consumption, we argued that besides these three values, hedonic values may play an additional role. We aimed to examine whether it is worthwhile to include hedonic values in environmental studies. More specifically, we aimed to test whether hedonic values can be distinguished as a separate value cluster, and to what extent hedonic values are related to environmentally relevant attitudes, preferences, and actions, particularly when environmental actions have clear hedonic consequences.

Our studies support the distinction between the hedonic, egoistic, altruistic, and biospheric values (Hypothesis 1). Confirmatory factor analyses showed

over and again that the four clusters of values can be distinguished empirically, suggesting that the distinction between the four types of values is not only theoretically meaningful but also recognized by people. In addition, the internal consistency of the four-value scale was good in all studies. A distinct cluster of hedonic values was also distinguished by Schwartz (1994) in his original set of 56 values. We replicated his finding in another set of values, notably, including values most relevant in the environmental domain and comprising additional biospheric values.

Our second hypothesis was confirmed as well. In all studies, hedonic values appeared to be related to environmentally relevant attitudes, preferences, and behaviors. When behavior has egoistic and hedonic consequences, such as car use, both egoistic and hedonic values were related to the relevant attitudes and behaviors (see Study 2). Importantly, hedonic values even predicted attitudes and behavior when egoistic values were controlled for, suggesting that both affect attitudes and behavior independently, and reflect different aspects of attitudes and behavior in the environmental domain. Indeed, the results of Study 3 indicated that hedonic values guide one's attention toward hedonic aspects: Those with strong hedonic values especially considered the hedonic consequences of choices. More generally, consumers tended to have value-congruent preferences, and particularly considered aspects of choices that align to their values. Finally, Study 4 showed that hedonic values were most relevant to understand environmental behaviors with salient hedonic consequences. When actions were clearly associated with hedonic consequences (and had less salient egoistic consequences), such as meat consumption or leaving appliances on standby (Study 4), hedonic values appeared to be significantly related to environmental behavior, whereas egoistic values did not play a significant role when the other values were controlled for.

Our results demonstrate that in general, hedonic (and to a lesser extent egoistic) values predicted attitudes, preferences, and behavior in the opposite direction compared with altruistic and biospheric values, suggesting that hedonic values mainly inhibit proenvironmental choices. This is in line with results from previous studies that generally showed that self-enhancement values are negatively related whereas self-transcendence values are positively related to environmentally friendly beliefs, attitudes, preferences, and behaviors (e.g., Collins et al., 2007; Kalof et al., 1999; Nordlund & Garvill, 2002, 2003; Schultz et al., 2005; Stern, 2000; Stern et al., 1995, 1998; Thøgersen & Ölander, 2002). In addition, our results suggest that values were better able to predict attitudes and preferences than actual behavior, which is in line with value theory and earlier studies that propose that values mainly predict behavior indirectly, via behavior-specific beliefs and

norms (e.g., Nilsson et al., 2004; Nordlund & Garvill, 2002, 2003; Steg & De Groot, 2012; Steg et al., 2005; Stern, 2000).

Generally, participants had value-congruent preferences and made value-congruent choices, suggesting that values provide a general and stable basis for beliefs, attitudes, preferences, and choices. There were some exceptions, however. In particular, altruistic and biospheric values were related to similar preferences and choices, which may be due to the fact that altruistic and biospheric values are correlated as both reflect self-transcendence values. Differences in the predictive value of altruistic and biospheric values are probably more pronounced when including dependent variables that elicit a clear conflict between altruistic and biospheric values (cf. De Groot & Steg, 2008). In addition, egoistic values did not consistently result in value-congruent choices, which may partly be due to the selection of variables included in our study, as explained above.

In sum, our results reveal that hedonic values form a distinct value cluster and are related to a broad range of environmentally relevant attitudes, preferences, and actions. This suggests that it is indeed important to include two types of self-enhancement (i.e., hedonic and egoistic) and two types of self-transcendence (i.e., altruistic and biospheric) values in environmental studies to better understand individual attitudes, preferences, and choices. Our results suggest that interventions aimed to promote proenvironmental actions should carefully take into account possible hedonic consequences of the relevant actions, as these may be important barriers for behavior change. This suggests that change agents should also consider how to make positive hedonic aspects of proenvironmental actions more appealing.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Study 4 was made possible through funding from the European Commission 7th Framework Programme for the project GILDED; see <http://www.gildedeu.org/>.

