

# “Good girl – bad boy. Do identity statements bias results from questionnaires?”

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## Good girl – bad boy. Do identity statements bias results from questionnaires?

### Abstract

Environmental policy analyses are often drawn on stated preferences. Most humans have preferences of how we would like others to perceive us, which may create systematic differences between reported and real behavior. The author model how social and moral norms and the image a respondent likes to project affect reported behavior, using data from a survey reporting environment-related household behavior in ten OECD countries as an illustration. The paper finds evidence of norms and identity statements affecting reported behavior, and of the misrepresentation of preferences, both among respondents complying with and protesting the norm. However, over- and understatements appear to be evenly distributed.

**Keywords:** household behavior, environment, norms, stated preferences.

**JEL Classification:** B41, D1, Q28, Q38, Q48.

### Introduction

Within the field of environmental economics, stated preferences are often used to analyze behavior as access to revealed preference data is typically limited. Moreover, stated preferences are the only option when analyzing behavioral responses to future policy measures. During the last few decades, the literature applying stated preference data to environmental issues has become quite extensive, particularly within the valuation literature. If there is no systematic bias with respect to how respondents report their behavior and preferences, these surveys may provide vital information when evaluating policy; e.g., policy instruments aimed at changing behavior. However, the potential for strategic responses, interviewer bias, and *yeah* saying has been a major concern in the valuation literature (Arrow et al., 1993, Spash, 2006; Mitchell and Carson, 1998; Bateman et al., 2002; Albirini and Kahn, 2006; Cooper, 2006). Concerns about ethical objections to the payment vehicle and other survey instruments, and how they may bias results e.g. through protest bids, are also heavily discussed in this literature. Seldom discussed, however, is the underlying link between norms and behavior when discussing these ethical considerations, often leading to the conclusion that all correlation between ethical considerations and protest behavior leads to biased estimates. We argue that this may not be the case if actual behavior reflects these ethical considerations.

To know how to deal with, for example, protest bids and interviewer bias, we need to know when and why some respondents tend to misrepresent their preferences in a questionnaire. To understand what is driving this behavior, we incorporate elements from the theories of social and moral norms (Rabin, 1998; Frey, 1994; Blamey, 1998; Deci and Ryan,

1985; Festinger, 1958; Schwartz, 1970; Halvorsen, 2008) and identity building (Blamey, 1998; Uesigi and Vinacke, 1963) into a standard economic modeling framework.

When a social norm exists, some respondents will comply while others will protest against it, depending on whether the respondents regard themselves as “a good citizen”, “a freethinker”, “a liberalist”, “an intellectual”, “an environmentalist”, “an outlaw”, or whatever image he/she wishes to present. The intrinsic moral norms the individual possesses may reinforce or counter this behavior. This may include an aversion against lying/misinforming or the virtue of being modest. The moral and social norms we adopt and attempt to live by may also affect how we respond to institutional settings; e.g., if we find a payment vehicle unethical. For instance, if we dislike haggling for moral (or other) reasons<sup>1</sup>, we may not wish to buy a souvenir, even if our willingness to pay for it is higher than the initial asking price. Another example is a respondent with moral objections to how a good is provided, often leading to the crowding out of intrinsically motivated behavior (Frey, 1994; Thøgersen, 1994). That is, some respondents may reduce effort when price incentives are introduced (e.g., a volume-based garbage collection fee) because they no longer see it as their civic duty to recycle when recycling services become a commodity.

Because of our preferences for the good in question, and how we react to the social setting and various (conflicting) norms, reported behavior may or may not equate to actual behavior. Note that having ethical considerations with respect to the good in question (including the payment vehicle), or being aware

<sup>1</sup> We may, for example, believe that trying to obtain a higher price than what the commodity is “worth” is unethical, or find that the aggressive haggling behavior of the seller conflicts with our social norm of how to behave (it is rude).

of and projecting an image of yourself in a questionnaire, is only a problem if the reported behavior differs from actual behavior. For instance, if your “bad boy” image prevents you from supporting the good in question, projecting this image in a questionnaire does not qualify for potential bias in the response, as the response will reflect the expected protest behavior. It is thus of vital importance to identify when reported behavior may deviate from actual behavior to be able to correct the analysis and to obtain an estimate as close as possible to the expected behavior.

How the valuation literature deals with interviewer biases, *yeah* saying, and protest bidders has varied over time. For example, a follow-up question is often used to identify protest bids so they can be removed from the analysis (Mitchell and Carson, 1998; Bateman et al., 2002). The problem with this approach is that it is difficult to identify which of the protesters are reporting some behavior that deviates from actual behavior. To legitimate excluding protest bidders, we need to construct a follow-up question that only identifies respondents whose protest is not a result of preferences for the good in question, and will thus not affect their actual behavior. Furthermore, biases from how we like to view ourselves and appear to others may appear in all types of questions (not just willingness-to-pay questions) and may bias the results in both directions. Finally, these biases are not only a potential problem attached to outliers, but may also occur for more average reported behavior. This is because respondents who are not complying with some norm (e.g., are not recycling) may say that they are doing it in order to feel less embarrassed. Thus, excluding one particular group of potentially biased responses may bias results even more than if these respondents were included in the survey. The challenge remaining is then to identify the potential misrepresentation of behavior.

The aim of this paper is to model how the existence of social and moral norms, and the image the respondent wishes to project, affect actual and reported effort in a stated preference questionnaire, and to obtain an estimate of their differences. As an illustration of detecting indications of the misrepresentation of preferences in survey data, we use data from an OECD survey mapping household environmentally friendly behavior in ten OECD countries<sup>1</sup>. In the analysis, we identify the degree of divergence between what you say you will do in the future and what you are currently doing. We interpret this deviation as an indication of a mismatch between current and ideal behavior. This provides

the potential for the misrepresentation of preferences for future behavior in the questionnaire.

## 2. Theoretical framework

Social and moral norms are likely to influence consumers, as how we live up to these norms determines our sense of self-respect and the respect we gain from others. For instance, Schwalbe and Staples (1991) found that a reflected appraisal (other people’s reaction to us) and self-perceptions (our observations of our own actions and their consequences) to be an important source of self-esteem. Further, self-esteem tends to arise from the expressions of liking and approval of others and the perception that one’s own behavior reflects competence and moral worth (Rosenberg, 1979; Wells and Marwell, 1976).

