JENA ECONOMIC RESEARCH PAPERS

2013 – 007

Values, food and bags: A study of consumption decisions in a laboratory supermarket

by

Astrid Matthey
Tim Kasser

www.jenecon.de

ISSN 1864-7057

The JENA ECONOMIC RESEARCH PAPERS is a joint publication of the Friedrich Schiller University and the Max Planck Institute of Economics, Jena, Germany. For editorial correspondence please contact markus.pasche@uni-jena.de.

Impressum:

Friedrich Schiller University Jena
Carl-Zeiss-Str. 3
D-07743 Jena
www.uni-jena.de

Max Planck Institute of Economics
Kahlaische Str. 10
D-07745 Jena
www.econ.mpg.de

Jena Economic Research Papers 2013 - 007

Values, food and bags: A study of consumption decisions in a laboratory supermarket

Astrid Matthey* and Tim Kasser†

November 15, 2011

Abstract

We study the relation between people's personal values and environmentally friendly consumption behavior. We first assessed subjects' personal values using the Aspiration Index. Then subjects participated in a laboratory supermarket offering organic and conventional food products and different kinds of bags. The results suggest that subjects' personal values are poor predictors of their ecologically-relevant consumption behavior. However, we find that subjects who spontaneously reflected upon power values made less ecologically sustainable consumption decisions than did those who reflected on universalism values. We discuss methodological differences as possible reasons for variations between our results and those of earlier studies.

APA classification: 3920

JEL classification: D12, Q31, Q56

Keywords: Consumer Behavior; Values; Conservation (Ecological Behavior)

*Max-Planck-Insititute of Economics, Strategic Interaction Group, Kahlaische Str. 10, 07743 Jena; tel: +49 3641 686 644, fax: +49 3641 686 623; matthey@econ.mpg.de (corresponding author)

†Knox College, Department of Psychology, Box K-83, Galesburg, IL 61401; tel: +1 309 341 7283; tkasser@knox.edu

1 Introduction

The aim of this study is to obtain a better understanding of the relation between people's values and and environmentally friendly consumption behavior. In particular, we try to answer two questions: First, to what extent do people's consumption decisions reflect their personal values, that is, the values that are trait-like and consistent over time? Second, if people's awareness of their values is increased, does this affect the influence of these personal values on ecologically-relevant consumption behavior?

The first question has in a similar way been addressed by several earlier studies (e.g., Grunert and Juhl, 1995; Kahn, 2007; Teisl et al, 2002; Thøgersen, 1999; Thøgersen and Ölander, 2002; Wier et al, 2008). The present study adds two important points. First, we assess values found to be of *general* importance to people across a wide range of cultures (Schwartz, 1992; Grouzet et al, 2005; see also Pinto et al (2011)), rather than particular "green" attitudes like voting for a green party (Kahn, 2007) or subjects' attitude towards environmentalism (e.g., BELV, 2008, Tanner and Wölfing Kast, 2003). In addition to providing a broader picture of the relation between values (which are known to influence attitudes; Feather, 1992) and decisions, this approach may ultimately allow a generalization to cultures or contexts where specifically "green" attitudes are either unknown or not of relevance. Second, we observe subjects' consumption decisions in the controlled environment of a laboratory experiment that was temporally disconnected from the assessment of their values. This procedure rules out any demand effects on the value assessment (i.e., subjects answering the AI with the purpose

of the study in mind), gives us control over the environment in which subjects make their decisions, and ensures incentive compatibility. Recent studies by Cason and Gangadharan (2002) and Murphy and Stranlund (2007) have again shown the usefulness of experiments as a complement to survey results and theoretical predictions.

The second question concerns the stability of consumption preferences when people's awareness of their values increases. Examining this question provides additional insights on the relation between personal values and (revealed) preferences, and gives an indication of whether the sustainability of consumption changes if people reflect upon their values prior to their shopping decisions. Although individual welfare effects are hard to deduce from these results, they can provide guidance for sustainability-enhancing policy measures.

In short, we obtain the following results. First, subjects' personal values are surprisingly weak predictors of the ecological relevance of their actual consumption decisions. For example, neither does a higher concern for money significantly decrease the consumption of (more expensive) organic food, nor does a higher concern for health increase the consumption of (presumably more healthy) organic food. This contrasts with the results of most survey and panel studies and suggests that people's actual consumption decisions may depend less on their personal values and more on situational factors. However, it is in line with a recent survey study by Pinto et al (2011), who also find relatively weak links between general values and (reported) behavior.

Second, the general link between people's personal values and their consumption does not increase if awareness of their values is raised. However, the results do

demonstrate that consumption is affected by the activation of *particular* values. More specifically, the consumption decisions of subjects who activated values of the category *universalism* (Schwartz, 1992) were significantly more environmentally friendly than those of subjects who activated values of the category *power*. This result is in line with the survey studies of Thøgersen and Ölander (2002), Schultz et al. (2005) and Pinto et al (2011), and gives a first hint towards possible ways to use values to decrease the overall environmental impact of individual consumption.// It supports the values specified in the United Nations Millennium Declaration as important for the sustainable development of globalization (UN 2000), since 5 of the Declaration's 6 *fundamental values* are included in Schwartz' *universalism* category (*equality*, *solidarity*, *tolerance*, *respect for nature*, *shared responsibility*, for an analysis see Shepherd et al, 2009).

For the experiment, we first assessed subjects' personal values using the Aspiration Index developed by Kasser and Ryan (1993, 1996) and Grouzet et al. (2005). Some weeks later subjects participated in an experimental supermarket where they could choose between organic and conventional, but otherwise similar, food products, and different kinds of bags. All products were taken from a local supermarket close to campus that many students visit frequently. Hence, all products used in the experiment were known to and readily available for our subjects in their normal shopping environment. Before the subjects actually made their choices, half of them were asked to reflect on their values and the influence of these values on their consumption decisions. The purpose of this manipulation, adapted from motivational interviewing (Miller and Rollnick, 1991), was to increase subjects' awareness of their values when making their consumption decisions. The values

mentioned by subjects were coded by naïve raters into categories according to Schwartz's (1992, 1995) model of values. Subjects then spent real money (which was deducted from their participation payoff) on items in the experimental supermarket whose cost was based on real market prices from a nearby supermarket. Purchased products and chosen bags were taken home by subjects.

