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Sustainable consumption dilemmas

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SUSTAINABLE CONSUMPTION DILEMMAS - ENVIRONMENT WORKING PAPER No. 84

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ABSTRACT

Consumers only occasionally choose to buy sustainable products. At the same time these consumers say in surveys that sustainability is important to them, and that the government should promote sustainable consumption. Most likely, a social dilemma is at play here. Everyone would be better off if we all consume sustainably; but because of the higher prices for sustainable products, there is an incentive for each individual to leave sustainability efforts to others. Government measures to promote sustainable consumption would resolve the social dilemma. But do consumers really want to increase sustainability? This study takes a closer look at public support for sustainable consumption and the associated dilemmas, with the help of a behavioural economics experiment of group decisions. In the experiment, participants had to decide whether they were willing to buy more sustainable varieties of meat or chocolate instead of less sustainable conventional varieties. They actually had to buy the product agreed upon for one week.

The results show that a large number of participants, who did not usually buy sustainable products, were willing to commit to buying sustainable products. This gap may partially be explained by 'conditional cooperation' phenomena. In addition participants appear insensitive to the size of the collective benefit. However, the participants in our experiment seem to have difficulties to force others to buy sustainable products. They seem to be caught in a moral dilemma in which they weigh the feel-good effect of contributing to a collective good against the higher individual costs of buying sustainable products and forcing others to do so. Also we found that the preference of the participants for, or dislike of, a measure beforehand did not say much about their appreciation of the measure afterwards.

Based on the results we draw the following policy conclusions. Since consumers do not always act in accordance with their values, the presently low market shares of sustainable products do not adequately reflect consumer support for government policy to promote sustainable consumption. To stimulate consumption of sustainable products, it may be useful to emphasize the feel-good effect ('warm glow') of individual contributions to sustainability. Furthermore, the government could make use of the fact that most consumers are 'conditionally cooperative', e.g. by convincing individual consumers that enough others are switching to sustainable products, too. In this context, it appears that consumers prefer 'soft' incentive measures (e.g. subsidies) over 'hard' restrictive regulations, even if their individual financial benefit from the former will be smaller. The freedom of choice is apparently worth it. However, rules and regulations, even in the form of bans of less sustainable product varieties, can be acceptable and more effective – as long as the government takes the lead in setting up these rules and regulations.

***Keywords**:* sustainable consumption, conditional cooperation, household economics

JEL classification: D11, D12

RÉSUMÉ

Les consommateurs ne choisissent qu'occasionnellement d'acheter des produits durables. Or quand on les interroge, ces mêmes consommateurs déclarent que la durabilité est importante pour eux et que les pouvoirs publics devraient promouvoir la consommation durable. Selon toute vraisemblance, un dilemme social est ici à l'œuvre. Chaque individu gagnerait à ce que nous consommions tous des produits durables, mais le prix plus élevé de ces produits l'incite à laisser cet effort aux autres. L'adoption par les pouvoirs publics de mesures visant à promouvoir la consommation durable résoudrait le dilemme social, mais les consommateurs souhaitent-ils *réellement* promouvoir la durabilité ? Cette étude examine l'intérêt des individus pour la consommation durable et les dilemmes que cela engendre, en s'appuyant sur une expérience d'économie comportementale appliquée à des décisions de groupe. Dans cette expérience, les participants devaient décider s'ils étaient prêts à acheter de la viande biologique ou du chocolat équitable au lieu de versions classiques (moins durables) de ces produits, et devaient effectuer les achats décidés durant une semaine.

Les résultats montrent qu'un grand nombre de participants, qui n'achètent habituellement pas de produits durables, étaient prêts à s'engager à le faire. Ce contraste peut en partie s'expliquer par un phénomène de « coopération conditionnelle ». En outre, les participants paraissent insensibles à l'ampleur du gain collectif généré. Toutefois, les participants de notre expérience semblent éprouver des difficultés à obliger les autres à acheter des produits durables. Ils semblent être confrontés à un dilemme moral, dans lequel ils doivent mettre en balance la sensation de bien-être que provoque la contribution à un bien collectif et les coûts individuels plus élevés que supposent l'achat de produits durables et le fait d'obliger les autres à agir de même. Nous avons aussi constaté que la préférence des participants pour une mesure ou leur rejet de celle-ci *a priori* n'en disaient pas beaucoup sur leur appréciation de la mesure *a posteriori*.