In this model, we assume that respondents create an image by the amount of environmentally friendly behavior they choose to report ( $Rg_h^c$ ) to members of community  $c$ . However, this reported behavior may differ from, or be equal to, actual behavior ( $g_h$ ). Norms affect behavior through feelings of respect, both from other human beings (hereafter, referred to as community respect) ( $CR_h^c$ ) and our sense of self-respect ( $SR_h$ ) (Halvorsen, 2008). A social norm ( $\theta^c$ ) influences how the reported behavior of respondent  $h$  ( $Rg_h^c$ ) affects the respect he/she receives in the community,  $c$ , whereas a moral norm ( $\theta_h$ ) controls how the respondent deals with the expectations of others. These norms may vary considerably across respondents and communities. In this model, the following function represents the community respect and self-respect a respondent receives:

$$\begin{aligned} CR_h^c &= CR_h^c(Rg_h^c; \theta^c), \\ SR_h &= SR_h(CR_h, g_h, \Delta g_h; \theta_h). \end{aligned} \quad (1)$$

The respondent’s respect in the community ( $CR_h$ ) may either increase or decrease with the reported behavior ( $Rg_h$ ), depending on the social norm in the community ( $\theta^c$ ), as consumers often face ambiguous social norms from different communities. For instance, some communities may have a norm that rewards environmentally friendly behavior, whereas in others this may not be sufficiently “cool” or “tough”.

In this model, self-respect ( $SR_h$ ) is assumed to be affected by the total amount of respect given to the respondent:  $CR_h = \sum_{c=1}^C CR_h^c$ . Self-respect is also assumed

to depend on actual behavior ( $g_h$ ) by either increasing self-respect by knowing that what you are doing is right, say, by helping the environment or other people (Spash (2008) refers to these as social-altruistic and

<sup>1</sup> The opinions expressed and arguments employed in this paper do not necessarily reflect the official views of the OECD or the governments of its member countries.

biospheric preferences), or by giving the respondent a “warm glow” through contributing to a just cause (Andrioni, 1990). Alternatively, it may decrease self-respect, depending on the respondent’s ideals concerning this type of behavior ( $\theta_h$ ). We also assume that the respondent’s self-respect is affected by the extent of truth telling, given by  $\Delta g_h = g_h - Rg_h$ . If the respondent has an aversion toward lying, misrepresenting behavior by either over- or understating “true” behavior will reduce his/her self-respect. However, if the respondent likes to deceive others, this negative effect may reduce or even become positive. We also assume the existence and strength of norms affects the strength of the derivatives of community respect and self-respect with regard to changes in actual and reported behavior, while the chosen identity determines the sign of the derivatives. In turn, institutional settings may affect the strength of norms, by the hypothetical level of the question, or by the organization of the service. An example of the latter is “crowding-out” effects (Frey, 1994), where the introduction of monetary incentives may weaken the norm, reducing both self- and community respect, and reducing environmental effort.

$$L_h = U_h(X_h, G(g_h), CR_h(Rg_h^c; \theta^c), SR_h(CR_h(Rg_h; \theta^c), g_h, g_h - Rg_h; \theta_h), \beta_h) - \eta_h \left\{ \sum_{i=1}^M p_i x_{ih} - Y_h \right\}, \quad (3)$$

where  $\eta_h$  is the Lagrange multiplier for the budget. From this optimization problem, we find that the optimal choice of actual and reported environmentally friendly behavior is a complex decision depending on the respondent’s norms and their wish to project an identity. Focusing on the first-order conditions for actual and reported environmentally friendly behavior gives:

$$\frac{\partial L_h}{\partial g_h} = \frac{\partial U_h}{\partial G} \frac{\partial G}{\partial g_h} + \frac{\partial U_h}{\partial SR_h} \left( \frac{\partial SR_h}{\partial g_h} + \frac{\partial SR_h}{\partial \Delta g_h} \right) \equiv 0, \quad (4)$$

$$\frac{\partial L_h}{\partial Rg_h} = \left( \frac{\partial U_h}{\partial CR_h} + \frac{\partial U_h}{\partial SR_h} \frac{\partial SR_h}{\partial CR_h} \right) \frac{\partial CR_h}{\partial Rg_h} - \frac{\partial U_h}{\partial SR_h} \frac{\partial SR_h}{\partial \Delta g_h} \equiv 0.$$

The decision of what to report in the questionnaire ( $Rg_h^c$ ) then depends on how much weight the respondent places on the perceptions of other human beings ( $\frac{\partial U_h}{\partial CR_h}$ ), how the community values the reported behavior ( $\frac{\partial CR_h}{\partial Rg_h}$ ) depending on the norms in the community ( $\theta$ ), how important self-respect is to the respondent ( $\frac{\partial U_h}{\partial SR_h}$ ), and how self-respect is affected by community respect ( $\frac{\partial SR_h}{\partial CR_h}$ ) and the misre-

We assume that the consumer gains utility ( $U_h$ ) from the consumption of a vector of goods and services ( $X_h = \{x_{1h}, \dots, x_{Mh}\}$ ) and environmental quality ( $G$ ) conditional on household characteristics ( $\beta_h$ ). Further, we assume that utility increases with self-respect ( $SR_h$ ) and the respect we receive in the community ( $CR_h$ ).

$$U_h = U_h(X_h, G, CR_h, SR_h; \beta_h). \quad (2)$$

$G$  is assumed to increase with the contribution to the environment by consumer  $h$  ( $G_h$ ) and other consumers ( $G_{-h}$ ), where  $G = G(G_h(g_h) + G_{-h})$ . We assume that income is given in the short term, and that the household uses all income on the consumption of goods and services, such that  $Y_h = \sum_{j=1}^M p_j x_{jh}$ , where  $p_j$  is the price of good  $x_j$ . The household is then assumed to maximize utility with regard to consumption ( $X_h$ ) and actual ( $g_h$ ) and reported environmentally friendly behavior ( $Rg_h$ ), subject to the budget constraint. This maximization problem provides the following Lagrange function:

porting of behavior ( $\frac{\partial SR_h}{\partial \Delta g_h}$ ). If a consumer wants to be

a “good citizen” and comply with the norm of contributing to a better environment,  $\frac{\partial U_h}{\partial CR_h}$  will be positive

and large, increasing the wish to report a high environmental effort in communities where this is highly valued ( $\frac{\partial CR_h}{\partial Rg_h} > 0$ ). However, if this good citizen has

an aversion toward lying, that is  $SR_h(CR_h, g_h, 0; \theta_h) > SR_h(CR_h, g_h, \Delta g_h; \theta_h)$ , the effect of exaggerating one’s own efforts ( $\Delta g_h < 0$ ) may reduce the wish to overre-

port. Likewise, if this good citizen not only has an aversion toward lying, but also views it as a virtue to understate one’s own efforts ( $\frac{\partial SR_h}{\partial \Delta g_h} > 0$ ), it may even

be optimal to report a lower effort than actual. Conversely, if the respondent has a “bad boy” image, he may still be very conscious of how others view him ( $\frac{\partial U_h}{\partial CR_h} \neq 0$ ), but if confrontational enough, may

gain utility and self-respect from losing respect in some communities ( $\frac{\partial U_h}{\partial CR_h} < 0$  and  $\frac{\partial SR_h}{\partial CR_h} < 0$ ), espe-

cially if the norms in these communities are considered moralistic.