The remainder of the paper is organized as follows. Section 2 gives some background and provides a discussion of earlier literature and the experimental method. Section 3 describes the experimental procedure and data generation process in detail. The results are presented in section 4. Section 5 briefly concludes.

2 Background and Literature

According to the common assumption in economics, individuals' decisions reveal their preferences: a person consumes organic food and other "green" products if she has a preference for it. If people's personal values (i.e., their conceptions of what is important in life; Rokeach, 1973) are found to influence decisions, this means they influence preferences and, hence, utility. Similarly, if increasing people's awareness of their values affects the values' influence on decisions, this means it also affects their influence on preferences and utility.

From an economist's point of view it may seem of little relevance how preferences are formed if decisions can be observed. Nevertheless, in recent years economists have developed a growing interest in the relation between attitudes and values on one hand, and consumption decisions on the other, not least to identify the drivers of these decisions and possible ways to influence them. Using neighborhood-level data, Kahn (2007) analyzes whether the political attitudes of Californian voters

- voting for the Green party or not - influence ecological consumption behavior, in particular transport choices. His results confirm the relation, showing that Greens are more likely to commute by public transit, purchase hybrid vehicles, and consume less gasoline. Tanner and Wölfing-Kast (2003) conduct a survey study among Swiss consumers, showing that self-reported green food purchases positively depend on attitudes toward environmental protection, fair trade, and local products. Welsch and Kühling (2009), in a similar survey study in Germany, find a positive relation between environmental attitudes and self-reported ecological consumption (organic food purchase, participation in green-electricity programs), although the relation is less clear for the use of solar-energy equipment. These results are supported by further survey studies on German consumers (BELV, 2008; Ernst & Young, 2008). For British and Danish consumers, Wier et al. (2008) find similar results showing a relation between certain environmental attitudes (e.g., "I try to buy environmentally friendly products") and self-reported organic consumption. Also for British consumers, Griffith and Nesheim (2008) find that environmental concerns influence households' willingness to pay for organic goods, although such concerns are less influential than quality or health concerns.

The above-mentioned studies have in common that they assess the influence of specific environmental attitudes rather than of general values. The role of attitudes on behavior is clearly an important question which deserves further attention, but there are at least two important reasons to also examine people's values. First, the results of studies of attitudes may not be generalizable to all contexts, e.g., contexts where ecological concepts are either unknown or not of relevance. Second, psychological research on attitudes suggests that they are the result, in part, of

people's deeper, personal values (Feather, 1992). Pinto et al. (2011) follow this argumentation, analyzing the relation between general values (Rockeach 1973) and (self-reported) environmentally relevant behavior. They find some evidence that more social-oriented world views are related to less wasteful (water) consumption. Similarly, Thøgersen and Ölander (2002) use a two-wave survey to test the relation between general values and (self-reported) sustainable consumption, finding a positive relationship for values of Schwartz' category *universalism*.

It is also important to note that the consumption decisions analyzed in these past studies are either self-reported (as in Thøgersen and Ölander, 2002, Tanner and Wölfing-Kast, 2003, Welsch and Kühling, 2009, BELV, 2008, Ernst & Young, 2008, and Pinto et al. (2011)), obtained from household panel data that cannot be matched to stated values (as in Wier et al., 2008) or assessed at an aggregated level (as in Kahn, 2007). Griffith and Nesheim (2008) derive consumption motives from product characteristics but do not assess consumer values directly.

The present study took a different approach on both accounts. First, we used a combination of a survey study and laboratory experiment, which allows us to match subjects' stated values to their observed and incentivized consumption decisions. Second, we assessed subjects' *general* personal values rather than specific environmental attitudes.

The combination of a survey study with a laboratory experiment offers a number of methodological advantages. It allows us to assess values directly and independently of the topic of the study, and match them with observed consumption data. In our design, the survey is temporally separated from the experiment. This means that when subjects fill in the survey on their goals and aspirations, they

are unaware of the purpose of the experiment. Hence, we can rule out the demand effects on the survey answers that may be present when personal characteristics and consumption behavior are assessed in one survey, or with a survey that is connected to a panel study (i.e., where subjects may have the purpose of the study in mind when answering the value survey). Such demand effects would only be possible for the consumption decision, which takes place after the survey. To minimize this possibility, the lab experiment took place two weeks after the survey had to be sent in, thus the survey's content will have lost presence in most subjects' minds.[1] In addition, the consumption decision was incentivized, i.e., consumption was paid for with real money, which can be expected to reduce demand-effects further.

Observing the consumption decision in the lab allows us to issue control in other domains. First, although the subject pool itself is based on self-selection (students registering their willingness to participate in experiments), self-selection into the experiment according to *topic* can be ruled out, since no subject was aware of the topic before signing up for the experiment. In contrast, survey and panel studies often suffer from the problem that subjects know the topic of the study when deciding whether to participate, which can lead to a biased sample. Second, we do not face problems of non-random attrition, since no subject left the experiment before the end. In survey or panel studies, subjects who feel uncomfortable with the questions or the decisions they have to record may leave the sample early, which may again lead to a biased sample. Third, we have complete control over

[1] It is possible that some subjects re-read the survey before coming to the experiment. However, experience with the subject pool suggests that this does not apply to a significant number of subjects.

the environment in which subjects make consumption decisions. Neither can they claim to consume something they did not consume, (e.g., because they may consider it appropriate) nor can they conceal part of their consumption (e.g., because they *do not* consider it appropriate).[2] Both may happen in surveys or panel studies. This is of particular relevance when the participants perceive their decision to be subject to certain social norms, which can be expected in our case (see also BELV, 2008, for the divergence between claims to support "green" consumption and willingness to pay for it). For a general discussion of *revealed* vs. *stated* preference data, see also Louviere et al. (2000) and McFadden (2001).