Notes

1. According to Schwartz, hedonic values reflect self-enhancement as well as openness-to-change values. As many actions that benefit the environment are associated with discomfort, inconvenience and effort, and thus entail a conflict between

collective and self-interests, we assume that in the environmental domain, hedonic values often reflect self-enhancement values.

2. Please note that hedonic values have been identified in Schwartz's (e.g., 1992, 1994) studies as a separate value cluster. However, Schwartz's studies were based on an extensive list of 56 values, and included only 2 biospheric values. We aimed to replicate this finding when using a brief version of Schwartz's value scale developed by De Groot and Steg (2007, 2008). This scale has often been used and validated in environmental studies and comprises 4 (rather than 2) biospheric values. In our studies, we extended this brief scale with 3 hedonic value items.

References

- Abrahamse, W., Steg, L., Gifford, R., & Vlek, C. (2009). Factors influencing car use for commuting and the intention to reduce it: A question of self-interest or morality? *Transportation Research-F: Psychology and Behaviour*, *12*, 317-324.
- Bamberg, S., & Schmidt, S. (2003). Incentives, morality or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz and Triandis. *Environment and Behavior*, *35*, 264-285.
- Collins, C. M., Steg, L., & Koning, M. A. S. (2007). Customers' values, beliefs on sustainable corporate performance, and buying behavior. *Psychology & Marketing*, *24*, 555-577.
- Crompton, T., & Kasser, T. (2009). *Meeting environmental challenges: The role of human identity*. Goldaming, UK: WWK-UK.
- De Groot, J. I. M., & Steg, L. (2007). Value orientations and environmental beliefs in five countries: Validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *Journal of Cross-Cultural Psychology*, *38*, 318-332.
- De Groot, J. I. M., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, *40*, 330-354.
- De Groot, J. I. M., & Steg, L. (2010). Relationships between value orientations, self-determined motivational types and pro-environmental behavioural intentions. *Journal of Environmental Psychology*, *30*, 368-378.
- Dietz, T., Fitzgerald, A., & Shwom, R. (2005). Environmental values. *Annual Review of Environment and Resources*, *30*, 335-372.
- Dittmar, H. (1992). *The social psychology of material possessions: To have is to be*. Hemel Hempstead, UK: St. Martin's Press.
- Dunlap, R. E., Grieneeks, J. K., & Rokeach, M. (1983). Human values and pro-environmental behavior. In W. D. Conn (Ed.), *Energy and material resources: Attitudes, values, and public policy* (pp. 145-168). Boulder, CO: Westview Press.

- Ellaway, A., Macintyre, S., Hiscock, R., & Kearns, A. (2003). In the driving seat: Psychosocial benefits from private motor vehicle transport compared to public transport. *Transportation Research Part F: Traffic Psychology and Behaviour*, 6, 217-231.
- Feather, N. T. (1995). Values, valences, and choice: The influence of values on the perceived attractiveness and choice of alternatives. *Journal of Personality and Social Psychology*, 68, 1135-1151.
- Gatersleben, B. (2007). Affective and symbolic aspects of car use: A review. In T. Gärling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 219-234). Amsterdam, Netherlands: Elsevier.
- Green, P. E., & Srinivasan, V. (1978). Conjoint analysis in marketing research: New developments and directions. *Journal of Marketing*, 54, 3-19.
- Grønhoj, A., & Thøgersen, J. (2009). Like father, like son? Intergenerational transmission of values, attitudes, and behaviours in the environmental domain. *Journal of Environmental Psychology*, 29, 414-421.
- Guttman, L. (1952). Multiple group methods for common-factor analysis: Their basis, computation and interpretation. *Psychometrika*, 17, 209-222.
- Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: Emerging concepts, methods and propositions. *Journal of Marketing*, 46, 92-101.
- Hiscock, R., Macintyre, S., Kearns, A., & Ellaway, A. (2002). Means of transport and ontological security: Do cars provide psycho-social benefits to their users? *Transportation Research Part D: Transport and Environment*, 7, 119-135.
- Honkanen, P., & Verplanken, B. (2004). Understanding attitudes towards genetically modified food: The role of values and attitude strength. *Journal of Consumer Policy*, 27, 401-420.
- Kalof, L., Dietz, T., Stern, P. C., & Guagnano, G. A. (1999). Social psychological and structural influences on vegetarian beliefs. *Rural Sociology*, 64, 500-511.
- Karp, D. G. (1996). Values and their effects on pro-environmental behavior. *Environment and Behavior*, 28, 111-133.
- Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal-frames guiding environmental behavior. *Journal of Social Issues*, 63, 117-137.
- Louviere, J. J. (1988). *Analyzing decision making: Metric conjoint analysis*. Beverly Hills, CA: Sage.
- Luce, R. D., & Tukey, J. W. (1964). Simultaneous conjoint measurement: A new type of fundamental measurement. *Journal of Mathematical Psychology*, 1, 1-27.
- MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding, and suppression effect. *Prevention Science*, 1, 173-181.