Looking at the decision on environmentally friendly efforts ( $g_h$ ), we find that this depends on the effect of the environmentally friendly efforts on environmental quality ( $\frac{\partial G}{\partial g_h}$ ), as well as the effect on self-respect ( $\frac{\partial SR_h}{\partial g_h} + \frac{\partial SR_h}{\partial \Delta g_h}$ ). The respondent's moral norms also influence the effect on self-respect of increased environmentally friendly efforts. If the respondent receive a warm glow from contributing ( $\frac{\partial SR_h}{\partial g_h} > 0$ ), or likes to understate his/her own efforts ( $\frac{\partial SR_h}{\partial \Delta g_h} < 0$ ), this will increase the respondent's wish to contribute. In contrast, if the respondent is more confrontational, complying with the social norm may reduce self-respect ( $\frac{\partial SR_h}{\partial g_h} < 0$ ), thereby reducing environmental effort.

Solving all first-order conditions for this maximization, and assuming that the budget must be fulfilled in optimum, gives the desired actual and reported environmental efforts ( $g_h$  and  $Rg_h$ ) as a function of all prices ( $P$ ), household income ( $Y_h$ ), and environmentally friendly behavior by other households ( $G_{-h}$ ), conditional on the individual characteristics ( $\beta_h$ ), social norms ( $\theta^c$ ) and moral norms ( $\theta_h$ ) affecting this decision. Using the property that the degree of misrepresentation of environmental efforts is the difference between actual and reported behavior ( $\Delta g_h = g_h - Rg_h$ ), we may write the optimal reported behavior as actual behavior less the degree of underrepresentation of behavior in optimum:

$$\begin{aligned}
 g_h &= g_h(P, Y_h, G_{-h}; \beta_h, \theta_h, \theta^c), \\
 Rg_h &= g_h(P, Y_h, G_{-h}; \beta_h, \theta_h, \theta^c) - \\
 &\Delta g_h(P, Y_h, G_{-h}; \beta_h, \theta_h, \theta^c).
 \end{aligned}
 \tag{5}$$

To observe the degree of misrepresentation in particular analysis requires observations of both actual and reported behavior. The problem is that in most cases where we need to use stated preference surveys, we cannot observe actual behavior. Thus, we must find a way to say something about the possibility of misrepresentation given the information we actually possess. In the current study, we use various types of reported behavior where it is reasonable to assume that the degree of truth telling may vary. Indeed, the underlying assumption is that the strength of the moral norm for "truth telling" will vary in different settings (see the discussion surrounding equation (1)). In this analysis, we use the difference between reported past and future behavior. We assume that it is easier for a respondent to

over- or understate one's expectations about future behavior ( $g_h^{t+1}$ ) than it is to report large deviations from past behavior ( $g_h^t$ ), as the latter may be considered lying whereas the former may be interpreted as a statement of intent. In this model, we represent the difference between reported past ( $Rg_h^t$ ) and future behavior ( $Rg_h^{t+1}$ ) as:

$$Rg_h^{t+1} - Rg_h^t = g_h^{t+1} - g_h^t + \Delta g_h^t - \Delta g_h^{t+1}.
 \tag{6}$$

If the respondent is rational (in a strict economic sense), expected future behavior will equal past behavior if nothing changes, and the difference between reported past and future behavior is from differences in the degree of misrepresentation. If the respondent is reporting his or her true behavior, or has the same degree of misrepresentation in both past and future behavior, we would not expect to see any differences in reported past and future behavior. If, however, we observe a large deviation in reported behavior, it would indicate that the degree of truth telling differs between reported past and future behavior. In reality, respondents may expect things to change over time, which will also result in a difference in actual behavior. However, we assume that a large difference between reported past and future behavior, e.g., from a very low reported effort in the past to a very high reported effort in the future, is an indication that the respondent is not entirely satisfied with his/her current effort. This will increase the possibility of a deviation between stated and actual future behavior if a significant percentage of these respondents does not follow up by changing behavioral habits. Thus, we use information on respondents reporting a large deviation between future and present behavior as an indication of the potential misrepresentation of future preferences.

### 3. Measuring misrepresentation in stated preferences

**3.1. Data.** In this analysis, we use data from the OECD survey to illustrate the degree of misrepresentation in stated preference analyses. The data, upon which this study is based, were collected as part of the OECD's project "Household Behavior and Environmental Policy<sup>1</sup>". The data were gathered in February 2008 using a web-based panel. Some 10,251 respondents from ten participating countries (Australia, Canada, the Czech Republic, France, Italy, Korea, Mexico, Norway, the Netherlands, and Sweden) responded to the survey.

This was a very extensive survey, including several questions on five different areas of environmentally

<sup>1</sup> www.oecd.org/env/cpe/consumption.

friendly household behavior, namely: waste generation and recycling; transportation choices; energy saving measures; organic food consumption; and water use and water saving measures. Information about sociodemographic background, household characteristics, attitudes toward environmental issues (see Q23, Q28 and Q42 in the Appendix), and stated preferences toward hypothetical changes in environmental policies (see Q44, Q44a, Q57, Q83, Q94 and Q75 in the Appendix) were included in the questionnaire. The survey also included several questions concerning past environmentally friendly behavior by the respondents and their household in all the five areas, all ranked with respect to the relative level of efforts (see Q37, Q41, Q67, Q72, Q73, Q78, Q91 and Q92 in the Appendix). We also have questions indicating the respondents' current commitment to various public issues (Q24, Q25 and Q27) and one variable indicating protest responses to the payment vehicle in one of the willingness-to-pay (WTP) questions (Q46). Questions concerning past and future behavior, identity statements and attitudes are provided in the Appendix.

**3.2. Constructed indexes.** To measure the degree of pleasing and confrontational behavior with respect to future policy measures, we create two indexes (*GOOD* and *BAD*) depending on how often the respondent chooses a particular type of answer on questions concerning expected responses to future policy actions<sup>1</sup>. The *GOOD* index measures the share of "very important" responses to the question of how hypothetical policy measures will affect their future environmentally friendly behavior, whereas *BAD* measures the number of "not at all important" responses given by each respondent. The indexes express the percentage of possible times this response is selected. These indexes then capture the degree of "extreme" behavior; that is, trying to be supportive or opposing the norm of the "good citizen" in the questionnaire. Thus, these indexes aim to capture the extent of belonging to the identity of a "good citizen" or identities opposing this norm; e.g., the wish to appear to be a "rebel", a "bad boy/girl" or a "critic".

It is important to note that scoring high on either the *GOOD* or the *BAD* index does not necessarily mean that the respondent is misrepresenting his/her future preferences if the identity the respondent attempts to build is also reflected in expected future behavior. Biases occur when the respondent attempts to appear to be someone else and the image is not subse-

quently followed up by action. These respondents will bias the results in stated preference analysis. We use the difference between reported past and future behavior as an indication of the misrepresentation of expected future behavior (see the discussion surrounding equation (6)). To measure the difference between the intentions about future behavior embedded in the *GOOD* and *BAD* indexes and the reported past behavior, we create two behavioral indexes based on reported past behavior: one for "environmentally friendly" behavior ( $EFB_h$ ) and one for "not environmentally friendly" behavior ( $NEFB_h$ ). The indexes are based on the responses to questions about actual behavior (see Appendix: Q39, Q42, Q53, Q67, Q72, Q73, Q78, Q91, Q92), by counting the percentage of possible times the respondent either reports the highest or the lowest activity alternative.