These advantages of the laboratory environment come at the cost of two major disadvantages. First, running experiments in the lab limits the number of participants. Second, taking place in a computer lab, an experimental supermarket cannot provide a natural shopping environment, as would be the case in a panel study. Hence, our results are to be interpreted as *complementing* earlier results, rather than attempting to replace or invalidate them. For a general discussion of the pros and cons of using experimental methods to address questions in environmental economics, see Greenstone and Gayer (2009).

The first step of our analysis is the assessment of subjects' personal values. Substantial cross-cultural psychological research has identified about a dozen different types of values that consistently emerge as important to individuals across cultures (Schwartz, 1992; Grouzet et al., 2005). Application of this work to the ecological domain shows that, generally speaking, more ecologically-damaging attitudes and behaviors are associated with the priority people place on self-enhancing, ex-

[2]Subjects can of cause consume 'inappropriate' products after leaving the lab. But this would not enter the analysis.

trinsic values (e.g., for wealth, possessions, status, and their own achievement), whereas more ecologically-sustainable attitudes and behaviors are associated with the priority people place on self-transcendent, intrinsic values (e.g., for having close interpersonal relationships and helping the world be a better place) (see Crompton and Kasser, 2009, for a review).

Regarding attitudes, Schultz et al.'s (2005) study of over 1000 undergraduates in six nations revealed that stronger preferences for the self-enhancing values of power and achievement were associated with caring less about how environmental damage would affect other species and future generations, whereas self-transcendent values predicted more responsible ecological behavior. Regarding behaviors, adolescents and adults who report a strong focus on goals such as wealth and possessions (i.e., self-enhancing, extrinsic values) also report that they are less likely to engage in environmentally-friendly behaviors such as recycling, reusing, bicycling, etc. (Brown and Kasser, 2005; Gatersleben et al. 2008; Kasser, 2005; Richins and Dawson, 2002). Similar results occur when contrasting egoistic (i.e., self-enhancing) value orientations with biospheric/social-altruistic (i.e., self-transcendent) value orientations (Stern and Dietz, 1994).

Actual observations of behavior in laboratory and field settings confirm these self-reports of behaviors. For example, those with a stronger extrinsic (than intrinsic) value orientation exhibit more greedy and less sustainable behaviors when placed in ecological resource dilemma games in a laboratory (Sheldon and McGregor, 2000), and education students who have the behavior of recycling framed as being about helping the community (i.e., an intrinsic goal) are more likely to visit a library for more information about recycling and to go voluntarily on a field trip

to a recycling center than are those who have the behavior framed as being about saving money (i.e., an extrinsic goal; Vansteenkiste et al., 2004). The dynamics also play out at a national level: Kasser (2011) has shown that the more nations are focused on values that promote wealth and achievement vs. harmony and egalitarianism, the higher their carbon emissions, even after controlling for their GDP. Thus, while values are far from perfectly correlated with behaviors, this body of research supports that the distinction between self-enhancing, extrinsic values on the one hand and self-transcendent, intrinsic values on the other clearly helps to explain certain ecologically-relevant behaviors, presumably because values organize the goals and specific action sequences which result in behaviors (Carver and Scheier, 1982).

Despite these consistent and significant correlations, it is also important to recognize that values and attitudes both have far from perfect relationships with actual behavior (Kraus, 1995). Thus, while one might expect that ecologically-relevant consumption behaviors would be negatively associated with dispositional measures of self-enhancing, materialistic values and positively associated with dispositional measures of self-transcendent, intrinsic values, such associations may be suppressed by any number of other personal and/or situational factors. What might enhance those correlations? Some approaches suggest that having the opportunity to reflect on the values that are most important to oneself will activate those values and increase the likelihood that they influence subsequent behavior. Indeed, momentary activation of specific values both increases the likelihood of engagement in value-relevant behavior (Bargh et al., 2001, Maio et al., 2009) and suppresses the likelihood of engagement in behavior that is in psychological conflict

with the activated values (Maio et al., 2009; Vohs et al., 2006). We thus reasoned that if subjects were given the opportunity to reflect on their values before they engaged in an ecologically-relevant consumption behavior, the magnitude of the expected associations between such behavior and different types of values would increase. That is, compared to subjects who reflected on some neutral topic, subjects who dispositionally preferred self-transcendent, intrinsic values would be especially likely to make ecologically-sustainable consumption choices after reflecting on their values, and subjects who dispositionally preferred self-enhancing, materialistic values would be less likely to make ecologically-sustainable consumption choices after reflecting on their values.

3 Experiment

3.1 Aspiration Index Questionnaire

The Aspiration Index (Kasser and Ryan, 1993, 1996) assesses subjects' goals and aspirations, and the relative centrality of particular goals within an individual's personal goal system. We used the version of Grouzet et al. (2005) which assesses aspirations in 11 domains. It consisted of 57 statements regarding a subject's future, which had to be rated according to their importance and likelihood of occurrence on a nine-point scale, with nine being highest (e.g., "In the future, other people will really respect me."). We used the German translation of Schmuck et al. (2000) for most questions. The remaining questions were translated by the authors, and checked through back translation by a German-English bilingual.

The 11 domains of aspirations are *money*, *image*, *popularity*, *conformity*, *self-acceptance*, *affiliation*, *community feeling*, *health*, *spirituality*, *hedonism* and *safety*.

