

# Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental<sup>☆</sup>

Gert Cornelissen<sup>a,\*</sup>, Mario Pandelaere<sup>b</sup>, Luk Warlop<sup>b</sup>, Siegfried Dewitte<sup>b</sup>

<sup>a</sup> Department of Economics and Business, Universitat Pompeu Fabra, Ramon Trias Fargas 25-27, 08005, Barcelona, Spain

<sup>b</sup> Catholic University of Leuven, 3000 Leuven, Belgium

First received in April 25, 2006 and was under review for 6 months

## Abstract

People frequently fail to see themselves as environmentally conscious consumers; one reason for this is that they are oftentimes prone to dismissing their more common ecological behaviors (e.g., avoid littering) as non-diagnostic for that particular self-image. The cueing of commonly performed ecological behaviors as environmentally friendly (what we call positive cueing) renders both cued and non-cued common ecological behaviors more diagnostic for the inference of pro-environmental attitudes (Study 1). As a result, positive cueing increases the likelihood that people will see themselves as consumers who are concerned with the degree to which their behavior is environmentally responsible (Study 2). The cueing of common ecological behaviors leads participants to choose environmentally friendly products with greater frequency, and even to use scrap paper more efficiently (Study 3). We discuss the implications for effective social marketing campaigns.

© 2007 Elsevier B.V. All rights reserved.

**Keywords:** Pro-environmental attitudes; Ecological consumer behavior; Self-perception theory; Social marketing; Accessibility–diagnosticity framework

Beginning in the early 1970s, there have been repeated calls for social marketing research to address sustainable consumption issues (Andreasen, 1995; Crane & Desmond, 2002; Kotler & Zaltman, 1971). The aim of this paper is to describe and test a social marketing tool for the promotion of environmental – and, by extension, other types of sustainable – behavior.

The promotion of sustainable consumption behavior has proved to be an arduous task. Although the general public has become increasingly interested in sustainable development (European Commission, 2005; DEFRA, 2002), this interest has not always gone hand in hand with changes in the public's decisions as consumers (Grunert, 1993; Pieters, Bijmolt, van Raaij, & de Kruijk, 1998). An often cited reason for this is that the costs – time, effort, and inconvenience – that people associate with sustainable behavior

ultimately gain the upper hand (Follows & Jobber, 2000; Pieters, 1989; Pieters et al., 1998; Thøgersen, 1994). This implies that people's attitudes towards specific *ecological behaviors* have an important impact on their decisions, over and above their attitudes towards *the environment* (Ajzen, 1996; McCarthy & Shrum, 1994; Thøgersen & Grunert-Beckmann, 1997). In this paper we examine a social marketing tool, called *positive cueing*, to promote environmentally conscious behavior by improving specific attitudes.

## 1. The role of the perception of previous behavior in the formation of attitudes

In order to change people's attitudes to ecological behavior, we must first understand how people construct such attitudes. In this paper, we focus on self-perception as a route to persuasion. Self-perception theory (Bem, 1972) argues that people's attitudes are formed from the perception of their own previous behavior. People are commonly inclined to use their previous behavior as a heuristic basis for later decisions (Taylor, 1975). A person who has behaved in this or that way in the past infers from that experience whether she approves of that type of behavior and of the object towards

<sup>☆</sup> We would like to gratefully acknowledge the support of the Barcelona Economics Program of CREA and the financial help of the Belgian Science Policy (SPSD II/CP/15) to the first and third authors, of the National Science Foundation (G.03.91), of the central KUL university board (OT 03/07), and of Censydiam-Synovate to the third and fourth authors.

\* Corresponding author. Ramon Trias Fargas 25-27, 08005 Barcelona, Spain.  
E-mail address: Gert.Cornelissen@upf.edu (G. Cornelissen).

which the behavior was directed (Albarracín & Wyer, 2000). It is particularly important that people's attitudes towards ecological behavior may have been formed from their perception of their pro-environmental conduct (or lack thereof) in the past (Salancik & Conway, 1975).

Two heuristics are likely to come into play when creating a perception of previous pro-environmental behavior. The first is the availability heuristic (Tversky & Kahneman, 1973), which uses ease of retrieval (Schwarz et al., 1991) or accessibility as a source of information. In other words, the easier it is to remember personal examples of past environmental behavior, the more pro-environmental the consumer's self-perception will be. The second is the representativeness heuristic (Kahneman & Tversky, 1972), which relies on a judgment about the similarity between a recalled event and an internalized representation or prototype of that event. The more a particular recalled behavior is regarded as typical of the category *ecological behavior* (e.g., cycling to work as opposed to turning off the lights in unused rooms), the more pro-environmental the inferred self-perception and attitude will be.

Based on the conceptual model of Raghurir and Menon (2005), of how self-diagnosis inventories can lead to behavior interpretation, we hypothesize that the representativeness heuristic in the context of environmental behavior leads to *underestimating* the extent to which past behavior can be seen as pro-environmental. This is mainly due to the fact that a number of common environmental behaviors are ambiguous in their ecological nature. Larger ambiguity renders a behavior less diagnostic for the inference of a particular attitude. Raghurir and Menon (2005) identify several reasons why certain behaviors might be too ambiguous to allow one to infer particular attitudes from them, or to judge them typical of a certain category (Sperling & Doshier, 1986). Two of those reasons are particularly relevant to the representativeness of ecological behaviors: frequency of occurrence and causal clarity. The frequency of occurrence explanation, which refers to the consensus construct in Kelley's attribution theory (1973), states that a behavior with a high frequency of occurrence in the population (e.g., avoid littering) may be taken for granted and therefore prove less diagnostic of a disposition, such as ecological concern. Causal clarity, conversely, refers to the number of reasons a particular behavior could be attributed to (Morris & Larrick, 1995): switching off lights in a room that is not being used is certainly an instance of environmentally friendly behavior, but is more readily attributed to a concern with keeping the electricity bill down. Causally unclear acts are more ambiguous because they can be attributed to more than one cause. For these two reasons, a great number of ecological behaviors may be judged non-representative of behavior, and hence as non-diagnostic for the inference of ecological attitudes. As a result, a number of people fail to see themselves as consumers who engage in environmentally friendly acts.

## 2. Cueing common ecological behaviors

We hypothesize that cueing commonly performed ecological behaviors *as environmental* (i.e., positive cueing) increases one's perception of oneself as a consumer who has engaged in pro-environmental behavior. After we emphasize the pro-environmental nature of behaviors commonly engaged in, we expect that a

person will infer that he or she must not be devoid of pro-environmental attitudes, and therefore see him/herself as a consumer who usually behaves in ecologically responsible ways (Albarracín & Wyer, 2000).