**3.3. Econometric specification.** To learn more about how norms affect current behavior, we estimate the determinants of reported past behavior of variables expected to influence preferences and how we prefer to appear. We estimate this for the "Environmentally friendly behavioral" (EFB) and "Not environmentally friendly behavioral" (NEFB) indexes. The functions are approximated by linear functions, assuming the error terms ( $\tilde{v}_h$ ) and ( $v_h$ ) to be independent and identically distributed with constant variance and a zero expectation.

$$\begin{aligned} EFB_h &= \delta + \sum \delta_i C_{ih} + \sum \rho_i N_{ih} + \sum \phi_i HC_{ih} + v_h, \\ NEFB_h &= \tilde{\delta} + \sum \tilde{\delta}_i C_{ih} + \sum \tilde{\rho}_i N_{ih} + \sum \tilde{\phi}_i HC_{ih} + \tilde{v}_h. \end{aligned} \quad (7)$$

In this estimation, we assume that household environmentally friendly behavior is a function of household and individual characteristics (*HC*) determining the opportunity and necessity to act, and variables describing how the respondent reacts to various norms (*N*) depending on the image he/she wishes to portray (see Table 1 for a complete list of the variables). Some of the effects of household and personal characteristics may also be a result of image building. For instance, we would expect to see more pleasing and supportive behavior among female respondents and confrontational behavior among males (Uesigi and Vinacke, 1963; K.A. Drass, 1986). We also include country dummies (*C*), where Norway is the reference category, as we expect social and moral norms to differ across cultures and countries (Schwalbe and Staples, 1991; Felson, 1981; Stern et al., 1993).

To obtain an empirical illustration of how the identity statements affect reported future behavior, we regress the *GOOD* and *BAD* indexes on household and individual characteristics (*HC*), variables describing how the respondent reacts to various norms (*N*), and country-specific dummies (*C*). We use the scores on the

<sup>1</sup> We embed no moral judgment in the words *GOOD* and *BAD*. From the viewpoint of being able to use the results from a stated preference survey, the actual score on the *GOOD* or *BAD* indexes is irrelevant. The issue is whether the intentions embedded in this score are representative of expected behavior.

*EFB* and *NEFB* indexes to control the estimation of reported expected future behavior for differences in past behavior. In the questionnaire, questions about future behavior always came after questions about past behavior, which makes the response to questions about future behavior recursive on reported past behavior.

$$\begin{aligned}
 GOOD_h &= \alpha + \beta_1 EFB_h + \beta_2 NEFB_h + \sum \gamma_i C_{ih} + \sum \kappa_i N_{ih} + \sum \lambda_i HC_{ih} + u_h, \\
 BAD_h &= \tilde{\alpha} + \tilde{\beta}_1 EFB_h + \tilde{\beta}_2 NEFB_h + \sum \tilde{\gamma}_i C_{ih} + \sum \tilde{\kappa}_i N_{ih} + \sum \tilde{\lambda}_i HC_{ih} + \tilde{u}_h.
 \end{aligned}
 \tag{8}$$

The parameters of particular interest with respect to giving indications of the misrepresentation of behavior are  $\beta_2$  and  $\tilde{\beta}_1$ . Put simply, if someone, who is currently doing very little, reports that he/she will do a lot in the future, it is reasonable to suspect that this may be a statement of intent, and when daily life catches up with them, these good ambitions are likely to be compromised, as in the past. Likewise, if someone who currently does a lot, not necessarily of their own free will, but because society expects them to (mandatory recycling, environmentally friendly spouse), they may protest the introduction of new policy tools in the questionnaire, but when the tools are implemented, the respondent is likely to comply with the new regulation.

#### 4. The effect of identity statements on stated preferences

To analyze how identity statements affect behavior and whether there are indications of the misrepresentation of preferences among respondents aiming to be a “good citizen” or “not a good citizen”, we use the OECD data to estimate equations (7) and (8).

Thus, the *EFB* and *NEFB* indexes are exogenous in the estimation of the *GOOD* and the *BAD* indexes. We also assume the error terms ( $u_h$  and  $\tilde{u}_h$ ) to be independent and identically distributed with constant variance and zero expectation (see Table 2 for a complete list of the variables).

4.1. What determines reported past behavior? We start by reporting the results from an estimation of reported past behavior equation (7) as a function of various exogenous variables<sup>1</sup>. The results are presented in Table 1. In the first two columns of the table, we present the coefficients and *p*-values from the estimation on the “environmentally friendly behavior” index, and in the last two columns, we present the coefficients and *p*-values from the estimation on the “not environmentally friendly behavior” index. We have divided the variables into different groups, according to how correlated they are with the identity statements. First, we present the effect of the country-specific dummies in the first section. We then report the coefficients of the personal and household characteristics in the second section, and finally, in the last section, we present the coefficients of the identity statements.

Table 1. OLS estimation results of the “Environmentally friendly behavior” (EFB) and “Not environmentally friendly behavior” (NEFB) indexes

	EFB index		NEFB index	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	-12.610	0.0000	22.558	0.0000
1. Country ( $\delta_i, \tilde{\delta}_i$ )				
Canada (0, 1)	3.511	0.0000	-0.407	0.2198
Netherlands (0, 1)	6.017	0.0000	0.541	0.1186
France (0, 1)	4.159	0.0000	0.830	0.0137
Mexico (0, 1)	2.175	0.0000	0.693	0.0674
Italy (0, 1)	5.963	0.0000	-0.585	0.0718
Czech Republic (0, 1)	0.796	0.1058	-1.640	0.0000
Sweden (0, 1)	3.469	0.0000	-1.672	0.0000
Australia (0, 1)	3.635	0.0000	-1.776	0.0000
Korea (0, 1)	-5.026	0.0000	-4.811	0.0000
2. Personal and household characteristics ( $\varphi_i, \tilde{\varphi}_i$ )				
Male (0, 1)	-0.525	0.0069		
The number of children in the household under 18 years of age	0.072	0.0000	-0.018	0.0009
Primary purchaser in the family (0, 1)			0.466	0.0015
Living as a couple (0, 1)	1.157	0.0000		
Homeowner (0, 1)	1.824	0.0000	-0.385	0.018
Living in a detached house (0, 1)	1.193	0.0000		
Living in a city (0, 1)	-1.513	0.0000		
Lived in the current residence more than 15 years (0, 1)	-0.406	0.0911		

Table 1 (cont.). OLS estimation results of the “Environmentally friendly behavior” (EFB) and “Not environmentally friendly behavior” (NEFB) indexes