À partir des résultats de cette expérience, nous avons tiré les conclusions suivantes. Puisque les consommateurs n'agissent pas toujours conformément à leurs valeurs, la part de marché des produits durables, qui est actuellement faible, ne reflète pas correctement le soutien des consommateurs aux mesures prises par les pouvoirs publics pour promouvoir la consommation durable. Afin de stimuler la consommation de produits durables, il pourrait s'avérer utile de jouer sur la sensation de bien-être (le « chaud au cœur ») que suscite une contribution individuelle au développement durable. En outre, les pouvoirs publics pourraient s'appuyer sur la « coopération conditionnelle » qui caractérise la plupart des consommateurs, par exemple en persuadant chaque individu qu'un nombre suffisant (important) de consommateurs change aussi ses habitudes de consommation au profit de la consommation durable. Dans ce contexte, il apparaît que les consommateurs préfèrent les mesures incitatives « douces » (comme les subventions) aux règlementations restrictives, mesures « dures », même s'ils y perdent sur le plan financier. C'est le prix à payer pour le libre-choix. Toutefois, les règlementations, même sous la forme d'interdiction des versions les moins durables d'un produit, peuvent être acceptées et s'avérer plus efficaces, tant qu'elles restent à l'initiative des pouvoirs publics.

Mots-clés: consommation durable, coopération conditionnelle, économie des ménages

Classification JEL : D11, D12

FOREWORD

This paper is a contribution to the OECD Project on "Behavioural Economics and Environmental Policy Design" (http://www.oecd.org/environment/behaviour.htm) that aims to improve our understanding of the implications of the insights from behavioural economics for environmental policy design. The paper has been authored by Kees Vringer (Netherlands Environmental Assessment Agency PBL), Herman Vollebergh (Netherlands Environmental Assessment Agency PBL, Tilburg Sustainability Centre and CESIfo), Daan van Soest (VU University Amsterdam, Tilburg University and Tilburg Sustainability Centre), Eline van der Heijden (Tilburg University and Tilburg Sustainability Centre) and Frank Dietz (Netherlands Environmental Assessment Agency PBL). The authors would like to thank Zack Brown and Nick Johnstone for useful comments on an earlier draft of this paper.

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EXECUTIVE SUMMARY

Various studies have shown that consumers only occasionally choose to buy sustainable products. At the same time, these consumers say in surveys that sustainability is important to them, and that the government should take measures to promote sustainable consumption. Thus, there seems to be a paradox. Many consumers do not act in accordance with their stated preferences. Most likely, a social dilemma is at play here. Everyone would be better off if we all consume sustainably; but because of the higher prices for sustainable products, there is an incentive for each individual to leave sustainability efforts to others. In this light, it is not surprising that when asked, consumers state they would support government measures to promote sustainable consumption (such as product standards). Such measures would resolve the social dilemma. The question then becomes, do consumers *really* want to increase sustainability? Or is it just too easy to say yes in a survey asking if sustainability is important?

The present study takes a closer look at public support for sustainable consumption and the associated dilemmas, with the help of a behavioural economics experiment of group decisions. In this experiment, participants had to decide whether they were willing (individually, or in groups of varying size) to buy organic meat (in one set of treatments) or Fair Trade chocolate (in another set of treatments) instead of the conventional (less sustainable) varieties of these products for one week. To make sure that participants would make realistic decisions, they actually had to buy the product (sustainable or conventional version) agreed upon by their group.

The results of our experiment show that a large number of participants, who did not usually buy sustainable products in their daily life, were willing to commit to buying sustainable products. This gap between participants' habitual decisions in daily life, and the commitments made in the experiment may partially be explained by 'conditional cooperation' phenomena elsewhere observed by behavioural economists. Many people are much more willing to contribute to a public good if they know peers are doing the same. In addition, in their decisions on whether to vote for a prohibition, participants appear insensitive to the size of the collective benefit to be had from the ban (which grows with group-size). However, the participants in our experiment seem to have more difficulties deciding whether they really want to force others to buy sustainable products. Thus they seem to be caught in a moral dilemma in which they weigh the feel-good effect of contributing to a collective good against the higher individual costs of buying sustainable products and forcing others to do so. Another interesting finding is that most participants in our experiment were satisfied with the measure decided on by their group – even when they themselves had voted against it. In other words, their preference for, or dislike of, a measure *beforehand* did not say much about their appreciation of the measure *afterwards*.