Positive cueing can increase in two ways the extent to which previous behavior is perceived as pro-environmental. The first involves accessibility: cued with 'cycling to work', one retrieves instances of having 'cycled to work' more easily than if one had not been cued. Importantly, this will only influence self-perceptions if the retrieved behaviors are judged to be diagnostic for the inference of pro-environmental attitudes (e.g., when they are perceived as being pro-environmental in nature). A second way in which people may come to view themselves as environmentally conscious involves the degree to which an activity is diagnostic (hereafter, 'diagnosticity'). The logic and conversation-perspective (Grice, 1975; Schwarz, 1994) suggests that cueing behaviors *as environmental* may render them more relevant for the purpose of deriving environmental attitudes. It implies that the messenger who communicates the cues (e.g., the government acting as a social marketer) considers these behaviors relevant to the inference of environmental attitudes on the part of the consumer. As a result, emphasizing the ecological nature of common environmental behaviors may motivate consumers to reinterpret them as diagnostic for the inference of environmental attitudes. The greater the diagnosticity of behaviors in which one engages, the greater will be one's self-perception as an environmentally friendly person.

The use of common environmental behaviors as cues has a two-fold advantage. First, because it uses behaviors in which most people engage, the technique can serve to address a large target audience with an identical message; the greater part of the audience will recognize that, indeed, they do engage in the behaviors mentioned. Secondly, it is just these types of behavior – the ones whose prevalence contributes to their being considered non-diagnostic (Raghurir & Menon, 2005) – that are most susceptible to the effects of marketing actions designed to increase their diagnosticity.

## 3. Current studies

We tested our conjectures in four studies. A pilot study verified our assumption that a given environmental behavior is often regarded as less diagnostic for the actor's green attitudes when that behavior is performed by a large number of people (i.e., when there is a high frequency of occurrence), or when the behavior can be attributed to alternative causes (i.e., when there is a significant lack of causal clarity). In Study 1, we tested whether positive cueing leads to an increase in the diagnosticity of these acts. In Study 2, we tested what effect the same manipulation would have on the participants' self-perception and attitudes. The final study put our proposed technique to the real test and examines its potential for actually influencing people's environmental choices.

## 4. Pilot study

The purpose of this pilot study is to verify our assumption that the perceived diagnosticity of any given environmental behavior for deriving one's own or someone else's green attitudes is smaller

if that behavior has a high frequency of occurrence or low causal clarity.

#### 4.1. Method

##### 4.1.1. Participants and procedure

Thirty-two students participated in this study in exchange for partial course credit. Upon arrival in the lab, they were seated individually in front of a computer screen. All participants were asked to rate forty environmentally friendly behaviors on a 100-point visual analog scale. We divided the participants into three groups, each of which was asked to rate the behaviors on a different dimension. The first group rated the ‘degree to which [each behavior] is informative for the inference of someone’s environmental consciousness’ (the diagnosticity), from ‘not at all’ to ‘perfectly’. The second group rated ‘the percentage of people who usually perform [each behavior]’ (the frequency of occurrence), from 0% to 100%. Finally, the third group rated ‘the degree to which people may have reasons other than ecological ones to perform [each behavior]’ (the causal clarity), on a scale ranging from ‘none at all’ to ‘many’.

The Cronbach alphas, representing inter-judge reliability scores, were .66, .88, and .86 for the three judged dimensions, respectively (see Holbrook & Lehmann, 1980). For each behavior, we calculated the mean of the ratings given for each of the three dimensions (diagnosticity, frequency of occurrence, and causal clarity). We then analyzed these data using the 40 behaviors as the rows in the data matrix (subjects are considered as replicates, see Holbrook & Batra, 1987; Vanden Abeele & MacLachlan, 1994). By using separate sets of judges for each dimension, we ruled out correlations based on shared method variance (MacKenzie, Lutz, & Belch, 1986).

#### 4.2. Results

Consistent with our assumptions, the judgments of causal clarity and frequency of occurrence correlated negatively with the diagnosticity of the behaviors ( $r(40) = -.43, p < .01$  and  $r(40) = -.45, p < .01$  respectively). Causal clarity and frequency of occurrence were not significantly correlated ( $r(40) = .03, p = .86$ ). In addition, regressing causal clarity and frequency of occurrence onto diagnosticity showed that both causal clarity and frequency of occurrence contributed significantly to the prediction of diagnosticity ( $t(37) = -3.20, p < .01$  and  $t(37) = -3.41, p < .01$ , respectively, and  $R^2 = .38$ ). This confirms our assumption that ecological behaviors are less diagnostic of someone’s green attitudes when the frequency of people engaging in those behaviors is higher or when there exist alternative causes to which the behaviors can be attributed. Because commonly performed behaviors are often considered non-diagnostic, people may disregard them when inferring their attitudes from their past ecological behavior.

## 5. Study 1

In this study, we test our hypothesis that the cueing of common environmental behaviors as environmental renders those behaviors more diagnostic in the inference of someone’s environmental friendliness.

#### 5.1. Method

##### 5.1.1. Participants and design

Eighty undergraduate students took part in the study in exchange for partial course credit. They came to the lab in groups of five to eight students and they were seated individually in front of a computer screen in semi-closed cubicles. Participants were randomly assigned to one of three conditions: the high-frequency condition, the low-frequency condition, and the control condition.

##### 5.1.2. Manipulation

We constructed three sets of behaviors. The high-frequency set contained eight *environmental behaviors that people usually perform*. These were the result of a pretest ( $N = 42$ ), in which we asked participants to list all the environmental behaviors in which they regularly engage. We selected the eight most often mentioned examples.<sup>1</sup> The low-frequency set was contained eight *environmental behaviors that people usually do not perform*. These were selected from a second task in the same pretest, in which we asked the participants to list all the environmental behaviors in which they do not regularly engage.<sup>2</sup> The control set contained eight behaviors that were not related to the environment (e.g., ‘reading the newspaper every day’ or ‘often eating French fries’). A pretest, in which 19 participants rated the 16 behaviors of the high- and low-frequency sets, showed that both sets do not differ with respect to the average *environmental friendliness* of the behaviors ( $t(18) = -0.30, p = .77$ ). Additionally, the data of the pilot study indicated that sets do not differ in causal clarity.

##### 5.1.3. Dependent measure

Our dependent measure consisted of 20 behaviors which were to be rated according to their use as a diagnostic in the inference of someone’s environmental friendliness. Those 20 items were of three types: the eight uncommon environmental behaviors that constitute the low-frequency set; the eight common behaviors that constitute the high-frequency set; and four “new” common environmental behaviors that had not been used as cues in the manipulation phase. We included these items in order to find out whether or not the effect of the manipulation would generalize to common behaviors that had not been used as cues themselves.