	EFB index		NEFB index	
	Coefficient	p-value	Coefficient	p-value
Length lived in current residence (1, ..., 4)	0.350	0.0008		
No recycling services are available (0, 1)	-0.496	0.0000	-0.398	0.0000
Number of recycling services available	0.244	0.0000	0.188	0.0000
Number of cars and motorbikes owned by the household	0.169	0.0947		
Renewable energy not available (0, 1)	0.692	0.0008		
Number of household appliances	0.094	0.0141		
Not charged for water consumption (0, 1)	-0.783	0.0047	0.493	0.0204
3. Identity statements ( $\rho_i, \tilde{\rho}_i$ )				
Did not vote during the last six years (0, 1)	-0.872	0.0038		
Member or contributor to environmental org. (0, 1)	1.787	0.0000	-0.818	0.0000
Do volunteer work only (0, 1)			-1.293	0.0701
Concerned about waste generation (1, 2, 3, 4)	0.394	0.002	-0.467	0.0000
Concerned about air pollution (1, 2, 3, 4)			-0.245	0.0349
Concerned about water quality (1, 2, 3, 4)	0.478	0.0002	-0.252	0.023
Concerned about GMO (1, 2, 3, 4)	0.516	0.0000	-0.529	0.0000
Believe the individual can contribute (1, 2, 3, 4)	0.825	0.0000	-0.476	0.0000
Environmental impacts are overstated (1, 2, 3, 4)	-0.249	0.0192	0.143	0.0787
Env. issues should be solved by future generations (1, 2, 3, 4)	-0.434	0.0000		
Env. issues resolved by technology (1, 2, 3, 4)	0.219	0.0299		
Env. policies should not cost me extra money (1, 2, 3, 4)			0.372	0.0000
Recycling is beneficial for the environment (1, 2, 3, 4)	3.741	0.0000	-1.190	0.0000
Recycle because it is mandatory (1, 2, 3, 4)	-0.211	0.0107		
Recycle to save money (1, 2, 3, 4)	-0.366	0.0000	0.544	0.0000
It is my civic duty to recycle (1, 2, 3, 4)	2.264	0.0000	-0.847	0.0000
Recycle to be seen as a responsible person (1, 2, 3, 4)			-0.810	0.0000
Zero WTP: It does not concern me (0, 1)	1.521	0.0022		
Zero WTP: Prefer to be responsible for recycling (0, 1)	2.165	0.0000		
Adjusted $R^2$	0.360		0.1739	

We can see that we can group the effects of the country dummies into three groups. In the first group, including Canada, Italy, the Czech Republic, Sweden, and Australia, the effect is positive for the *EFB* index and negative for the *NEFB* index. This implies that the respondents in these countries report that they have more environmentally friendly effort than in Norway. The next group, containing the Netherlands, France, and Mexico, has a positive coefficient for both the *EFB* and *NEFB* indexes (although the *NEFB* index for the Netherlands is not significant). This implies that respondents in these countries are more inclined to report more extreme behavior, selecting either the highest or the lowest option, compared with Norway. Finally, we have Korea, with a strong negative coefficient in both estimations, implying that Koreans are more “modest” or “conservative” in evaluation of their own efforts as they avoid using the highest or the lowest scores. This may be an indication of cultural differences in how respondents interpret the alternative answers, either because of variations in social norms with respect to modesty, the social desirability of the

behavior reported in the questionnaire, or the social acceptance of deviating views on these issues. However, the country-specific dummies may also capture other effects besides cultural differences in how we express ourselves, as environmental problems and current environmental policy (not captured in the remaining explanatory variables) may vary across countries. However, it is reasonable to believe that the considerably larger reported environmental efforts in, e.g., Italian respondents compared with Norwegian and Korean respondents is, to some degree, a result of cultural differences in how we report our efforts.

Looking at the effects of personal and household characteristics, we can see that males report a lower degree of environmentally friendly behavior than females, but only the coefficient for the *EFB* index is significant. This implies that males who have a high score on the “environmentally friendly behavior” index, report they do significantly less than females with a high score. Looking at household characteristics, we can see that respondents with better opportunities for environmentally friendly beha-



avior (own their own residence, live in detached houses, having many appliances and the opportunity to buy renewable energy) do more. We can also see that respondents who are not charged for water consumption do significantly less than other respondents, as their incentive for water saving is significantly reduced. Interestingly, we can see that the increased supply of recycling services has a positive effect on both environmentally friendly behavior and not environmentally friendly behavior. This effect is significant for both respondents with no recycling services available and for those with an increase in the number of recycling services. The positive sign on the *EFB* index is most likely because increased services reduce the alternative cost of the recycling effort. The positive sign on the *NEFB* index is, however, more unexpected. One explanation may be that some respondents are provoked by the social pressure to increase efforts that the increase in recycling services implies, and respond by protesting to this norm by not complying. This is an indication that protesting a social norm may affect behavior.

Finally, we examine the variables reflecting identity issues. Most of these variables have the expected signs. That is, the more concerned the respondent is with environmental issues (member of an environmental organization, do volunteer work, concerned about waste generation, air pollution, water quality and GMO, believe the individual can contribute), the higher the effort (a positive sign on *EFB* and a negative sign on *NEFB*). Further, the more the respondent protests (believes environmental impacts are overstated or should be solved by future generations), the lower is the effort. We can see that respondents who recycle to be regarded as responsible persons (that is, they want to project the image that they comply with the social norm of recycling) score significantly lower on the *NEFB* index, as expected. We can also see that respondents expressing a strong moral commitment (by recycling because they see it as their civic duty) have a significantly higher environmental effort, both on the *EFB* and *NEFB* indexes.

The literature on moral norms and intrinsically motivated behavior is particularly concerned about the crowding out of moral norms: that is, when you attempt to regulate or bring money incentives into behavior previously driven by intrinsic motivation, people may be offended or no longer have a moral justification for their actions, and thereby reduce effort (Frey, 1994; Thøgersen, 1994). In this estimation, we find a clear indication of crowding out, as respondents who see recycling as mandatory have a significantly lower score on the *EFB* index than other respondents, and respondents who recycle to save money do significantly less than other respondents on both the *EFB* and *NEFB* indexes.

One particularly interesting group of respondents are the potential “protest bidders”, detected by the follow-up question to respondents reporting a zero WTP for leaving their recycling efforts to others, either because they prefer to recycle themselves (a strong moral commitment) or because they do not think it concerns them. These are the same respondents often targeted for exclusion from the samples in many analyses. Respondents who have a zero WTP because they prefer to recycle themselves report that they recycle significantly more than do others. If this is correct, this is an indication that the self-respect and respect of the community for recycling effort overshadows the cost of actually recycling. Thus, these respondents may have negative utility from leaving recycling to others. If this is correct, the zero responses are legitimate and should not be excluded from the sample. With respect to the respondents reporting a zero WTP because they agree that “It does not concern me”, we can see that it has a positive effect on their reported environmentally friendly behavior. This is a bit surprising, and indicates that the question is not as easily interpreted as one would expect. One explanation is that it is unclear exactly what is not concerning them: recycling, the effect on the environment, or paying for the waste collection and recycling services. This is a good illustration that follow-up questions to identify the so-called protest bidders are difficult to construct, and so it may be risky to exclude respondents based solely on their responses to these types of questions.