Factor analysis shows that 6 of these goals can be aggregated into *intrinsic* (*self-acceptance*, *affiliation*, *community*) vs. *extrinsic* (*money*, *image*, *popularity*) goals (see, e.g., Grouzet et al., 2005).[3] To ensure comparability between the subjects, the 11 domains are normalized, i.e., the average weight of all domains is subtracted from each individual weight. For some of the analyses, we aggregate the goals into the difference in weights for intrinsic and extrinsic goals: *DiffInEx=intrinsic-extrinsic*; past studies have used a similar computational formula and found this variable to be associated with ecologically-relevant outcomes (Brown and Kasser, 2005; Sheldon and McGregor, 2000).

Subjects were invited from all departments of the University through the software ORSEE (Greiner, 2004) to participate in the experiment. Those who registered received the Aspiration Index (AI) questionnaire by email. They were asked to complete and return it within one week, for which they would receive 5 Euro, to be paid on the day of the lab experiment. Up to this point, subjects were completely unaware of the topic of the later lab experiment.

3.2 Laboratory Experiment

Two weeks after subjects returned the AI they participated in a laboratory experiment. The first stage of the experiment differed between treatments. Subjects in the VALUE treatment were first asked to reflect on three to five values or principles that are important to them in life. They had several minutes time to write down their thoughts. Afterward, without being able to return to the first question, they were asked to describe - again in writing - how these values influence their

[3]Note that the aggregation we use is very general in that all goals of a category enter with the same weight, i.e., ignoring their particular location in the circumplex. For a similar approach, see Schmuck et al., 2000.

consumption behavior. When answering the first question, subjects were unaware of the content of the second. If values other than those mentioned in the first question were the primary determinants of their consumption decisions, subjects described those. In the BASE treatment, subjects were asked to explain common knowledge terms like "French Revolution" or "Plate tectonics". To be as similar to the VALUE treatment as possible, they did so in writing and had the same amount of time (15 minutes overall) to fulfill the task.

Reflecting upon their values in the VALUE treatment was meant to increase subjects' awareness of these values and their relevance for consumption decisions. The technique is adapted from motivational interviewing (Miller and Rollnick, 1991), a method used in clinical psychology to elicit "behavior change by helping clients to explore and resolve ambivalence" (Miller and Rollnick, 1991). Answers were given in an open format, with 8-10 min time for each question.

At the second stage, subjects in both treatments participated in an experimental supermarket. They received 10 Euro as payoff from the experiment, which they could spend on groceries of different kinds (see list in Appendix B). Each product was available in an organic and a conventional variety. To improve comparability, all products were of high quality. Obviously, the range of groceries we offered did not comprise the whole spectrum of products available in a real supermarket. However, pre-tests ensured that the products matched the daily shopping list of most students reasonably well.[4] Prices were real market prices from a nearby supermarket, i.e., organic products were at least as expensive as their conventional alternative. Further, just as in the real supermarket, organic and conventional

[4]The major exceptions here were fresh products like vegetables and fruits, which could not be offered for technical reasons.

products were placed side by side. In order to mimic a real shopping decision as closely as possible, and not bias the results by revealing the purpose of the experiment, we did not explicitly draw subjects' attention to the different environmental impact the offered products may induce. We measured the amount subjects spent on organic relative to conventional products (variable *organic*).[5]

Subjects did not have to spend exactly 10 Euro in order to avoid losses. Otherwise, they may have chosen certain products just to spend their budget exactly. If subjects spent less, amounts up to 1.50 Euro were refunded. If they spent more, the extra amount was subtracted from their show-up fee (2.50 Euro) or their remuneration for the AI questionnaire (5 Euro). The amount of money subjects actually spent on groceries varied between 6.84 and 10.58 Euro.

After subjects had chosen their groceries, they indicated whether they wanted no bag for their purchases, a paper bag, or a plastic bag. Bags were for free. Bag choices (variable *bag*) were coded according to their presumed environmental impact, with the choice "plastic bag" receiving code -2, "paper bag" receiving code -1 and "no bag" receiving code 0.

Subjects' answers to the first question in the VALUE treatment were coded by student assistants naïve to the purpose of the study so as to identify the described values. These values were then aligned into categories using Schwartz's (1992, 1995) model of values. In particular, subjects mentioned values representing the categories *power/achievement*, *hedonism*, *self-direction*, *universalism*, *benevolence*, *tradition*, and *security*. For each value that a subject mentioned, the category

[5]People may have several reasons to buy organic beyond environmental concerns. However, the environmental impact of organic products is lower on average than of conventional ones, i.e., buying organic is environmentally friendly even if it occurs for health or image reasons (GSF 2007).

represented by this value was increased by one.[6]

The laboratory experiment was run in June and July 2008 at the lab of the Max-Planck-Institute of Economics in Jena. It proceeded as follows. Upon their arrival at the laboratory, subjects were randomly assigned to one of the computer terminals. Each computer terminal was in a cubicle that did not allow communication or visual interaction among the participants. Subjects were given time to read the instructions and to privately ask for clarifications. The experiment then started with the first stage, which lasted about 20 minutes. Next, subjects were invited to examine the available products, which were presented on several tables. During this phase, assistants ensured that the subjects neither communicated among each other nor openly expressed opinions regarding the offered products. Once they had seen all products, subjects returned to their computers and made their choices. Finally, they filled in a brief questionnaire where in addition to some socio-demographic variables, we asked subjects for their usual consumption of organic and fair-trade products on a 5-point scale (5 being highest). After the experiment had ended, subjects privately received their purchased groceries, if applicable in their chosen kind of bag, and their payoffs. The experiment was programmed and conducted with the software z-Tree (Fischbacher, 2007). It lasted 70 minutes on average. Subjects were recruited with the software ORSEE (Greiner, 2004) from different departments, including business, economics, natural sciences and the humanities.

[6]The answers to the second question were not used in the analysis, as it was only included to make subjects think about the relation between their values and their shopping behavior. Asking for an answer to this question was necessary to ensure that subjects did indeed reflect on this relation.