##### 5.1.4. Procedure

Participants in the high-frequency, the low-frequency and the control condition were presented with the high-frequency, the low-frequency and the control set of behaviors, respectively. They were then instructed to indicate, on a seven-point scale (ranging from *I do not agree at all* to *I fully agree*) “whether or

<sup>1</sup> These were: ‘selectively disposing of household garbage’, ‘using the bike instead of the car when possible’, ‘not littering’, ‘turning off electrical appliances (to save energy)’, ‘using both sides of scrap paper’, ‘disposing of cans and milk cartons in a recycling bag’, ‘cleaning up after a picnic’, and ‘buying a less polluting product when given the choice’.

<sup>2</sup> The behaviors most often mentioned were: ‘using energy saving light bulbs at home’, ‘always using public transportation instead of a car’, ‘reducing shower time’, ‘buying glass instead of plastic bottles’, ‘being a member of environmental organizations’, ‘actively looking for the most environmentally friendly products’, ‘using a reusable shopping bag’ and ‘buying organic products’.

not they usually display each of the eight environmental behaviors included in their set". The instructions for the control condition omitted the word "environmental".

In the second phase of the experiment, after 10 min of unrelated filler tasks, participants indicated, on a 100-point visual analog scale which ranged from *not at all* to *perfectly*, "the extent to which observing each of the following 20 behaviors in others allows for an inference regarding the other person's environmental consciousness".

## 5.2. Results

### 5.2.1. Manipulation check

As expected, participants in the high-frequency condition indicated that they engaged more in the included behaviors ( $M=6.12$ ,  $SD=.50$ ) than participants in the low-frequency condition ( $M=3.66$ ,  $SD=.85$ ;  $F(1, 51)=170.18$ ,  $p<.01$ ).

### 5.2.2. Diagnosticity

Cronbach alpha's for the common, uncommon, and new common behaviors were .84, .66 and .64, respectively. We averaged the diagnosticity-ratings for each of the three types of behaviors. Then we conducted a repeated measures ANOVA with cueing condition (high-frequency, low-frequency, or control) as a between-subjects factor and type of behavior (common, uncommon, and new common) as a within-subjects factor. As predicted, the analysis revealed a significant interaction effect<sup>3</sup> ( $F(4, 154)=6.64$ ,  $p<.01$ ).

As Table 1 shows, in the control condition, the uncommon behaviors were indeed judged more diagnostic than the common ones ( $F(1, 77)=12.74$ ,  $p<.01$ ) or the new common ones ( $F(1, 77)=28.12$ ,  $p<.01$ ). Additionally, new common behaviors were considered less diagnostic than the common behaviors ( $F(1, 77)=4.59$ ,  $p<.04$ ). This last difference is small compared to that between the uncommon and both types of common behaviors, and is perhaps due to sampling effects.

In the low-frequency condition, the uncommon behaviors were judged to be more diagnostic than the common ones ( $F(1, 77)=19.21$ ,  $p<.01$ ) and than the new common ones ( $F(1, 77)=25.41$ ,  $p<.01$ ). The difference between the common behaviors and the new common behaviors was not significant ( $F(1, 77)=1.06$ ,  $p=.31$ ).

In the high-frequency condition, we expected that positive cueing would increase the diagnosticity of common behaviors, and possibly also that of new common behaviors. Accordingly, here we did not observe any differences between the diagnosticity of uncommon behaviors and the common ones ( $F(1, 77)<1$ ), and the new common ones ( $F(1, 77)<1$ ). In fact, the diagnosticity of the common behaviors was larger in the high-frequency condition than in the low-frequency condition ( $F(1, 77)=4.38$ ,  $p<.04$ ) and than in the control condition ( $F(1, 77)=3.80$ ,  $p<.05$ ). Additionally, the new common behaviors were judged as more diagnostic in the high-frequency condition than in the low-

Table 1

Diagnosticity ratings for common, uncommon, and new common behaviors in the high-frequency, low-frequency, and control condition

Condition	Diagnosticity ratings					
	Common behaviors		Uncommon behaviors		New common behaviors	
	Mean	SD	Mean	SD	Mean	SD
High frequency	77.82 <sup>a</sup>	10.23	76.29 <sup>a</sup>	8.71	76.38 <sup>a</sup>	10.00
Low frequency	71.25 <sup>b</sup>	11.47	78.71 <sup>a</sup>	7.79	69.52 <sup>bc</sup>	11.49
Control	71.89 <sup>b</sup>	12.39	77.62 <sup>a</sup>	9.50	68.51 <sup>c</sup>	14.07

Note. Cell means with different superscripts differ significantly ( $p<.05$ ).

frequency condition ( $F(1, 77)=4.33$ ,  $p<.04$ ) or in the control condition ( $F(1, 77)=6.07$ ,  $p<.02$ ).

The manipulation did not affect the diagnosticity of the uncommon behaviors; no significant differences were found between the control condition and the high- and low-frequency conditions ( $F_s<1$ ).

## 5.3. Discussion

Common environmental behaviors are judged to be less diagnostic in the inference of environmental attitudes than uncommon ones (pilot study). However, cueing these behaviors as environmental increases this diagnosticity. Importantly, this positive cueing effect generalizes to new common behaviors: we also observed an increased diagnosticity among common behaviors (which were not used as cues themselves) as the result of cueing with other common behaviors. Note that uncommon environmental behaviors, which are considered diagnostic before cueing, did not increase in diagnosticity after cueing with either common or uncommon behaviors. This indicates that cueing people with common environmental behaviors affects their pro-environmental self-perception more strongly than does cueing with uncommon environmental behaviors.

## 6. Study 2

Because most people engage in common environmental behaviors, we expect that increasing the diagnosticity of these behaviors through a positive cueing manipulation will result in more environmentally friendly attitudes and self-perceptions. The purpose of Study 2 is to test this hypothesis. We expect that the manipulation used in Study 1 will lead to more environmentally friendly attitudes and self-perceptions in the high-frequency condition than in either the low-frequency or the control condition.