**4.2. What determines reported expected future behavior?** We now turn to the estimation of stated preferences toward future behavior (equation (8)) as measured by the *GOOD* and *BAD* indexes. The results from these estimations are presented in Table 2. In the first two columns of the table, we present the coefficients and *p*-values from the estimation including the *GOOD* index, and in the last two columns, we present the coefficients and *p*-values from the estimation including the *BAD* index. We have divided the variables into different groups, according to how correlated they are with the identity statements. First, we present the effect of the country-specific dummies. Then we report the effects of reported past behavior on future behavior. The third section reports the coefficients of personal and household characteristics, and the last section presents the coefficients of the identity statements.

We can see from the second section in the table that both *behavior* indexes are highly significant in determining the score on both the *GOOD* and *BAD* indexes, but the signs are unexpected as they are all positive. Looking at the *GOOD* index, both respondents who do a lot and respondents who do little believe the policy issues are more important than respondents who do some. One explanation for the

positive sign of a high score on the *NEFB* index on the *GOOD* index ( $\beta_2$ ) may be that some respondents have a bad conscience because they are doing little, and thus express a very positive attitude toward new policy instruments. This may be an indication of the potential misrepresentation of future efforts in order to regain respect after admitting to a modest environmental effort in the past. We can observe the same pattern for the *BAD* index, where respondents who do a lot and respondents who do little believe the policy issues are less important than respondents who do some. An explanation for the positive sign of the *EFB* index on the *BAD* ( $\tilde{\beta}_1$ ) index may be that some respondents do a lot, not because they want to, but because of social pressure, mandatory policies or because their spouse is very concerned.

These respondents will then not be happy with increased pressure on environmental policies. However, if they have a tendency to end up complying with the norm, as they have done in the past, their reported future behavior may be biased downwards. We can also see that the effect of the *NEFB* on the *GOOD* index ( $\beta_2$ ) is as strong as the effect of the *EFB* index on the *BAD* index ( $\tilde{\beta}_1$ ). This indicates that these “keeping up appearance” biases are evenly distributed among respondents wanting to comply with the norm and respondents protesting against the norm. We can also see the same symmetry with respect to the coefficients indicating the consistency in responses ( $\beta_1, \tilde{\beta}_2$ ), where the effect of *EFB* on the *GOOD* index is in the same range at the effect of *NEFB* on the *BAD* index.

Table 2. OLS regression on the percentage of “Very important” replies (*GOOD* index) and the percentage of “Not at all important” replies (*BAD* index) to the hypothetical policy questions

	GOOD index		BAD index	
	Coefficient	p-value	Coefficient	p-value
Intercept	-21.57	0.0000	13.49	0.0000
1. Country ( $\gamma_i, \tilde{\gamma}_i$ )				
Canada (0, 1)	3.36	0.0000	1.34	0.0001
Netherlands (0, 1)	-2.20	0.003	1.68	0.0000
France (0, 1)	5.23	0.0000	2.44	0.0000
Mexico (0, 1)	12.07	0.0000	-0.16	0.7133
Italy (0, 1)	4.28	0.0000	1.81	0.0000
Czech Republic (0, 1)	9.24	0.0000	0.10	0.7932
Sweden (0, 1)	2.21	0.0015	1.25	0.0005
Australia (0, 1)	3.13	0.0000	1.78	0.0000
Korea (0, 1)	-0.92	0.2015	0.10	0.8067
2. Past behavior ( $\beta_1, \beta_2, \tilde{\beta}_1, \tilde{\beta}_2$ )				
Positive behavioral index ( <i>EFB</i> )	0.34	0.0000	0.12	0.0000
Negative behavioral index ( <i>NEFB</i> )	0.13	0.0000	0.31	0.0000
3. Personal and household characteristics ( $\lambda_i, \tilde{\lambda}_i$ )				
Male (0, 1)	-2.12	0.0000	0.84	0.0000
Number of children in the household under 18 years of age	-0.36	0.0258		
Age of the respondent (in years)			0.03	0.0000
Single parent (0, 1)	1.57	0.0163		
Number of adults in the household			-0.24	0.0066
Income group (1, 2, ..., 12)	-0.08	0.0772	-0.07	0.0012
Homeowner (0, 1)	-1.78	0.0000	-0.37	0.0367
Living in a detached house (0, 1)	-1.56	0.0000		
Length lived in current residence (1, ..., 4)	-0.56	0.0002		
Lived in the current residence more than 15 years (0, 1)			0.45	0.0178
No recycling services are available (0, 1)	0.94	0.0000	0.60	0.0000
Renewable energy not available (0, 1)	0.61	0.0616		
Number of household appliances	0.29	0.0000		
Number of cars and motorcycles owned by the household			0.26	0.0019
Not charged for water consumption (0, 1)	-1.17	0.0075	0.56	0.0124
4. Identity statements ( $\kappa_i, \tilde{\kappa}_i$ )				
Member or contributor to environmental org. (0, 1)	0.86	0.0024	-0.53	0.0003
Concerned about waste generation (1, 2, 3, 4)	0.86	0.0000	-0.27	0.0100
Concerned about air pollution (1, 2, 3, 4)	0.57	0.0193		

Table 2 (cont.). OLS regression on the percentage of “Very important” replies (*GOOD* index) and the percentage of “Not at all important” replies (*BAD* index) to the hypothetical policy questions

	<i>GOOD</i> index		<i>BAD</i> index	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
4. Identity statements ( $\kappa_i, \bar{\kappa}_i$ )				
Concerned about climate change (1, 2, 3, 4)			-0.80	0.0000
Concerned about water quality (1, 2, 3, 4)	0.60	0.0103		
Concerned about natural resource depletion (1, 2, 3, 4)	0.63	0.0037	-0.30	0.0063
Concerned about GMO (1, 2, 3, 4)	0.43	0.0032	-0.33	0.0000
Believe the individual can contribute (1, 2, 3, 4)	1.66	0.0000	-0.73	0.0000
Environmental impacts are overstated (1, 2, 3, 4)	-0.88	0.0000	0.14	0.1120
Env. issues should be solved by future generations (1, 2, 3, 4)	-0.47	0.0044	-0.38	0.0000
Env. issues resolved by technology (1, 2, 3, 4)			-0.33	0.0000
Env. policies should not cost me extra money (1, 2, 3, 4)	1.14	0.0000	1.00	0.0000
Recycling is beneficial for the environment (1, 2, 3, 4)	2.01	0.0000	-1.42	0.0000
Recycle because it is mandatory (1, 2, 3, 4)	0.31	0.0168	-0.18	0.0081
Recycle to save money (1, 2, 3, 4)	1.30	0.0000	0.18	0.0128
It is my civic duty to recycle (1, 2, 3, 4)	1.42	0.0000	-0.42	0.0008
Recycle to be seen as a responsible person (1, 2, 3, 4)			-0.48	0.0000
Zero WTP: It does not concern me (0, 1)			5.52	0.0000
Zero WTP: Prefer to be responsible for recycling (0, 1)	1.01	0.0037	3.68	0.0000
Adjusted $R^2$	0.27		0.30	