Based on the results of this experiment in combination with a survey ex post, we draw the following policy conclusions. Since consumers do not always act in accordance with their values, the presently low market shares of sustainable products do not adequately reflect consumer support for government policy to promote sustainable consumption. To stimulate consumption of sustainable products, it may be useful to emphasize the feel-good effect ('warm glow') of individual contributions to sustainability. Furthermore, the government could make use of the fact that most consumers are 'conditionally cooperative', e.g. by convincing individual consumers that enough others are switching to sustainable products, too. In this context, it appears that consumers prefer 'soft' incentive measures (e.g. subsidies) over 'hard' restrictive regulations, even if their individual financial benefit from the former will be smaller. The freedom of choice is apparently worth it. However, rules and regulations, even in the form of bans of less sustainable product varieties, can be acceptable and more effective – as long as the government takes the lead in setting up these rules and regulations.

SUSTAINABLE CONSUMPTION DILEMMAS

1. The sustainable consumption paradox

A remarkable paradox exists between stated preferences by consumers and their own behaviour. For instance, Dutch consumers claim that sustainability is definitely important to them. Several surveys consistently show that Dutch consumers consider sustainability one of the most pressing social issues (e.g. Visser et al., 2007; Verbeek and Boelhouwer, 2010). At the same time the market share of sustainable products in the Netherlands – despite a relatively strong growth in the last few years – usually does not exceed 5-10% (Biomonitor, 2012, Max Havelaar, 2010). Indeed, according to Vringer et al. (2007) no relation whatsoever exists between how much importance Dutch consumers attribute to sustainability (climate change), and their energy consumption behaviour. Apparently, the majority of Dutch consumers are not willing or able to voluntarily change their consumption patterns to increase sustainability. And the Dutch case is far from unique. Only a relatively small number of European consumers for instance choose to buy sustainable products (Willer, 2012).

Of course, one could simply conclude from the difference between stated and revealed preferences that consumers might pretend 'pro-social behaviour' when it is 'cheap' to do so, like in a survey without any consequences. Indeed, in a real world setting such behaviour is much more costly. More sustainable products are usually more expensive, and/or harder to get. One indication that consumers might not be reluctant to change is their, again stated, support for *government* involvement. Dutch consumers, for instance, state in surveys that they would like to see the government take measures to stimulate sustainable behaviour (MNP, 2007). Also surveys in countries such as Germany, France and Sweden show similar results, with 66-75% of consumers supporting more far-reaching government measures to promote sustainable consumption (Verhue et al., 2007). However, also the actual implementation of measures to increase sustainable consumption often provokes heated debate. For example, in the Netherlands a fierce discussion arose in 2007 when the then environment minister (following her Australian colleague) announced the phase-out incandescent lamps. While the societal benefits of alternative, energy-saving LED and CFL light bulbs are undisputed, the proposal sparked a fierce discussion about the question whether it was appropriate to limit individuals' freedom of choice in this domain.[1]

Apparently there is a difference between stated preferences about the importance of consumption related sustainability issues and government intervention on the one hand and actual behaviour and support on the other. To some, the difference between stated preferences and observed behaviour just illustrates a lack of real support for sustainability. People simply do not really want to change. Indeed, people might too easily provide pro-social answers in surveys (Levitt and List, 2007). To others, this difference is an indication of the existence of a paradox or of a social dilemma. People might be willing to change, but find this simply hard to do. Recent insights from behavioural economics, for instance, show that changing a default is very costly due to habits, temptation, complexity, silent choices, etc. (cf. Thaler and Sunstein, 2008). Moreover, consumers might be willing to change but only on the condition that others would join as well. Indeed, people may not cooperate because they typically face a social dilemma in a setting where one has to create a common public good (Chaudhuri, 2010).

To gain more insight in the causes of the difference between stated preferences and observed behaviour, we present the results of a behavioural economics experiment that we implemented on

[1] Similar discussions have arisen around the question whether the Dutch government may interfere with consumer decisions to purchase 'unsustainable products' such as Jacuzzis, SUVs and cheap meat. Interestingly, the same measure taken at EU level evoked much less discussion.

sustainable consumption. In this experiment, participants had to decide whether they were willing (individually, or in groups of varying size) to buy organic meat or Fair Trade chocolate instead of the conventional (less sustainable) varieties of these products, for one week. To make sure that participants would make realistic decisions, they actually had to buy the product (sustainable or conventional variety) agreed on by their group. This design of the experiment not only creates a social dilemma in the group, but also the option to solve the dilemma by securing other people's commitment. After a short explanation of background and experimental design, we discuss our finding in three separate sections.