Although we did not expect there to be any differences between the control condition and the low-frequency condition, we retained the latter for two reasons. First, as a second control condition, it excludes alternative explanations of positive cueing in terms of priming environmental behavior, since the *environmental friendliness* of the high- and low-frequency sets were identical. Second, it is a way of simulating the traditional social marketing approach. Social marketing campaigns often emphasize uncommon behaviors that people should (but usually do not) engage in. Although these campaigns succeed in temporarily motivating targets to make pro-environmental decisions, we

<sup>3</sup> Because the set of new common behaviors contains fewer items (4) than the sets of common and uncommon behaviors (8), we repeated the analysis using only the common and uncommon behaviors. We found a similar, but somewhat larger, interaction effect:  $F(2, 77)=8.92$ ,  $p<.01$ .

predict that their approach is unlikely to influence the targets' self-perceptions.

## 6.1. Method

### 6.1.1. Participants and procedure

One-hundred-sixty undergraduate students took part in the study in exchange for partial course credit. They came to the lab in groups of five to eight students and were seated individually in front of a computer screen in semi-closed cubicles. The participants were randomly assigned to one of three conditions: the high-frequency condition, the low-frequency condition, or the control condition. These groups were then presented with the high-frequency, low-frequency, and control sets of behaviors, respectively. As in Study 1, participants indicated, on a seven-point scale ranging from *I do not agree* to *I fully agree*, their engagement in each of the eight (environmental) behaviors included on their list. In the second phase of the experiment, after 20 min of filler tasks, participants reported their environmental attitudes and their self-perceptions as green consumers. We also included an item that assessed whether the participants felt a sense of moral obligation to protect the environment.

### 6.1.2. Materials

We used the same positive cueing manipulation that we used in Study 1. The main dependent measure was a 3-item scale which probed the participants' attitudes towards ecological behaviors. The attitude items were embedded in a longer questionnaire, thus concealing the true purpose of the task. The questionnaire also included items that measured the participants' perceptions of themselves as an ecological consumer (2 items), as well as the degree to which participants felt morally obliged to protect the environment (see Table 2).

## 6.2. Results

### 6.2.1. Manipulation check

As intended, participants in the high-frequency condition indicated that they engaged more in the included behaviors than

did participants in the low-frequency condition ( $M=5.53$  versus  $3.05$ ,  $F(1, 103)=204.88$ ,  $p<.01$ ).

### 6.2.2. Attitudes towards ecological behaviors

The three attitude items loaded on one factor that explained 75.69% of the variance ( $\alpha=.84$ ). The ANOVA on the mean of these items revealed that the cueing manipulation significantly affected the participants' attitudes towards ecological behaviors,  $F(2, 157)=7.47$ ,  $p<.01$ . Simple contrasts showed that the attitudes in the high-frequency condition were more favorable than in both the control condition ( $F(1, 157)=14.41$ ,  $p<.01$ ) and the low-frequency condition ( $F(1, 157)=6.52$ ,  $p<.01$ ). The latter two conditions did not differ significantly ( $F(1, 157)=1.50$ ,  $p=.22$ ).

### 6.2.3. Self-perception and moral obligation

The two items which probed participants' self-perception as 'green consumers' loaded on one factor that explained 77.51% of the variance ( $\alpha=.71$ ). The ANOVA on the mean scores showed that our manipulation influenced the self-perception of participants,  $F(2, 157)=9.97$ ,  $p<.01$ . Simple contrasts revealed that participants in the high-frequency condition saw themselves as more ecological than participants in both the control ( $F(1, 157)=9.80$ ,  $p<.01$ ) and the low-frequency conditions ( $F(1, 157)=18.80$ ,  $p<.01$ ). The self-perception of participants in the low-frequency condition did not differ significantly from that of participants in the control condition ( $F(1, 157)=1.57$ ,  $p=.21$ ).

The ANOVA on the participants' feelings of moral obligation to protect the environment also revealed a significant effect ( $F(2, 157)=4.20$ ,  $p<.02$ ). The high-frequency condition scored marginally significantly higher than the control condition ( $F(1, 157)=3.35$ ,  $p<.07$ ) and significantly higher than the low-frequency condition ( $F(1, 157)=8.21$ ,  $p<.01$ ). Again, the low-frequency condition did not differ significantly from the control condition ( $F(1, 157)=1.14$ ,  $p=.29$ ).

A Sobel test (Baron and Kenny, 1986) indicated that the attitude towards environmental behaviors mediated the effect of our manipulation on the participant's self-perception ( $Z=-3.06$ ,  $p<.01$ ) and sense of moral obligation ( $Z=-3.32$ ,  $p<.01$ ). In both cases, the bootstrapped estimate of the indirect effect was

Table 2  
Means and standard deviations of the items of the attitude, self-perception and moral obligation scales

	Condition					
	High frequency		Low frequency		Control	
	Mean	SD	Mean	SD	Mean	SD
Attitude scale	5.21 <sup>a</sup>	0.92	4.79 <sup>b</sup>	0.82	4.59 <sup>b</sup>	0.87
How do you feel about environmental behaviors? (1=very negative, 7=very positive)	5.19	1.01	4.92	0.81	4.78	0.94
How do you feel about performing environmental behaviors? (1=very negative, 7=very positive)	5.35	1.05	5.00	1.04	4.62	1.05
How important is it that you perform environmental behaviors? (1=not important at all, 7=very important)	5.08	0.93	4.43	0.91	4.36	1.04
Self-perception scale	4.51 <sup>a</sup>	0.92	3.63 <sup>b</sup>	1.07	3.88 <sup>b</sup>	1.10
I think my behavior is environmentally responsible (1=totally don't agree, 7=totally agree)	5.06	0.85	3.60	1.18	4.31	1.12
When I buy a product, I take environmental considerations into account. (1=totally don't agree, 7=totally agree)	3.96	1.25	3.66	1.18	3.46	1.36
Moral obligation scale						
I feel morally obliged to protect the environment (1=totally don't agree, 7=totally agree)	5.29 <sup>a</sup>	1.18	4.66 <sup>b</sup>	1.21	4.89 <sup>b</sup>	0.98

Note. For each scale, cell means with different superscripts differ significantly ( $p<.05$ ); cells referring to individual items of a scale were not compared.

significant with 99% confidence (Preacher & Hayes, 2004).<sup>4</sup> As shown above, the manipulation had a significant effect on the mediator — the participants' attitude towards environmental behavior. The direct effects of the mediator on self-perception ( $t(159)=-3.71, p<.01$ ) and moral obligation ( $t(159)=7.27, p<.01$ ) were significant. The direct effects of the manipulation on the participants' self-perception ( $t(158)=-1.61, p=.11$ ) and sense of moral obligation ( $t(158)=.11, p=.92$ ) disappeared after we added *attitude* as a mediator.