3.3 Hypotheses

Applying the argumentation in section 2 to our experimental design, we derive the following hypotheses:

Hypothesis 1 *Subjects who show higher scores for the extrinsic values* money*,* image*, and* popularity *in the Aspiration Index buy less organic and make less sustainable bag choices. Subjects who show higher scores for the intrinsic values* self-acceptance*,* affiliation *and* community *buy more organic and make more sustainable bag choices.*

This hypothesis attempts to replicate past findings (Brown and Kasser, 2005; Sheldon and McGregor, 2000) by predicting that subjects who dispositionally prefer extrinsic values show relatively less environmentally friendly consumption behavior, while subjects who dispositionally prefer intrinsic values show relatively more environmentally friendly consumption behavior.

Hypothesis 2 *The effects predicted in hypothesis 1 are stronger in the VALUE than in the BASE treatment.*

If subjects reflect upon their values, the influence of these values on their consumption decisions is strengthened.

4 Results

4.1 Descriptive Analysis

72 subjects participated in the experiment, 36 in treatment BASE and 36 in treatment VALUE. For technical reasons, one person in treatment BASE filled in the AI only after the experiment, and was therefore not included in the analysis.

There were 17 female subjects in treatment BASE and 21 in treatment VALUE. The age median was 23 in treatment BASE, 22 in treatment VALUE.

Aspiration Index

Table 3 shows the average (normalized) weights subjects assigned to the goals assessed by the Aspiration Index. On average, subjects assigned larger weights to intrinsic relative to extrinsic goals, the difference being larger for women than for men (though not significant in our sample). The ranking of aspirations is similar to that found in earlier studies (see, e.g., Grouzet et al., 2005). Intrinsic and extrinsic goals are strongly negatively correlated (-0.74).

Table 3 about here

Values

Table 4 shows how often on average subjects in the VALUE treatment mentioned values of Schwartz's categories as relevant for their life.

Table 4 about here

Supermarket

The average ratio of organic to conventional purchases (*organic*) is 0.38 in both treatments. It is independent of the amount subjects spent overall. The distribution is shown in figure 1.

Figure 1 about here

Males spent on average 31% on organic products in the BASE and 46% in the VALUE treatment. Females spent on average 46% in the BASE and 34% in the VALUE treatment. Although they seem to point to a different treatment effect for males and females, these differences are not significant for either gender.

Table 5 shows the distribution of bag choices. In both treatments, a majority of the subjects chooses a bag, which may reflect the fact that subjects were not prepared to purchase groceries when coming to the experiment. In all sub-groups, at least twice as many subjects choose a paper bag than a plastic bag. Females and subjects in the VALUE treatment seem to make slightly more environmentally friendly bag choices, but the differences are not significant.

Table 5 about here

4.2 Regression Analysis

The first question we sought to answer is to what extent subjects' consumption decisions reflect their personal values. In particular, we test whether dispositional preferences for extrinsic values are linked to less environmentally friendly consumption behavior and higher preferences for intrinsic values to more environmentally friendly behavior.

Columns 1 and 2 of table 6 show the results of an OLS regression with robust standard errors and *organic* as the dependent variable, split by treatment. In both

treatments, neither extrinsic nor intrinsic values have a significant influence on subjects' decision to purchase organic products. Columns 3 and 4 show a similar lack of influence on subjects' bag decisions (ordered logit regression with robust standard errors and *bag* as the dependent variable).[7] Thus, both hypothesis 1 and 2 have to be rejected: we neither find a general relationship between subjects' personal values and their ecologically-relevant consumption behavior, nor a strengthening of this relation as the result of subjects reflecting upon their values.

Table 6 about here

As a next step, we consider subjects' reflection upon their values in the VALUE treatment in more detail. In addition to the analysis above, which evaluated the general effect of this reflection, we now consider the *particular* values subjects activated during this stage.

The relation between activated values and subjects' consumption decisions is shown in table 7. Note that due to the low number of observations the regression includes only single variables with *Female* as a control. Only variables that have a significant effect for either the *bag* or the *organic* choice are reported. The results do not change if *Female* is excluded.

Table 7 about here

The regressions show that the consumption decisions of subjects who activate the

[7] A regression including individual AI values can be found in table 6 of appendix A. The results are in line with those of the aggregated variables.

self-enhancing value of *power* tend to be less environmentally friendly than of subjects who do not activate such this value (significant for *bag* choices). The opposite effect seems to be present for subjects who activate self-transcendent values of *universalism* and *benevolence* (significant for *organic* and *bag* choices, respectively). Although the regression does not show a significant effect of the *universalism* value for the *bag* decision, none of the 10 out of 36 subjects who activate *universalism* values takes a plastic bag. This suggests that even if these subjects need a bag, they do not take the one with the higher presumed environmental impact. The effect is significant at 10% in both a t-test and a rank-sum test.

As a control, we correlated the questionnaire items *organic consumption* and *fair-trade consumption* that subjects reported regarding their usual consumption behavior with the treatment, and with subjects' organic consumption in the experiment. First, both parameters are significantly and positively correlated with *organic* (0.41 and 0.27 for organic and fair-trade, respectively), suggesting that subjects in the lab behaved in line with their usual consumption patterns. Second, neither *organic consumption* nor *fair-trade consumption* is significantly correlated with the treatment variable, suggesting that randomization worked satisfactorily.

4.3 Discussion

The results of the current study did not support our predictions that personal values (as assessed by the Aspiration Index) would be associated with people's ecologically-relevant consumption behavior, or that allowing subjects the opportunity to reflect on those personal values would promote a stronger association between those values and their behavior. Instead, we found that people's personal

values bore no significant association with how much actual money they spent on organic vs. non-organic food, and on whether they chose to take their food home in a sustainable way (i.e., bag choice). What's more, reflecting on their values did not affect their consumption behavior, nor did it interact with subjects' values to predict the ecological-quality of their consumption behavior.