2. Theoretical background and experimental design

Considering sustainability important but not acting on this belief is consistent with a social dilemma. A social dilemma arises if two conditions are met[2]:

(i) Collective welfare is maximized if all members of the community undertake a specific action;

(ii) Individual members can maximize their private welfare by *not* undertaking this specific action, but this will be at the expense of collective welfare.

Indeed, the individual costs of buying sustainable product varieties are relatively high (with price premiums for such products amounting to 10-50% compared to conventional varieties), but society is best off if *everyone* makes this individual contribution. However, individuals are better off free-riding on the investments made by others, than making investments in the collective good (sustainability) themselves. From this reason it is not surprising that consumers support the idea of more far-reaching government measures to promote sustainable consumption; such measures would help to resolve the dilemma. As many as 70% of Dutch citizens subscribe to the proposition that the government should take the initiative in solving important societal issues, and indicate that they would accept government measures to increase sustainability (MNP, 2007).

However, the oftentimes fierce public debates about concrete measures suggest that also something else could be at play. Perhaps it is too easy for survey respondents to say that they consider sustainability important and that government measures are needed. Due to the hypothetical nature of surveys, these studies may overlook the possibility that consumers find sustainable products simply too expensive. Most studies on preferences related to nonmarket environmental goods employ contingent valuation (CV) and discrete choice experiments (also known as conjoint analysis) techniques (Carson & Groves, 2007). Throughout the years both techniques have been criticized because, just like in other survey methods, the questions are essentially hypothetical (Levitt and List, 2007). Respondents are asked whether they are willing to pay *X* euros for a specific project, but rarely do they actually have to pay. While the literature often assumes that it is in the respondents' own interest to truthfully answer a yes/no preference question ('Are you willing to pay *X* euros for this project, yes or no?'), it appears that these survey techniques generally lead to an *over*estimation of the true willingness to pay. In the economic literature this phenomenon is known as *hypothetical bias*[3], and in the social-psychological literature as *socially desirable answers*. The hypothetical bias arises when respondents expect that the project is more likely to be

[2] For classic contributions on the role of social dilemmas in daily life, see for example Olson (1965) and Schelling (1978), and for an early theoretical analysis, see Sen (1974).

[3] A good overview of the nature and degree of hypothetical bias is provided by the meta-analyses of List & Gallet (2001) and Murphy et al. (2005), and by the literature reviews of Harrison (2006) and Harrison & Rutström (2008). Incidentally, the hypothetical nature of CV is not always considered the greatest problem of this method (see Carson, 1997).

implemented if they answer 'yes' rather than 'no'. In such cases respondents will be more concerned about influencing the outcome of the 'vote,' rather than truthfully answering the question. Clearly, the potential for such hypothetical bias is particularly important for the present research question, where we want to explain the difference between consumers' (stated) support for policies promoting sustainable products, and their much less frequent purchase of such products.

A semi-field experiment

To explore the hypothetical bias in relation to the likely occurrence of a social dilemma, we used both standard survey questions as well as economic experiments to answer the research question. A key characteristic of economic experiments is that decisions taken by the participants have *real* consequences for them – financial, and/or otherwise. Furthermore, in our study the experimental environment was linked directly to situations in which daily decisions – such as whether or not to buy a specific product – are usually taken. This way, participants were confronted with the real, tangible consequences of their personal beliefs (and those of others) about abstract values such as 'sustainability'. Because of this design we expected participants in our experiment to be better able to picture the consequences of their personal beliefs on abstract values such as sustainability, in their choice situation (Levitt and List 2007). In addition, we expected that this realistic setting would provide a greater incentive to participants to vote truthfully, in accordance with their real preferences.

Our study was set up as a semi-field experiment. The 1100 participants in our experiment were a representative sample of Dutch consumers responsible for the food shopping in their household. All information exchange took place through the Internet, and there was no contact between participants. In the experiment, participants had to decide whether or not to jointly address a sustainability problem. They were divided into groups, and each participant was allocated a budget (credit) to be spend on a product of which both a (less expensive) conventional and a (more expensive) sustainable variety were available in the supermarket.