### 6.3. Discussion

Positive cueing renders people's attitudes towards ecological behaviors more favorable, makes them perceive themselves as more environmentally friendly, and increases their sense of moral obligation towards the environment. The effects of positive cueing on self-perception and on moral obligation are mediated by the positive cueing effect on the participants' attitudes towards ecological behaviors.

There were no significant differences between the control condition and the low-frequency condition. This was to be expected, given that Study 1 showed that cueing low-frequency behaviors did not influence the diagnosticity of common or uncommon environmental behaviors. One might have expected that an approach that emphasizes past failures when encouraging people to behave in environmentally friendly ways (the low-frequency condition) would induce hypocrisy (Aronson, Fried, & Stone, 1991), and that induced hypocrisy might prove an effective way of improving environmental attitudes. In our experiment, induced hypocrisy did not have beneficial effects. However, we did not include a phase designed to elicit a (public) commitment to one's attitudes, as is usually done in induced hypocrisy studies. In the absence of that step, emphasizing people's flaws seems to be a less than efficient way to improve people's attitudes. Additionally, we did not observe any backfire effects in the low-frequency condition. In other words, making it salient to people that they usually do not engage in environmental behaviors (as we did in the low-frequency condition) did not adversely affect their attitudes towards their ecological behaviors, their self-perceptions, or their sense of moral obligation towards the environment.

## 7. Study 3

Assuming that a more favorable attitude towards ecological behavior would result in more environmentally friendly behavior (Ajzen, 1996; Gill, Crosby, & Taylor, 1986; Minton & Rose, 1997), we tested the potential of positive cueing for beneficially influencing actual ecological behavior.

Participants were presented with two product choice tasks. In both instances, one alternative was more ecologically sound than the other, but was also more expensive. In addition, we

observed how efficiently participants used available scrap paper in a task that required them to take notes.

We took several steps to avoid demand effects or hypothesis guessing (cf. Sawyer, 1975). First, we did not measure the participants' attitudes towards ecological behavior. Second, we included unrelated filler tasks. Third, the writing task yielded a very subtle measure, unlikely to be sensitive to demand effects, as the environmental aspect of the task was not evident. Fourth, we made the product choices as consequential as possible. The notepad choice was an actual choice between an ecological and a more attractive, non-ecological notepad. In a simulated shop task, participants were told that they would have to buy the product of their own choosing for a randomly selected product category. Finally, the manipulation was preceded by an environmental-concern questionnaire which ensured that all participants were primed on ecology, thus ruling out explanations based on differential activation of ecology in different conditions.

Considering the results of Study 1 and 2, we expected a higher number of pro-environmental choices in the high-frequency condition than in the low-frequency condition or the control condition. Given that we had not observed any differences between the latter two conditions in the previous experiments, we did not expect there to be any differences between these conditions in the current experiment.

### 7.1. Method

#### 7.1.1. Participants and procedure

Sixty-six undergraduates were paid 6 € for their participation in this study. They came to the lab in groups of five to eight students. At the beginning of the session (before introducing our manipulation), we asked them to complete an environmental-concern questionnaire that used 13 out of the 16 items in the environmental-concern scale of Minton and Rose (1997); we dropped three repetitive items in order to keep the questionnaire as short as possible. We then subjected the participants to a cueing manipulation identical to the one in the previous studies, which resulted in a high-frequency, a low-frequency, and a control condition.

#### 7.1.2. Dependent variables

The remaining part of the session consisted of several tasks designed to measure ecological behavior. After completing a filler task, participants were presented with a *product choice task* in which they received ten product pairs: five filler pairs and five critical pairs. The critical pairs all consisted of one environmentally friendly product that was more expensive than the alternative. We asked the participants to indicate which product they would pick if they were to purchase them. To increase the ecological validity, we informed the participants that at the end of the session they would actually have to purchase the product of their choice from a randomly chosen product category, and that they would have to use part of their participation fee to do so. The critical product categories were cookies (which differed in the amount of plastic used for wrapping), paper towels, deodorants, energy-efficient light bulbs, and detergents (see Appendix A). For eight product categories, the more expensive product cost 1.05 € and the less expensive 0.95 €. The light bulbs were priced at 1.50 €

<sup>4</sup> A reversed model shows that self-perception partially mediates the relationship between our manipulation and attitude. The indirect effect is significant ( $Z=-2.59, p<.01$ ), but the effect of the manipulation on attitude remains significant after controlling for self-perception ( $t=-2.67, p<.01$ ). As the model in which attitude mediates the effect of manipulation on self-perception shows complete mediation, it is preferable.

Table 3  
Behavioral effects of the cueing manipulation

Condition	Dependent measures						
	Product choice task		Percentage of participants who chose recycled notepad	Efficiency of using scrap paper <sup>1</sup>		Size of handwriting <sup>2</sup>	
	Mean	SD		Mean	SD	Mean	SD
High frequency	3.12 <sup>a</sup>	0.79	81 <sup>a</sup>	0.30 <sup>a</sup>	0.26	-0.40 <sup>a</sup>	0.66
Low frequency	1.96 <sup>b</sup>	1.13	23 <sup>b</sup>	0.20 <sup>ab</sup>	0.22	0.10 <sup>b</sup>	0.59
Control	2.34 <sup>b</sup>	1.14	52 <sup>c</sup>	0.13 <sup>b</sup>	0.10	0.16 <sup>b</sup>	0.93

Note. For each dependent measure, cell means with different superscripts differ significantly ( $p < .05$ ).

<sup>1</sup> The scores in the table are squared percentages.

<sup>2</sup> The numbers represent means of standardized scores.

and 1.30 €, and the detergents at 1.40 € and 1.30 €. We pre-tested these prices in a different sample of the same student population ( $N=34$ ) by informing participants about the retail value of a certain object and asking them how much more they would be willing to pay for a more environmentally friendly product. We used the median price mentioned for the ecological products in the choice task.

After the choice task, we unobtrusively measured how efficiently respondents used *scrap paper*. We asked participants to write down a short summary of each of the eleven quite elaborate product descriptions shown on the screen, under the pretext of investigating which information consumers regard as essential. We examined how economically the participants used the available paper by counting the number of sheets used and measuring the percentage of the surface on which they wrote.

The final measure was an actual product choice (*notepad choice*). After spending ten more minutes on filler tasks we informed the participants that the experimental session was finished and asked them to proceed to the exit doors, where the experimenter would pay them for their cooperation. The experimenter thanked each participant individually for his or her participation and paid the promised 6 €, casually mentioning the fact that, as the summer holidays were approaching, some leftover material from previous experiments was to be given away. The experimenter then invited the participants to take a notepad from a nearby table. These notepads were piled up in two stacks: one contained notepads made from brownish, recycled paper, with a large “recycled” logo on the cover, and the other contained notepads of white, regular paper. The retail value of these notepads is 1.39 € and 1.30 €, respectively. The experimenter inconspicuously observed which notepad the participants chose.