Such results call into question past findings of positive associations between ecological behavior and certain types of values (self-enhancing, materialistic vs. self-transcendent, intrinsic). Perhaps our different findings are due to the fact that past studies asked subjects to complete measures of their values and their consumption behavior in a single sitting, whereas we separated the assessments by a couple of weeks. Alternatively, the differences in findings may be due to the fact that most past studies have assessed self-reported consumption behavior, whereas we measured actual behavior (i.e., the purchase of food and the choice of a bag). Either of these alternatives suggests that the results of past studies may be clouded by subject response biases towards appearing consistent in their reporting.

In addition, we did not directly measure "environmentalism" as, e.g., BELV (2008) or Tanner and Wölfing Kast (2003), since we tried to relate consumption to the general aspirations assessed in the AI. It is therefore possible that we would have found a stronger link between "environmentalism" and consumption behavior, but that environmentally relevant behavior is not strongly related to the general goals assessed in the AI. The results of Pinto et al. (2011) support this view. The authors analyze the relation between personal values (Rokeach 1973) and i) environmental attitude or ii) wasteful behavior (water). They do find a relatively strong relation between values and attitudes. But the relation between values and

behavior is weak or non-existent, although behavior is self-reported rather than observed and may be subject to self-serving biases. Interestingly, supporting our results, one of the few effects they find is for *universalism* values (their *pvirtue* together with self-direction). Similarly, Grunert and Juhl (1995) in a survey study find that values of the category *universalism* are more relevant for people with "green" attitudes (those agreeing more strongly with statements of environmental attitudes), who in turn also report higher consumption of organic food. Thøgersen and Ölander (2002) in their two-wave survey study also find a positive influence of *universalism* values on sustainable consumption.

That said, our results suggested that values do play a role in determining ecologically-relevant consumption behavior. Specifically, we found that among subjects given the opportunity to reflect on their values before "shopping," those who reflected on the self-transcendent values of benevolence and universalism were more likely to purchase a relatively large percentage of organic items and to choose not to take a (plastic) bag, whereas those who reflected on the self-enhancing value of power chose more ecologically-damaging means of conveying their purchases home. Such results extend past research (e.g., Schultz et al., 2005) by showing that the distinction between self-transcendent and self-enhancing values does indeed have an important role to play in influencing actual consumption decisions, although values' influence depends on whether or not they are actually at the forefront of a person's mind at the time of the purchase decision.

Thus, it seems that actual purchase behavior does not depend so much on the values that one dispositionally endorses or on having the opportunity to reflect on one's values, but does depend on which values have been activated in one's mind

immediately before shopping. As was the case in past research, self-enhancing, materialistic values are associated with worse ecological outcomes and self-transcendent, intrinsic values are associated with better ecological outcomes, but only when the person has just considered those values.

In many respects, this is quite sensible, as research shows that most people place at least some importance on both the self-enhancing and self-transcendent values, leading them to be in competition with each other for determining a particular behavior. As such, individuals' decision about what to purchase in a given moment may depend less on their personal values and more on values were most on their mind in the moments before they actually make a decision.

The most relevant limitation of the experimental method for the purpose of this study may be its focus on student subjects, with the resulting homogeneity in education and age. For example, earlier studies found a somewhat weaker link between health concerns and organic food consumption for younger people (without children), because health concerns play less of an overall role for this group (Ernst & Young, 2008). In addition, the laboratory naturally limits the number of subjects who participate in the study. Hence, we cannot detect the small (interaction) effects that may be detectable in a survey or panel study with hundreds or thousands of subjects.

5 Conclusion

In this paper we investigate the relation between people's personal values and their environmentally relevant consumption behavior in a controlled laboratory environment. The results suggest that subjects' personal values are weak predic-

tors of their ecologically-relevant consumption decisions and that, in aggregate, reflecting upon their values does not affect the ecological relevance of subjects' consumption behavior. However, a detailed analysis of the values that subjects reflect on shows that the activation of self-transcendent values for *universalism* and *benevolence* is related to more environmentally friendly behavior, whereas the activation of self-enhancing values for *power* is related to less environmentally friendly behavior.

The results suggest that policies which aim at reducing the environmental impact of individual consumption need to foster the activation of *particular* values, rather than making people reflect upon their values in general. However, in line with our research question, the activation of *universalism* values that led to more environmentally friendly behavior in our experiment was *endogenous*. The impact of an *exogenous* activation of these values has to be investigated in future studies.

Appendix A - Data

Table 1: The first five columns show an OLS with robust standard errors and *organic* as the dependent variable, first across all subjects, then split by gender and then split by treatment. Despite the small sample, two-sided tobit regressions yield qualitatively similar results. The sixth column shows an ordered logit regression with robust standard errors and *bag* as the dependent variable.

	OLS (*organic*)					oLogit (*bag*)
	All	Female	Male	VALUE	BASE	All
Affiliation	.018	.058	-.074	-.096	.103	.445
Health	-.052	-.013	-.124	-.132	.003	.341
Safety	.003	-.007	.010	.036	-.021	-.602
Self-acceptance	-.148*	-.221**	-.005	-.260*	-.209	-.046
Community	-.044	-.076	-.018	-.096	-.033	-.056
Hedonism	-.037	-.121*	.052	-.024	-.049	-.321
Money	-.017	-.078	.017	-.099	.013	-.056
Popularity	-.003	-.048	-.039	-.002	-.004	-.241
Conformity	-.042	-.060	-.008	.013	-.096	-.233
Image	-.054	-.069	-.054	-.151	-.041	.463*
Constant	.491***	.499	.418	.876***	.253	–
$(Pseudo)R^2$	0.08	0.28	0.14	0.17	0.13	0.084
Observations	$N = 71$	$N = 37$	$N = 34$	$N = 36$	$N = 35$	$N = 71$

Appendix B - Products

Table 2: Products and prices in the experimental supermarket. The first product of a kind is conventional, the second is organic. The third variety of chocolate is organic fair trade.