All participants were informed that their credit was sufficient to cover the additional costs of buying the sustainable variety of the product for one week. Furthermore, it was made clear that the credit could only be used for buying this specific product (i.e. not for other shopping). Next, the participants had to *vote* on whether to oblige all members of their group (including themselves) to use their credit only for buying the sustainable variety of the product, or to leave everyone free to spend their credit on the variety of their choice (sustainable or conventional). The group's decision was based on majority voting. Once the voting outcome was known, participants in some treatments had to spend their budget (or credit) on the product variety decided on by their group, while in other treatments no such condition was imposed. The 1100 participants in our semi-field experiment were randomly assigned to different treatments (Table 1). By comparing the results of these treatments we obtained information about the influence of various factors on the voting behaviour of the participants.[4]

Two familiar products as case study: meat and chocolate

So participants in our semi-field experiment had to make decisions about the purchase of existing, familiar products, and vote in a referendum as to whether to impose a ban on the purchase of the

[4] It should be noted that our main interest is not in the exact outcomes, percentages etcetera, but in the comparison between situations (treatments). Although quantitative results may depend on and be sensitive to details of the experimental design, qualitative differences between treatments in experiments are typically rather robust.

conventional product in the group or not.[5] Before participants made their decision we provided them with information about the effect of their purchase on sustainability and price differences between the conventional versus sustainable variety of the product.

To minimize the potential impact of physical differences between product varieties in these decisions the two product varieties had to be as similar as possible. Furthermore, both varieties had to be widely available and known by most people. For our experiment, we selected two product groups that fit these criteria: meat (sustainable alternative: organic meat) and chocolate (sustainable alternative: Fair Trade chocolate). For both products, physical properties such as quality and taste are more or less similar between the conventional and sustainable varieties (Brandt, 2007; Olsson et al., 2003; Van der Wal et al., 1993), and both varieties are widely available and known by most people. Moreover, meat and chocolate are related to two distinct sustainability problems, animal welfare and poverty, respectively. Both these problems receive widespread attention in politics and the media.

The sustainability value of organic meat lies mostly in the significantly higher quality of animal life (PBL, 2013). However, organic meat is on average about twice as expensive as non-organic meat. Furthermore, some people are convinced that organic meat is better for their health and tastes better (although others think it tastes worse). Thus, for some people the purchase of organic meat may bring not only collective gains (higher animal welfare), but also (or only) individual gains (health, taste). To minimize the effect of the latter, we chose not to mention factors such as health and taste in the instructions provided to the participants before they were to cast their vote (see Appendix 1). We also did not mention differences in land and energy use of non-organic versus organic meat production, as these differences are not (yet) widely recognized. Participants in the 'meat' treatments each received a budget (credit) based on the size and composition of their household. This credit – seven euros per adult and four euros per child – was sufficient to cover the additional costs of buying organic meat for one week.

As for chocolate, the Fair Trade label guarantees that cocoa farmers receive a fair income for their work. Therefore, in our experiment Fair Trade chocolate served as the sustainable alternative for conventional chocolate. The price difference between conventional and Fair Trade chocolate is relatively small, about 30%. Participants in the 'chocolate' treatments each received a credit of seven euros, regardless of the size and composition of their household.

Thus, the two product groups in our experiment, chocolate and meat, differ both in terms of their sustainability effect of the two varieties within these groups and in terms of the relative price differences between the conventional and (more) sustainable product varieties. By including both product groups in our experiment, we hoped to gain more insight into the influence of different factors on the choice between the conventional and sustainable product variety. Incidentally, persons who had indicated beforehand that they ate little or no meat (i.e. flexitarians and vegetarians) or chocolate, were not invited to participate in the experiment.

Treatments

Our semi-field experiment included a number of treatments. The main treatment, on which all other treatments were based, was the so called 'binding prohibition' treatment. In this treatment, a group of 31 participants had to decide, by majority vote, whether to prohibit using the budget for purchasing the conventional variety of the product. The group's decision was binding. Participants were informed that if one participant decided to spend his or her credit on buying organic meat for one week, this would mean a

[5] Our experiment focuses on group decisions which is not the same as a ban by the government. We did not frame the experiment as a boycott because this raises a different mind-set, i.e. punish the public bad instead of support for the good.

better life for about 1 chicken; if a group of 31 participants decided to do this, the costs of contributing was unchanged for every participant, but then about 40 chickens would have a better life. The 'binding prohibition' treatment was also conducted for chocolate. In that case, participants were told that if a group of 31 participants decided to buy Fair Trade chocolate rather than standard chocolate for one week, this would mean a better income for one cocoa farmer family during one week.