## 7.2. Results

### 7.2.1. Manipulation check

As in our previous studies, participants in the high-frequency condition indicated that they engaged more in the behaviors listed ( $M=5.96$ ,  $SD=.77$ ) than did participants in the low-frequency condition ( $M=3.34$ ,  $SD=.87$ ,  $F(1, 39)=104.61$ ;  $p < .01$ ).

### 7.2.2. Product choice task

We performed an ANCOVA on the number of ecological choices made in the product choice task, using environmental concern as a covariate. The scree plot resulting from the factor

analysis on the 13 environmental-concern items suggested a uni-dimensional solution. One factor explained 48.47% of the total variance (Cronbach's  $\alpha = .90$ ).

The manipulation had a significant effect on the number of ecological products chosen ( $F(2, 62)=8.22$ ,  $p < .01$ ), see Table 3. Simple contrasts show that, on average, students in the high-frequency condition opted for more environmentally friendly products than did students in the control condition ( $F(1, 62)=7.07$ ,  $p < .01$ ) or the low-frequency condition ( $F(1, 62)=15.89$ ,  $p < .01$ ). There was no significant difference between the low-frequency condition and the control condition ( $F(1, 62)=1.69$ ,  $p = .20$ ). The covariate – ecological concern – had a significant, positive relationship with the number of ecological products chosen ( $F(1, 62)=7.28$ ;  $p < .01$ ), indicating that our dependent measure is indeed sensitive to the willingness to make environmentally friendly choices.

### 7.2.3. Notepad choice task

Participants assumed that the experiment was already over when they were offered a notepad to take home with them. Two participants turned down the offer, so in the end we had 64 observations. A chi-square test revealed a significant effect of cueing ( $\chi^2(2, N=64)=14.59$ ,  $p < .01$ ), see Table 3. The ecological notepad was chosen more often by participants in the high-frequency condition (81%) than by participants in the control condition (52%),  $\chi^2(1, n=42)=3.86$ ,  $p < .05$ , or in the low-frequency condition (23%),  $\chi^2(1, n=43)=14.58$ ,  $p < .01$ . Moreover, choosing the ecological notepad was also significantly more likely in the control condition than in the low-frequency condition,  $\chi^2(1, n=43)=4.04$ ,  $p < .04$ .

### 7.2.4. Use of scrap paper

Participants were free to use as many sheets of paper as they needed to summarize the eleven elaborate product descriptions presented on the computer screen. The sheets were 9.7 cm by 10 cm. As a measure of paper usage efficiency, we used scanner software to determine what percentage of the total surface of used sheets contained writing. We squared this number to approximate a normal distribution. Higher numbers correspond to more efficient, and therefore more ecological, paper usage.<sup>5</sup> The

<sup>5</sup> The data regarding three participants were excluded from this analysis because the participants failed to follow the instructions. Instead of summarizing the product descriptions, these participants only indicated whether they thought the statement was true or false.

ANCOVA, controlling for the number of words participants wrote and for environmental concern, revealed a significant effect of cueing,  $F(2, 59)=3.74$ ,  $p<.03$ , see Table 3. Participants in the high-frequency condition used the paper more efficiently than those in the control condition ( $F(1,59)=7.28$ ,  $p<.01$ ). The difference between the high- and low-frequency conditions was marginally significant, with  $F(1, 59)=2.96$  and  $p<.09$ . Again, we did not find a significant difference between the low-frequency condition and the control condition ( $F(1, 59)=1.13$ ;  $p=.29$ ).

We also measured the size of the participants' handwriting. In order to do so we selected three words that met two criteria. First, they had to have been written down by (almost) all participants (as participants wrote down summaries, not everyone used the same words), and, second, they had to appear either midway or towards the end of the sequence of summaries, as we noticed that the size of the handwriting often varied considerably within each participant's writing for the first few summaries. We found two words that had been used by everyone, and one word that had been used by all but one participant. The selected words were 'glycerine', 'omega3' and 'celoxydatie' (Dutch for 'cell oxidation'). We measured the length of these words in centimeters for each participant. To control for objective word-length, we standardized these scores and then calculated the average length of these three standardized scores. We found a significant effect ( $F(2, 59)=3.36$ ,  $p<.04$ ): participants in the high-frequency condition wrote smaller than participants in the control condition ( $F(1, 59)=5.63$ ,  $p<.02$ ) or in the low-frequency condition ( $F(1, 59)=4.47$ ,  $p<.04$ ). There was no significant difference between the low-frequency group and the control condition, with  $F(1,59)<1$ .

### 7.3. Discussion

Positive cueing successfully increased the level of the participants' environmental behavior. Participants in the high-frequency condition indicated a larger preference for a more expensive, but environmentally friendly, variant of a common product in the simulated shop environment, and more often chose the less attractive but recycled notepad that they were offered.

Since the environmental dimension of the choice tasks was rather obvious – making a choice between a product and its environmentally friendly alternative – we also included a task where the environmental dimension was not obvious at all: taking notes on scrap paper. Even for that task, we found that cueing with common environmental behaviors resulted in more efficient (and therefore more environmentally friendly) use of scrap paper than in the case participants were not cued or cued with uncommon environmental behaviors. Participants even 'spontaneously' decreased the size of their handwriting to make more efficient use of the provided paper. This suggests that the manipulation does more than merely priming the concept of ecology, which in its turn influences subsequent choices where there is a clearly delineated environmental dimension. It shows, in fact, that those who are cued with commonly performed environmental behaviors seem to look actively for ways in which they can adjust their behavior in order to minimize their environmental impact.

Again, emphasizing the green behaviors in which people generally do not engage (i.e., low-frequency behaviors), a tech-

nique used by traditional social marketing campaigns, did not result in more environmental choices. In fact, the results are quite to the contrary — in the notepad choice task it actually led to less environmentally friendly choices than in the control condition. This result is in line with the findings of Menon, Block, and Ramanathan (2002). They found that cueing with uncommon behaviors (in their case, behaviors that may lead a person to contract hepatitis C) led people to worry less about contracting a disease than the people in a control group. Why did we obtain this boomerang effect, and why only on this measure? A possible answer is that traits act as uni-polar categories: evidence that one possesses a given trait does not necessarily affect one's self-perception on an opposite trait (cf. Buss & Craik, 1983; Gannon & Ostrom, 1996), although it will affect self-ratings on a bi-polar trait rating scale. Although cueing participants with ecological behaviors that they did not practice seemed to have no effect on their perception of how environmentally *conscious* they are (Study 2), it might, however, have changed their perception of how environmentally *inconsiderate* they are. The increased sense that one is environmentally inconsiderate may have decreased pro-environmental behavior.