We can also detect highly significant differences in the scores on both the *GOOD* and *BAD* indexes with respect to gender and country. For example, females show a more positive attitude toward new environmental policies. However, even if gender differences are significant, cultural differences are even more important. Most respondents in most countries (other than Norway) are more inclined to use the end points of the scale, either being more positive (very important) or negative (not at all important) toward new environmental policy measures. The exceptions are respondents from Mexico and the Netherlands who are generally more positive than are respondents in Norway. Korean respondents do not differ significantly from Norwegian respondents in this respect. This means there are pronounced cultural differences in how we approach a stated preference questionnaire with hypothetical new policy measures. We can also see that these coefficients have a much stronger effect on the *GOOD* index compared with the *BAD* index.

Once again, there are several significant variables indicating differences in personal and household characteristics. It is interesting to note that many of these have the same sign for both the *GOOD* and *BAD* indexes. For instance, respondents in high-income groups have a lower score on both the *GOOD* and *BAD* indexes, which implies that the respondents in high-income groups are very heterogeneous. We can see the same effect for homeowners and respondents with no recycling services available. We also note that respondents with no renewable energy available promise to do significantly more in the

future. The stock of appliances and cars/motorcycles have the opposite effect, as the increased possibility of saving behavior with a large stock of appliances allows respondents to promise to do more, whereas respondents with many cars/motorcycles promise to do significantly less in the future. This may be because the stock of cars not only increases the opportunity of saving behavior but may also be the result of a larger need or strong preferences for personal transportation (e.g. car enthusiasts).

We also see that some variables have the opposite sign on the *GOOD* and *BAD* indexes when compared with reported past behavior (*EFB* and *NEFB*). This holds for the effect of children under 18 years of age, homeowners, respondents living in detached houses, length lived in current residence and respondents with no recycling services available. This may be an indication of respondents trying to restore their image after admitting to do either more or less than what they would actually like to do. This may create biases in reported future behavior if old habits return and these statements are not followed by action. As shown, these effects go in both directions.

Finally, we consider the responses to the attitude statements. Most of these have the expected sign, as respondents who are concerned promise to do more and respondents protesting the norm promise to do less. There are, however, some interesting exceptions. For instance, respondents who do not believe that environmental policies should cost them extra money promise to do more in the future. This may be a commitment of moral behavior, expressing the concern

that “We cannot buy our way out of this environmental crisis; we need to act”. There are, however, a significant number of respondents agreeing to this statement that are unwilling to do more, as agreeing to this statement also increases the *BAD* index significantly. Moreover, we no longer see evidence of the crowding out of intrinsically motivated behavior of mandatory recycling in the effect on the *GOOD* index of saving money by recycling. This may be an indication that crowding-out effects are easier to detect in reported past behavior than in future behavior, and may thus be a potential source of bias in the reported expected behavior to future policy actions.

Once again, the response to the follow-up question for the so-called protest bidders is not so easily interpreted, as respondents who do not like to leave recycling services to others because they like to recycle themselves (that is, a moral commitment to recycling) have a significantly higher score on the *BAD* index than other respondents. They also have a higher score on the *GOOD* index. This means that this group is very heterogeneous, containing both respondents complying and protesting new policy actions in the future.

## Conclusion

Hypothetical policy questions are often used to evaluate the effect of possible future policy measures, and it is thus of great importance that the responses to these questions reflect the respondent’s actual preferences. However, because people differ with respect to how they would like to appear, and therefore respond differently to the norms embedded in these policies and in the questionnaire, there is the potential that reported and actual behavior may deviate. In general, it is very difficult to identify exactly who is misrepresenting their preferences. Excluding extreme observations (which has been the common approach to deal with, e.g., protest bidders in the valuation literature), may involve excluding respondents who are truthfully reporting their preferences and including respondents who lie about being average to keep up appearances. This poses a challenge when using the results of stated preference analysis to predict the effects of, for example, policy instruments.

In this paper, we model how identity statements and norms affect how we behave and how we report our behavior, and discuss the underlying mechanisms for the misrepresentation of behavior in stated preference analysis. As identity statements may affect both actual and reported behavior, we argue that stating ethical objections to either the payment vehicle or other institutional settings in the questionnaire does not necessarily imply that the respondent is misrepresenting his/her preferences if these moral objec-

tions also affect behavior. We argue that the respondents that potentially bias the results are those whose expressed ideals are not followed by action.

In our illustration, we find many indications of how personal and household characteristics, as well as norms and identity statements, affect reported behavior, both in the past and in the future. For instance, we find that females appear to comply more with the norm of “the good citizen”, reporting a significantly higher score on both the *EFB* and *GOOD* index, whereas males are more confrontational, scoring higher on the *BAD* index. That is, females on average are more likely to project the image of “good girls” by complying with the current social norm, whereas males are, on average, more likely to consider themselves as “bad boys” by opposing the norm. We also discern very strong cultural differences across countries.

With respect to identity statements, we find that these affect reported behavior in a significant way. We also find evidence of the crowding out of intrinsically motivated environmentally friendly behavior, particularly with respect to recycling behavior. We mainly find these crowding-out effects in reported past behavior, indicating that respondents tend to omit them when reporting future behavior. This may be a potential source of misrepresentation. We also find that the responses to questions aimed at capturing protest bidders may be very difficult to interpret.

The results also indicate that a significant number of respondents change their reported effort considerably, from one end of the scale to the other, between the reported past and future environmental efforts. This may be an indication that some respondents have a mismatch between their ideal and actual effort, and that they are expressing a wish to change their current behavior in the future. These responses also represent a potential bias, as it is reasonable to believe that a considerable number of these respondents will be unable to follow through. However, these potential biases appear to be equally strong in both directions, implying that they do not represent a significant problem for the mean estimates in this analysis. Thus, excluding protest bidders, as per the common recommendation in the valuation literature, may bias the results more than including them when applying these data.

These results have important implications for how we may use stated preference surveys when designing policy instruments. First, we need to be careful comparing results across groups where we would expect differences in how social and moral norms affect behavior. Second, we should also be careful when including normative statements in a questionnaire, e.g., that “recycling is good for the environment”, or

“if we do not do something now, we may suffer significant consequences in the future”, unless we wish to capture how the public responds to these norms. If we do not want to trigger protesting or complying behavior in responding to these norms, we should attempt to keep the questionnaire as neutral as possible by including all political standpoints as equals. Having said that, there are cases where information about the public’s responses to norms embedded in future politics are of vital importance. However, as norms appear to be a dominant driver of behavior, it is important to have an intentional purpose for including normative statements in a questionnaire.