In addition to describing these potential collective gains, the instructions also included information about the price difference between the conventional and sustainable variety of the product. Next, the participants were asked to vote on whether all members of the group should be obliged to use their credit only for buying the sustainable alternative, or whether everyone should be free to spend it on the variety of their choice. For meat, the question was phrased as follows:

You are now asked to vote on the following proposition:

"All 31 households shall use their credit only for buying organic meat."

□ *I vote IN FAVOUR (I think that all 31 households should be obliged to use their credit only for buying organic meat).*

□ *I vote AGAINST (I think that all 31 households should be free to use their credit for buying organic or non-organic meat).*

Provided that all participants know and understand that the majority decision of their group is binding, it easily follows that the optimum strategy for each individual is to vote truthfully (Carson & Groves, 2007; Cummings et al., 1995).

After the vote, all participants were informed of the voting outcome in their group. If the majority of the group had voted in favour of using the credit only for buying organic meat, then the credit could indeed only be used for this purpose. Hence, the purchases of meat made during the week following the vote were reimbursed only if they complied with the majority decision. Furthermore, reimbursement was limited to the amount of credit reserved for each participant's household. The purchases were checked based on the receipts handed in for reimbursement. See Appendix 1 for further details.

We have tested several variations on the 'binding prohibition' treatment; the most important ones are listed in Table 1. Treatments differed in the size of the group, in the nature of the decision (ban on non-sustainable variety, or subsidy on the purchase of the sustainable alternative) and in the type of commitment (conditional or non-conditional). Furthermore, we included two treatments in which the 'ban' question was only hypothetical (participants did not have to buy meat or chocolate afterwards). Each participant took part in only *one* of these treatments —a between subject design.

Data such as disposable income, age, household composition and educational level were collected before the experiment took place. Furthermore, we asked the participants a number of questions before, during and after the experiment, related to their purchasing behaviour, voting motives, and whether or not they were happy with the voting outcome in their group. In addition, we asked them to what extent they thought that the government should take stricter measures to promote sustainable production and consumption. Finally, we asked a number of participants to complete a so-called social orientation test (also known as *ring test*; see Liebrand, 1984). This test allowed us to assess (in an abstract context unrelated to our experiment) whether the social orientation of a participant is altruistic, cooperative, individualistic or competitive. Linking this information to the actual decisions made by the participants in our experiment permitted additional analysis.

Before conducting the experiment in its definitive form, we tested the design in qualitative and quantitative pilot studies[6]. Based on the results of these pilot studies the original design was further optimized (Vringer et al., 2013). The final experiment was conducted in the last months of 2010. About 75% of the participants took part in a treatment related to meat, and 25% in a treatment related to chocolate.

3. Results

The results of the most important treatments are shown in Table 1 (for a complete overview of all treatments and results, see Vringer et al., 2013). The first observation is that the shares of votes in favour of (regulation of) the sustainable variety are remarkably high across all treatments, considering the small market shares of organic meat (3%; Biomonitor, 2012) and Fair Trade chocolate (4%; Max Havelaar, 2010). The percentage of Yes voters for Fair Trade chocolate was substantially higher than for organic meat.

The second observation from Table 1 is that there are no significant differences between the voting outcomes in the treatments with group sizes 1, 31 and 61, respectively. 51, 42 and 50 percent of the participants voted in favour of obliging all members of their group to use their credit only for buying organic meat.[7] Group size also did not have an effect on the voting outcomes in the two 'hypothetical' treatments. The percentage of Yes voters was similar regardless of whether the 'ban' on non-organic meat would apply to 31 households, or to all 7 million households of the Netherlands (28% versus 27%).[8]

Thirdly, compared to the binding prohibition treatment, the percentage of Yes voters was slightly higher (although not significantly so) if the voting outcome was non-binding, as in the 'prohibition, advisory vote' treatment.

Fourthly, the percentage of voters in favour of a 'subsidy' on organic meat (57%; group size 31) was found to be significantly[9] higher than the percentage of voters in favour of a 'ban' on buying non-organic meat (42%; group size 31). This is remarkable because the 'subsidy' was far less attractive financially: in this treatment, participants were only compensated for *the additional cost* of organic meat, whereas in the 'prohibition treatment', the *full* costs were covered. Thus, given that organic meat is about twice as expensive as non-organic meat, participants in the 'subsidy' treatment had to buy twice as much organic meat to get the same compensation as participants in the 'binding prohibition' treatments.[10]

[6] The aim of the qualitative pilot study was to check whether the information provided to the participants on conventional versus sustainable varieties of the product was clear and correctly understood. The quantitative pilot study was done to detect and solve any problems in the design before conducting the final experiment.