There may be two reasons why this decreased pro-environmental behavior in the low-frequency condition manifested itself on the notepad choice only. The first is that, in the notepad choice task, more than 50% of the participants in the control condition behaved in an environmentally friendly way. This elevated instance of pro-environmental behavior may have increased the possibility of finding a significant boomerang effect. Second, the notepad choice may have raised the issue of environmental concern more than it was raised by the note-taking task. Clearly, the product choice task also may have raised an ecological concern. Although the low-frequency condition did not differ significantly in the number of pro-environmental choices, it was nevertheless below the number of such choices in the control condition. The failure to obtain a significant difference may have been due to a lack of power. In the studies of Menon et al. (2002), results regarding a backfire effect of cueing uncommon behaviors were mixed as well. For example, they did not find a difference between the control and the uncommon behaviors condition on the estimated risk of contracting hepatitis C. Future research will have to investigate the origins and the robustness of the current boomerang effect, as these are clearly relevant for the development of social marketing campaigns.

Some of the features we included in the design of this study were meant to reduce the likelihood of a demand-effect driving our results. For example, we added an environmental consciousness measure that we administered right before our cueing manipulation. By doing so, we were able to rule out an alternative explanation for the environmental priming: all participants were primed with references to environmental behaviors. In fact, the high- and low-frequency conditions did not differ at all regarding environmental references. Also, following Sawyer's guidelines (1975), we included multiple dependent measures in our study. Since both choice tasks were to some extent consequential, and since the note-taking task could hardly be recognized as an environmental task, it is unlikely that the observed behavioral effects are due to a demand-effect.



## 8. General discussion

The current paper presents and tests a social marketing tool, positive cueing, which is founded on the idea that, in at least some situations, attitudes are derived from prior behavior (Bem, 1972) or from the perception of that behavior (Salancik & Conway, 1975). The perception, in its turn, depends on the use of the accessibility heuristic and the representativeness heuristic (Kahneman & Tversky, 1972; Tversky & Kahneman, 1973). We showed that the cueing of commonly performed environmental behaviors as *environmental* results in increased pro-environmental decision making (Study 3), and we also revealed the process responsible for this effect. A pilot study showed that people are disinclined to draw inferences from behaviors that are easily explainable by other factors, and are also disinclined to draw inferences from behaviors thought to be too common to warrant any inference about one's attitudes (Raghubir & Menon, 2005). In our studies, however, we showed that positive cueing increases the perceived 'diagnosticity' of common environmental behaviors in inferring an actor's environmental attitudes (Study 1). We also showed that this increased 'diagnosticity', together with a higher salience of common environmental behaviors, results in a greater inclination to infer more favorable attitudes towards ecological behaviors and to see oneself as a consumer who is concerned with the environment (Study 2). The use of self-perception – in this case, the perception that one is “the kind of person that usually makes pro-environmental decisions” – as a decision heuristic is probably responsible for the behavioral effects of the positive cueing manipulation.

The findings in this paper allow us to propose some guidelines for designing effective social marketing campaigns. Traditional campaigns frequently tend to emphasize just how poorly the target audience is doing with regard to a certain topic. This might induce aversive feelings towards the request, and it might elicit feelings of guilt, reactance, and resentment (Reich & Robertson, 1979). Implicitly, traditional campaigns also tell the audience that they are just doing what everyone else does (i.e., they are failing to make the responsible environmental choices), a strategy that has been shown to reinforce the (undesirable) behavior (Cialdini, 2003). Saying that “a problematic behavior needs urgent attention because it is very prevalent” implies that it is prevalent. Research on descriptive norms (Cialdini, Reno, & Kallgren, 1990) suggests that *doing what everyone else is doing* is often preferred over *doing the right thing*. Therefore, such a message might ironically be interpreted as a justification for one's continued engagement in the undesirable behavior. Our findings confirm that this may result in an ineffective social marketing effort and suggest that drawing attention to the ecological behaviors in which people already engage improves their propensity to act in environmentally responsible ways. Rather than invoking social norms, the social marketing tool we presented in this paper draws on the suggestion of the existence of *personal* norms or values to engage in pro-environmental behavior. In those situations, especially, where the social descriptive norm is *not to engage* in a certain socially desirable behavior, our alternative might be a useful addition to the arsenal of the social marketer.

A second point touches on the fact that traditional campaigns usually call upon people's moral sense when asking them to do the ‘right thing’. However, because of the behavioral costs related to sustainable behaviors (Follows & Jobber, 2000; Pieters, 1989; Pieters et al., 1998; Thøgersen, 1994), these incentives to do the ‘right thing’ are only effective in the short term, before the costs regain salience. The technique we presented in this paper works by influencing the consumer's self-perception. People come to see themselves as “consumers willing to make an effort for the environment's sake”, or for any other promoted cause for that matter, and as consumers who act upon their self-perception (Osbaldiston & Sheldon, 2003). It is a well-documented fact that internal motivation results in increased performance and persistence of behavior (Ryan & Deci, 2000; Sheldon & Elliot, 1999). Therefore we expect a persuasion method based on a change in self-perception to have a more long-term effect (Albarracín & Wyer, 2001).

## Appendix A. Product attribute specifications of the product choice task, Study 3

Product		Choice A	Choice B
Cookies	Price	1.05 €	0.95 €
	Packaging	25 units in 1 plastic wrapper	Each unit wrapped individually
Kitchen paper	Price	1.05 €	0.95 €
	Paper	100% recycled	Non-recycled
Deodorant	Price	0.95 €	1.05 €
	Content	Contains propellants	Environmentally friendly vaporizer
Light bulbs	Price	1.30 €	1.50 €
	Type	Regular	Energy saving
Detergent	Price	1.30 €	1.40 €
	Type	Regular	Ecological packaging and content

## References

- Ajzen, I. (1996). The directive influence of attitudes on behavior. In P. M. Gollwitzer, & J. A. Bargh (Eds.), *The psychology of action* (pp. 385–403). New York: The Guilford Press.
- Albarracín, D., & Wyer, R. S. (2000). The cognitive impact of past behavior: Influences on beliefs, attitudes, and future behavioral decisions. *Journal of Personality and Social Psychology*, 79(1), 5–22.
- Albarracín, D., & Wyer, R. S., Jr. (2001). Elaborative and nonelaborative processing of a behavior-related communication. *Personality and Social Psychology Bulletin*, 27(6), 691–705.
- Andreasen, A. R. (1995). *Marketing social change*. San Francisco: Jossey-Bass.
- Aronson, E., Fried, C., & Stone, J. (1991). Overcoming denial and increasing the intention to use condoms through the induction of hypocrisy. *American Journal of Public Health*, 81(December), 1636–1638.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical

- considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182.
- Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 6. (pp. 1–62). New York: Academic Press.
- Buss, D. M., & Craik, K. H. (1983). The act frequency approach to personality. *Psychological Review*, 90(2), 105–126.
- Cialdini, R. B. (2003). Crafting normative messages to protect the environment. *Current Directions in Psychological Science*, 12(4), 105–109.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58(6), 1015–1026.
- Crane, A., & Desmond, J. (2002, June). Societal marketing and morality European. *Journal of Marketing*, 36, 548–569.
- Department for Environment, Food and Rural Affairs (2002). *Survey of Public Attitudes to Quality of Life and to the Environment*. London, UK: Defra Publications.
- European Commission, Directorate General of the Environment (2005). *The attitudes of European citizens towards environment*. Brussels, Belgium: Directorate General of Communication.
- Follows, S. B., & Jobber, D. (2000). Environmentally responsible purchase behaviour: A test of a consumer model European. *Journal of Marketing*, 34(5/6), 723–746.
- Gannon, K. M., & Ostrom, T. M. (1996). How meaning is given to rating scales: The effects of response language on category activation. *Journal of Experimental Social Psychology*, 32(4), 337–360.
- Gill, J. D., Crosby, L. A., & Taylor, J. R. (1986). Ecological concern, attitudes, and social norms in voting behavior. *Public Opinion Quarterly*, 50(4), 537–554.
- Grice, H. P. (1975). Logic and Conversation. In P. Cole, & J. L. Morgan (Eds.), *Syntax and semantics*, Vol. 3. New York: Academic Press.
- Grunert, S. C. (1993). Everybody seems to be concerned about the environment; but is this concern reflected in (Danish) consumers' food choice? In F. Van Raaij, & G. J. Bamossy (Eds.), *European advances in consumer research*, Vol. 1. Provo, UT: Association for Consumer Research.
- Holbrook, M. B., & Batra, R. (1987). Assessing the role of emotions as mediators of consumer responses to advertising. *Journal of Consumer Research*, 14(3), 404.
- Holbrook, M. B., & Lehmann, D. R. (1980). Form versus content in predicting Starch scores. *Journal of Advertising Research*, 20(4), 53.
- Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representativeness. *Cognitive Psychology*, 3(3), 430–454.
- Kelley, H. H. (1973). The processes of causal attribution. *American Psychologist*, 28(2), 107–128.
- Kotler, P., & Zaltman, G. (1971). Social marketing: An approach to planned social change. *Journal of Marketing*, 35(3), 3–12.
- MacKenzie, S. B., Lutz, R. J., & Belch, G. E. (1986). The role of attitude toward the ad as a mediator of advertising effectiveness: A test of competing explanations. *Journal of Marketing Research*, 23(2), 130.
- McCarthy, 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(May), 53–62.
- Menon, G., Block, L. G., & Ramanathan, S. (2002). We're at as much risk as we are led to believe: Effects of message cues on judgments of health risk. *Journal of Consumer Research*, 28(4), 533–549.
- Minton, A. P., & Rose, R. L. (1997, September). The effects of environmental concern on environmentally friendly consumer behavior: An exploratory study — Dimensions of environmental concern. *Journal of Business Research*, 40, 37–48.
- Morris, M. W., & Larrick, R. P. (1995). When one cause casts doubt on another: A normative analysis of discounting in causal attribution. *Psychological Review*, 102(2), 331.
- Osbaldiston, R., & Sheldon, K. M. (2003, December). Promoting internalized motivation for environmentally responsible behavior: A prospective study of environmental goals. *Journal of Environmental Psychology*, 23, 349–357.
- Pieters, R. G. (1989). *Attitudes and behavior in a source-separation program: A garbology approach*. Delft: Eburon.
- Pieters, R. G., Bijmolt, T., van Raaij, F., & de Kruijk, M. (1998). Consumers' attributions of pro-environmental behavior, motivation, and ability to self and others. *Journal of Public Policy and Marketing*, 17(2), 215–225.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717–731.
- Raghubir, P., & Menon, G. (2005). Depressed or just blue? The persuasive effects of a self-diagnosis inventory. *Journal of Applied Social Psychology*, 35(12), 2535–2559.
- Reich, J. W., & Robertson, J. L. (1979). Reactance and norm appeal in anti-littering messages. *Journal of Applied Social Psychology*, 9(1), 91–101.
- Ryan, R. M., & Deci, E. L. (2000, January). Facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78.
- Salancik, G. R., & Conway, M. (1975, November). Attitude inferences from salient and relevant cognitive content about behavior. *Journal of Personality and Social Psychology*, 32, 829–840.
- Sawyer, A. G. (1975). Demand artifacts in laboratory experiments in consumer research. *Journal of Consumer Research*, 1(4), 20.
- Schwarz, N. (1994). Judgment in a social context: Biases, shortcomings, and the logic of conversation. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 26. (pp. 123–162). San Diego, CA: Academic Press.
- Schwarz, N., Strack, F., Bless, H., Klumpp, G., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social Psychology*, 61(2), 195–202.
- Sheldon, K. M., & Elliot, A. J. (1999, March). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, 76, 482–497.
- Sperling, G., & Doshier, B. A. (1986). Strategy and optimization in human information processing. In K. R. Boff, L. Kaufman, & J. P. Thomas (Eds.), *Handbook of perception and human performance*, Vol. 1. New York: Wiley.
- Taylor, S. E. (1975). On inferring one's attitudes from one's behavior: Some delimiting conditions. *Journal of Personality and Social Psychology*, 31(1), 126–131.
- Thøgersen, J. (1994, March). A model of recycling behaviour, with evidence from Danish source separation programmes international. *Journal of Research in Marketing*, 11, 145–163.
- Thøgersen, J., & Grunert-Beckmann, S. C. (1997). Values and attitude formation towards emerging attitude objects: From recycling to general, waste minimizing behavior. *Advances in Consumer Research*, 24(1), 182–189.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5, 207–232.
- Vanden Abeele, P., & MacLachlan, D. L. (1994). Process tracing of emotional responses to TV ads: Revisiting the warmth monitor. *Journal of Consumer Research*, 20(4), 586.