Product class	Product	Price (Euro)	amount
Cookies	Prinzenrolle Mehrkorn	1.49	400g
	Alnatura Doppelkeks Dinkel	1.75	330g
Coffee	Jacobs Krönung	4.59	500g
	Alnatura Cafe Classic	4.95	500g
Jam	tegut Erdbeer-Konfitüre	1.59	340g
	Alnatura Erdbeer-Konfitüre	1.65	250g
Tomato sauce	Barilla Basilico	1.99	400g
	Alnatura Kräuter	1.95	350g
Chocolate	Milka Alpenmilch	0.79	100g
	Alnatura Vollmilch	0.95	100g
	gepa Vollmilch	1.39	100g
Herb tea	Goldmännchen 9 Kräuter	0.89	37.5g
	Alnatura Kräutertee	1.45	30g
Muesli	Hahne Premium Müsli	1.79	750g
	Alnatura Frchte Müsli	2.75	750g
Spaghetti	Spaghetti Di Campo	0.55	500g
	Alnatura Spaghetti	0.95	500g
Dried Fruits	Fit for Fun - Trockenfruchtmix	1.95	200g
	Alnatura Mischobst	1.95	200g
Orange juice	tegut Orangensaft	1.49	1l
	Alnatura Orangensaft	1.95	1l

References

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A. Y., Barndollar, K., and Troetschel, R., 2001: The automated will: Nonconscious activation and pursuit of behavioral goals, Journal of Personality and Social Psychology, Vol. 81, p. 1014-1027.

BELV (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz), 2008: Ökobarometer 2008.

Brown, K. W., and Kasser, T., 2005. Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. Social Indicators Research, Vol. 74, p. 349-368.

Carver, C. S., and Scheier, M. F., 1982: Control theory: A useful conceptual framework for personality-social, clinical, and health psychology, Psychological Bulletin, Vol. 92, p. 111-135.

Cason, T. and Gangadharan, L., 2002: Environmental Labeling and Incomplete Consumer Information in Laboratory Markets, Journal of Environmental Economics and Management, Vol. 43, p. 113-134.

Crompton, T. and Kasser, T., 2009: Meeting Environmental Challenges: The Role of Human Identity, WWF-UK, Green Books Ltd.

Ernst & Young, 2008: Lifestyle of Health and Sustainability.

Feather, N. T., 1992: Values, valences, expectations, and actions, Journal of Social Issues, Vol. 48, p. 109-124.

Gatersleben, B., Meadows, J. Abrahamse, W. and Jackson, T., 2008: Materialistic and environmental values among young people volunteering in nature conservation projects, RESOLVE working Paper Series 07-08, University of Surrey.

Griffith, R. and Nesheim, L., 2008: Household willingness to pay for organic products, CEPR Discussion paper 6905.

Grouzet, F. M. E., Kasser, T., Ahuvia, A., Fernandez-Dols, J. M., Kim, Y., Lau, S., Ryan, R. M., Saunders, S., Schmuck, P., and Sheldon, K., 2005: The structure of goal contents across 15 cultures. Journal of Personality and Social Psychology, 89, p. 800-816.

Grunert, S.C. and Juhl, H.J., 1995: Values, environmental attitudes, and buying of organic foods, Journal of Economic Psychology, Vol. 16, p. 39-62.

GSF - National Research Center for Environment and Health, 2007: Bio-Lebensmittel - umweltschonend und gesund?, Munich.

Kahn, M.E., 2007: Do greens drive Hummers or hybrids? Environmental ideology as a determinant of consumer choice, Journal of Environmental Economics and Management, Vol. 54 (2), p. 129-145.

Kasser, T., 2005: Frugality, generosity, and materialism in children and adolescents, In: K. A. Moore and L. H. Lippman (Eds.), What do children need to flourish? Conceptualizing and measuring indicators of positive development (p. 357-373), New York: Springer Science.

Kasser, T. and Ryan, R.M., 1993: A dark side of the American dream: Correlates of financial success as a central life aspiration, Journal of Personality and Social Psychology, Vol. 65, p. 410-422.

Kasser, T. and Ryan, R.M., 1996: Further examining the American dream: Differential correlates of intrinsic and extrinsic goals, Personality and Social Psychology Bulletin, Vol. 22, p. 280-287.

Kasser, T., 2009: Cultural Values and the Well-Being of Future Generations: A Cross-National Study." Journal of Cross-cultural Psychology, Vol. 42, p. 206-215.

Kraus, S.J., 1995: Attitudes and the Prediction of Behavior: A Meta-Analysis of the Empirical Literature, Personality and Social Psychology Bulletin, Vol. 21(1), p. 58-75.

Louviere, J.J., Hensher, D.A. and Swait, J.D., 2000: Stated Choice Methods - Analysis and Applications, Cambridge University Press.

Maio G.R., Pakizeh A., Cheung W.Y., and Rees K.J., 2009: Changing, priming, and acting on values: effects via motivational relations in a circular model, Journal of Personality and Social Psychology, Vol. 97(4), p. 699-715.

McFadden, D., 2001: Economic Choices, American Economic Review, Vol. 91(3), p. 351-378.

Miller, W.R. and Rollnick, S., 1991: Motivational interviewing: Preparing people to change addictive behavior, New York: Guildford Press.

Murphy, J. and Stranlund, J., 2007: A laboratory investigation of compliance behavior under tradable emissions rights: Implications for targeted enforcement, Journal of Environmental Economics and Management, Vol. 53, p. 196212.

Pinto, D.C., Meucci Nique, M., da Silva Añaña, E. and Maurer Herter, M., 2011: Green consumer values: how do personal values influence environmentally responsible water consumption?, International Journal of Consumer Studies, Vol. 35(2), p. 122-131.

Richins, M. L. and Dawson, S., 1992: A consumer values orientation for materialism and its measurement: Scale development and validation. Journal of Consumer

Research, Vol. 19, p. 303-316.

Rokeach, M., 1973: The Nature of Human Values. Free Press, New York.