[7] Chi-squared test: p-values were 0.20, 0.16 and 0.98 for the differences between 51 and 42%, 42 and 50%, and 51 and 50%, respectively.

[8] Chi-squared test: p=0.78.

[9] Chi-squared test: p=0.01.

[10] Another remarkable result is that more participants voted in favour of a ban on non-organic meat if it was *binding* (42% for group size 31), than if it was only *hypothetical* (28% for group size 31). Presumably, the credit offered in the 'binding' treatment had raised expectations about reciprocity. Note that the remainder of our discussion focuses on comparing results within the same category of treatments (e.g. comparing different group sizes within the 'binding prohibition' treatments), rather than between categories (e.g. comparing 'binding prohibition' group size 31 to 'hypothetical prohibition' group size 31).

Table 1. Overview of the most important treatments and their results

Treatment	Group size	Binding?	Number of participants voting*		Percentage in favour of buying sustainable variety	
			Meat	Chocolate	Meat	Chocolate
Individual choice	1	Yes	83		51	
Prohibition, binding **	31	Yes	160	104	42	68
Prohibition, binding	61	Yes	111		50	
Prohibition, hypothetical	31	No	123	53	28	43
Prohibition, hypothetical	7 million***	No	112		27	
Prohibition, advisory	31	No	160	76	50	75
Subsidy, binding	31	Yes	124		57	
Conditional choice, binding	31	Yes	83		76	
Total			873	233		

*Note that, in most treatments, the number of participants is not a round multiple of group size. This is due to non-response. To determine the voting outcome in incomplete groups, we randomly assigned participants from intact groups to incomplete groups to cover the missing votes.

**This is the main 'binding prohibition' treatment described in Appendix 1.

***In this hypothetical treatment, participants were told to assume that all households in the Netherlands were to vote on the ban. Thus, the hypothetical group size was 7 million.

Finally, by far the highest number of voters in favour of a binding prohibition agreement was found in the 'conditional choice' treatment. As many as 76% of the participants in this treatment were willing to commit to buying organic meat, if a minimum number of other group members would do the same. The greater this minimum number, the higher the percentage of participants willing to commit. Subsequently we discuss these results in more detail centred around three main findings relevant for policy making.

Consumers want to buy sustainable products, but only up to some limit

In our experiment the revealed willingness to commit oneself is considerable higher than what one observes in the real world, but hardly exceeds 50% in the case of meat (see Table 1). Interestingly, this percentage does not differ significantly between treatments with self-commitment and those where one could break through the social dilemma by committing others as well (in the treatments with groups of 31 or 61 participants). The same holds for the treatment where individuals were not committed to the group choice (advisory prohibition). The much higher support for sustainable chocolate consumption relative to meat is as one would expect because the individual cost of 'cooperation' is lower in this case. The price difference between the Fair Trade and conventional variety of chocolate is relatively small.

Apparently a stronger (conditional or unconditional) willingness of consumers exist to buy more sustainable products than they reveal in the market place. Interestingly, this support is irrespective from whether participants buy sustainable product varieties in everyday life, or not. Both groups vote 'yes' more or less equally often in our experiment. Indeed, no less than 50% of participants who had *never* bought

organic meat before, voted in favour of obliging themselves and others to spend their credit only on organic meat. In the case of Fair Trade chocolate this percentage was 33%.[11]

Peer pressure may increase support

To investigate the role of the social dilemma more explicitly, we also varied the size of the groups. In addition to the standard group size of 31 participants, we included treatments with group size 1 (i.e. one participant, taking an individual decision) and group size 61. We expected the percentage of Yes voters to increase with group size, because in larger groups the collective gains of a Yes vote are considerably greater (e.g. higher welfare for more animals), while the individual costs remain the same (e.g. same individual costs of buying organic meat). Interestingly, the results of our experiment suggest that participants do not seem to weigh *the size* of the potential collective gains against their individual costs. Although participants in larger groups (where potential collective gains were greater) did vote more often in favour of a collective measure (see Table 1), the difference between group sizes of 31 and 61 is statistically not significant. This is the case despite that participants were being explicitly informed about the potential size of the collective gains before the vote. Thus, contrary to expectations, in this experiment the size of collective gains does not seem to play a significant role in the decision to vote for, or against, a measure that would increase animal welfare.