- Maio, G. R. (2010). Mental representations of social values. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 42, pp. 1-43). San Diego, CA: Academic Press.
- Mann, E., & Abraham, C. (2006). The role of affect in UK commuters' travel mode choices: An interpretative phenomenological analysis. *British Journal of Psychology, 97*, 155-176.
- McCarty, J. A., & Shrum, L. J. (1994). The recycling of solid wastes: Personal values, value orientations, and attitudes about recycling as antecedents of recycling behavior. *Journal of Business Research, 30*, 53-62.
- Naess, A. (1989). *Ecology, community, and lifestyle*. Cambridge, UK: Cambridge University Press.
- Nilsson, A., Von Borgstede, C., & Biel, A. (2004). Willingness to accept climate change policy measures: The effect of values and norms. *Journal of Environmental Psychology, 24*, 267-277.
- Nordlund, A. M., & Garvill, J. (2002). Value structures behind proenvironmental behavior. *Environment and Behavior, 34*, 740-756.
- Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology, 23*, 339-347.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.
- Rohan, M. J. (2000). A rose by any name? The values construct. *Personality and Social Psychology Review, 4*, 255-277.
- Rokeach, M. (1973). *The nature of human values*. New York, NY: Free Press.
- Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franik, M. (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-Cultural Psychology, 36*, 457-475.
- Schultz, P. W., & Zelezny, L. C. (1998). Values and pro-environmental behaviour: A five-country study. *Journal of Cross-Cultural Psychology, 29*, 540-558.
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 1-65). Orlando, FL: Academic Press.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50*, 19-45.
- Steg, L. (2003). Can public transport compete with the private car? *IATSS Research, 27*, 27-35.
- Steg, L. (2005). Car use: Lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice, 39*, 147-162.

- Steg, L., & De Groot, J. I. M. (2012). Environmental values. In S. Clayton (Ed.), *The Oxford Handbook of Environmental and Conservation Psychology*. New York, NY: Oxford University Press.
- 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*, 349-367.
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: Testing VBN theory. *Journal of Environmental Psychology*, *25*, 415-425.
- Steg, L., Vlek, C., & Slotegraaf, G. (2001). Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F: Psychology and Behaviour*, *4*, 151-169.
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*, 407-424.
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, *50*, 65-84.
- Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review*, *6*, 81-95.
- Stern, P. C., Dietz, T., & Guagnano, G. A. (1998). A brief inventory of values. *Educational and Psychological Measurement*, *58*, 984-1001.
- Stern, P. C., Dietz, T., Kalof, L., & Guagnano, G. (1995). Values, beliefs, and pro-environmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology*, *25*, 1611-1636.
- Stuive, I. (2007). *A comparison of confirmatory factor analysis methods: Oblique multiple group method versus confirmatory common factor method* (Unpublished doctoral dissertation). University of Groningen, Netherlands.
- Thøgersen, J., & Ölander, F. (2002). Human values and the emergence of a sustainable consumption pattern: A panel study. *Journal of Economic Psychology*, *23*, 605-630.
- Thøgersen, J., & Ölander, F. (2003). Spillover of environmental-friendly consumer behaviour. *Journal of Environmental Psychology*, *23*, 225-236.

Author Biographies

Linda Steg, PhD, is a professor of environmental psychology at the University of Groningen. Her research interests include understanding and changing environmental behavior, and the acceptability of environmental policies. She is particularly interested in normative considerations and proenvironmental actions, including the role of values and norms.

Goda Perlaviciute is pursuing a doctoral degree at the University of Groningen. Her research interests include understanding the processes behind people's motivations to engage in normative behavior, including proenvironmental behavior. She is interested in the role of values and situational cues.

Ellen van der Werff is pursuing a doctoral degree at the University of Groningen. Her research interests include identity, values, and environmental behavior.

Judith Lurvink recently received her MSc in clinical psychology, and collected and analyzed the data reported in Study 3 as a student in the honors program in psychology at the University of Groningen.