Schmuck, P., Kasser, T. and Ryan, R.M., 2000: Intrinsic and Extrinsic Goals: Their Structure and Relationship to Well-being in German and U.S. College Students, Social Indicators Research, Vol. 50, p. 225-241.

Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P. and Franek, M., 2005: Values and their Relationship to Environmental Concern and Conservation Behavior, Journal of Cross-Cultural Psychology, Vol. 36, p. 457-475.

Schwartz, S.H., 1992: Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), Advances in experimental social psychology, Vol. 25, p. 1-65.

Sheldon, K. M. and McGregor, H., 2000: Extrinsic value orientation and the tragedy of the commons, Journal of Personality, Vol. 68, p. 383-411.

Shepherd, D.A., Kuskova, V., and Patzelt, H., 2009: Measuring the values that underlie sustainable development: The development of a valid scale, Journal of Economic Psychology, Vol. 30, p. 246256.

Stern, P.C. and Dietz, T., 1994: The Value Basis of Environmental Concern, Journal of Social Issues, Vol. 50(3), p. 65-84.

Tanner, C. and Wölfing Kast, S., 2003: Promoting Sustainable Consumption: Determinants of Green Purchases by Swiss Consumers, Psychology & Marketing, Vol. 20(10), p. 883902.

Teisl, M., Roe, B., and Hicks, R., 2002: Can Eco-Labels Tune a Market? Evidence from Dolphin-Safe Labeling, Journal of Environmental Economics and Manage-

ment, Vol. 43, p. 339-359.

Thøgersen, J., 1999: Spillover processes in the development of a sustainable consumption pattern, Journal of Economic Psychology, Vol. 20, p.53-81.

Thøgersen, J. and Ölander, F., 2002: Human values and the emergence of a sustainable consumption pattern: A panel study, Journal of Economic Psychology, Vol. 23, p. 605630.

Thompson, S.C. and Barton, M.A., 1994: Ecocentric and anthropocentric attitudes towards the environment, Journal of Environmental Psychology, Vol. 14, p. 149-157.

UN, 2000: The United Nations Millennium Declaration. New York: United Nations.

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., and Deci, E. L.: 2004, Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy-support, Journal of Personality and Social Psychology, Vol. 87, p. 246-260.

Vohs, K. D., Mead, N. L., and Goode, M. R., 2006: The psychological consequences of money, Science, Vol. 314, p. 1154-1156.

Welsch, H. and Kühling, J., 2009: Determinants of pro-environmental consumption: The role of reference-groups and routine behavior, Ecological Economics, Vol. 69 (1), p. 166-176.

Wier, M., ODoherty Jensen, K., Mrch Andersen, L., and Millock, K., 2008: The character of demand in mature organic food markets: Great Britain and Denmark compared, Food Policy, Vol. 33 (5), p. 406-421.

Tables and Figures

Table 3: Average weights of the 11 goals assessed by the AI, overall and by gender. Stars denote significant differences between females and males (Wilcoxon rank-sum test, ** = 5%).

	ALL	FEMALE	MALE
Affiliation**	2.15	2.40	1.89
Health	1.65	1.72	1.57
Safety	1.52	1.65	1.38
Self-acceptance	1.40	1.44	1.35
Community	0.71	0.72	0.70
Hedonism	0.54	0.43	0.66
Money	-0.47	-0.67	-0.26
Popularity	-1.38	-1.60	-1.15
Conformity	-1.77	-1.82	-1.71
Image	-1.78	-1.57	-2.01
Spirituality	-2.57	-2.70	-2.43
Intrinsic	1.42	1.52	1.31
Extrinsic	-1.21	-1.28	-1.14
DiffInEx	2.63	2.80	2.45
Observations	$N = 71$	$N = 37$	$N = 34$

Table 4: Average frequency with which values of Schwartz's categories were mentioned, overall and by gender. None of the differences between genders is statistically significant.

	ALL	FEMALE	MALE
Benevolence	1.56	1.76	1.27
Tradition	1.19	1.24	1.13
Power	0.42	0.38	0.47
Self-direction	0.39	0.38	0.40
Universalism	0.36	0.33	0.40
Security	0.19	0.14	0.27
Hedonism	0.11	0.10	0.13
Observations	$N = 36$	$N = 21$	$N = 15$

Table 5: Distribution of *bag* by treatment and gender.

	ALL	FEMALE	MALE	BASE	VALUE
no bag	27	17	10	12	15
paper bag	32	14	18	18	14
plastic bag	13	7	6	6	7
observations	$N = 72$	$N = 38$	$N = 34$	$N = 36$	$N = 36$

Table 6: The first two columns show an OLS with robust standard errors and *organic* as the dependent variable, split by treatment. Despite the small sample, two-sided tobit regressions yield qualitatively similar results. Columns three and four show an ordered logit regression with robust standard errors and *bag* as the dependent variable.

	OLS (*organic*)		oLogit (*bag*)	
	VALUE	BASE	VALUE	BASE
Intrinsic	-.044	-.014	-.043	.216
Extrinsic	-.024	-.012	-.071	.283
Female	-.110	.141	.880	-.449
Constant	.536***	.322**	–	–
$(Pseudo)R^2$	0.045	0.043	0.031	0.031
Observations	$N = 36$	$N = 35$	$N = 36$	$N = 35$

Table 7: Columns 2 to 4 show the OLS regression with robust standard errors and *organic* as the dependent variable. Columns 5 to 7 show the ordered logit regression with robust standard errors and *bag* as the dependent variable.

	organic			*bag*		
	coeff.	coeff.	coeff.	coeff.	coeff.	coeff.
Power	-.43	–	–	-4.94*	–	–
Universalism	–	.68*	–	–	.49	–
Benevolence	–	–	.16	–	–	2.68*
Female	-.12	-.09	-.12	.89	.95	.71
Constant	.49***	.38***	.40***	–	–	–
$(Pseudo)R^2$	0.052	0.108	0.033	0.080	0.028	0.068
Observations	N=36			N=36		

Figure 1: Distribution of *organic* across treatments