Finally, it is important to keep in mind that we do not know beforehand who is misrepresenting their preferences, and in which direction this misrepresentation affects the mean results. In this analysis, we have indications that “good Mexican girls”, by complying with the norm, appear to misrepresent preferences just as much as the “bad Norwegian boys”, who are protesting against these same norms. Excluding protest bidders may then be just as problematic as including respondents who are misrepresenting their preferences, especially if the over- and understating of preferences are evenly distributed in the sample, which we find evidence of in our analysis.

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### Appendix. Main questions from the questionnaire

The survey included several questions measuring past environmentally friendly behavior by the respondents and their household, all ranked with respect to the relative level of efforts.

Q37: Which of the following materials does your household recycle?

Answer: glass bottles/containers, plastic bottles/containers, aluminum/tin/steel cans, paper/cardboard, food waste, garden waste, batteries, pharmaceuticals/medicines, none of the above.

Q41: Please indicate approximately what percentage of material xxxx your household recycles?

Answer: 25%, 50%, 75%, 100%, don't know.

Q67: Does your household take special measures to buy renewable energy from your electricity provider?

Answer: yes, no, don't know.

Q72: How often do you ...

- ◆ turn off lights when leaving a room;
- ◆ cut down on heating/air-conditioning to limit your energy consumption;
- ◆ wait until you have full loads when using washing machines or dishwashers;
- ◆ switch off standby mode of appliances/electronic devices?

Answer: yes, no.

Q73: Has your household installed any of the following items over the past ten years in your current primary residence?

- ◆ energy efficiency-rated appliances;
- ◆ low-energy light bulbs;
- ◆ thermal insulation;
- ◆ efficient heating boiler;
- ◆ renewable energy.

Answer: yes, no, already equipped, not possible.

Q78: Please estimate the percentage of expenditures of your household for the following items which are organic products.

Answer: 0%, 1-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-99%, 100%, Consume organic products but % unknown, Don't know if consume organic products: fresh fruits and vegetables, milk and other dairy products, eggs, meat and poultry, bread, pasta, rice and cereal.

Q91: How often do you ...

- ◆ turn off the water while brushing teeth;
- ◆ take showers instead of bath specifically to save water;
- ◆ plug the sink when washing the dishes;
- ◆ water your garden in the coolest part of the day to reduce evaporation and save water;
- ◆ collect rainwater or recycle waste water.

Answer: never, occasionally, often, always, not applicable.

Q92: Has your household invested in the following appliances/devices in the past ten years in your current primary residence?

- ◆ water-efficient washing machines;
- ◆ low-volume or dual-flush toilets;
- ◆ water flow-restrictor taps/low-flow shower head;
- ◆ water tank to collect rainwater;
- ◆ water purifier for drinking water.

Answer: yes, no, already equipped, not possible.

The questionnaire also contains questions concerning hypothetical future environmental policies, all ranked with respect to their relative level of importance.

Q44 and Q44a: How important would the following factors be in encouraging your household to start recycling/to recycle more?

- ◆ more practical information on how to recycle;
- ◆ greater financial incentives;
- ◆ more storage space at home;
- ◆ having more time to recycle;
- ◆ improved collection and recycling services;
- ◆ stronger belief that the environmental benefits are significant.

Answer: not at all likely, not very likely, quite likely, very likely.

Q57: What aspects of public transport are likely to encourage you to use your car/motorcycle less?

- ◆ more convenient;
- ◆ more reliable;
- ◆ more rapid;
- ◆ more comfortable;
- ◆ more secure.

Answer: not at all likely, not very likely, quite likely, very likely.

Q83: What would encourage you to start consuming/consume more organic food products?

- ◆ Better availability of organic products;
- ◆ Lower price of organic products;
- ◆ Better appearance of the food;
- ◆ More trust in health benefits of organic products;
- ◆ More trust in environmental benefits of organic products;
- ◆ More trust in certification and labeling of organic products.

Answer: not at all likely, not very likely, quite likely, very likely.

Q94: How important are the following factors in encouraging you to reduce your water consumption?

- ◆ practical information on things you can do to save water at home;
- ◆ money savings;
- ◆ clear importance of the environmental benefits of saving water;
- ◆ availability of water-efficient products;
- ◆ confidence in water-efficiency labels;
- ◆ lower costs of water-efficient equipment;
- ◆ mandatory water restrictions;
- ◆ none of the above.

Answer: not at all likely, not very likely, quite likely, very likely.

Q75: How important are the following factors in encouraging you to reduce your energy consumption?

- ◆ more practical information on energy conservation measures;
- ◆ higher energy prices;
- ◆ belief that the environmental benefits are significant;
- ◆ greater availability of energy-efficient products;
- ◆ easier identification of energy-efficiency labels;
- ◆ less expensive to invest in energy-efficient equipment.

Answer: not at all likely, not very likely, quite likely, very likely.

In the survey, the responses to the attitudinal questions are discrete on a scale from 1 (not concerned/strongly disagree) to 4 (very concerned/strongly agree).

Q23: How concerned are you about the following environmental issues?

- ◆ waste generation;
- ◆ air pollution;
- ◆ climate change (global warming);
- ◆ water pollution;
- ◆ natural resource depletion;

- ◆ genetically modified organisms (GMO);
- ◆ endangered species and biodiversity.

Q28: To what extent do you agree with each of the following statements?

- ◆ each individual can contribute to a better environment;
- ◆ environmental impacts are frequently overstated;
- ◆ environmental issues should be dealt with primarily by future generations;
- ◆ environmental issues will be resolved primarily through technological progress;
- ◆ environmental policies introduced by the government to address environmental issues should not cost me extra money.

Q42: How important are the following factors in motivating your household to recycle?

- ◆ It is beneficial for the environment;
- ◆ It is mandated by the government;
- ◆ I want to save/receive money;
- ◆ I think it is my civic duty;
- ◆ I want to be seen by others as a responsible citizen.

We also have questions indicating the respondents' current commitment to various public issues.

Q24: Have you voted in any of the following types of elections in the past 6 years?

Answer: national/general elections, local elections, none of the above.

Q25: In the past 24 months have you given any of your personal time to support or participate in activities of any of the following types of groups/organizations?

- ◆ parent-teacher association;
- ◆ environmental organization;
- ◆ local community organization;
- ◆ charitable organization.

Q27: Are you currently a member of, or contributor/donor to, any environmental organizations?

We also have one variable indicating protest responses to the payment vehicle in one of the willingness-to-pay (WTP) questions.

Q46: Why are you not willing to pay anything?

- ◆ prefer to be responsible for recycling;
- ◆ it does not concern me.