Table 2. Percentage of participants willing to commit to buying organic meat, in the conditional choice treatment.

Condition	% of Yes voters
(1) All other group members will also commit (100%)	57
(2) 22-29 group members will also commit (71-94%)	58
(3) 16-21 group members will also commit (52-68%)	54
(4) 9-15 group members will also commit (29-48%)	42
(5) 1-8 group members will also commit (3-26%)	39
(6) No other group members will commit (0%)	43 *
Percentage of participants who voted Yes, under *at least one* of the conditions (1-6) above	76

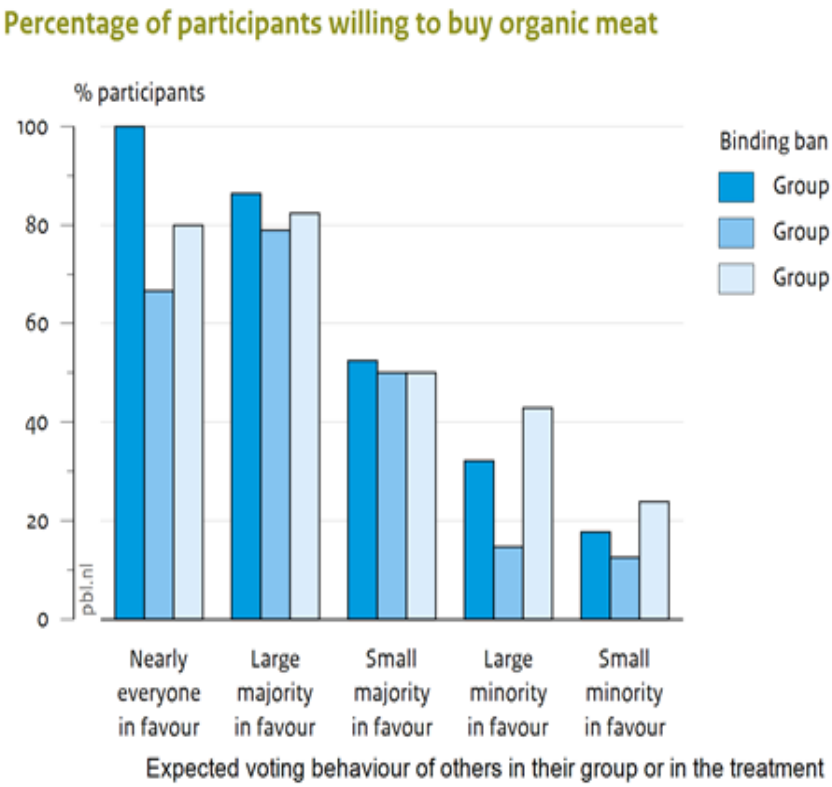
* These voters could be regarded as 'leaders', because they were willing to commit to buying organic meat without requiring the same commitment from other group members. However, this conclusion appears to be premature: 84% of these seemingly-unconditional Yes voters expected that the majority of their group would commit to buying organic meat anyway. As this did not happen, it is unlikely that many of these 'leaders' would commit unconditionally again, if the experiment were to be repeated. in most treatments, the number of participants is not a round multiple of group size.

What does play a role, however, are expectations with respect to the behaviour of others. Whether people are willing to commit themselves is a function of other people's willingness to commit. Indeed, cooperating consumers expect also that others cooperate (Yes voters expect sooner that others do cooperate, even in the hypothetical or individual commitment treatments). This becomes clear from the substantial (significant) difference between the percentage of Yes voters in the main 'binding prohibition' treatment (42%, group size 31) versus the 'conditional choice' treatment (76%, group size 31). Participants were more willing to commit to buying organic meat if they were sure that at least some other members of

[11] This lower percentage can be explained by the fact that the share of people who never bought Fair trade chocolate is much smaller, so the likelihood to observe the voting behaviour of conscious non-buyers is much higher.

their group would do the same. As Table 2 shows, the greater the number of others who are willing to commit, the higher the percentage of participants willing to commit as well. Statistically, the percentage of Yes voters was significantly higher if *more* than half of the other group members would also commit (conditions 1, 2 and 3), than if *less* than half would also commit (conditions 4 and 5).[12]

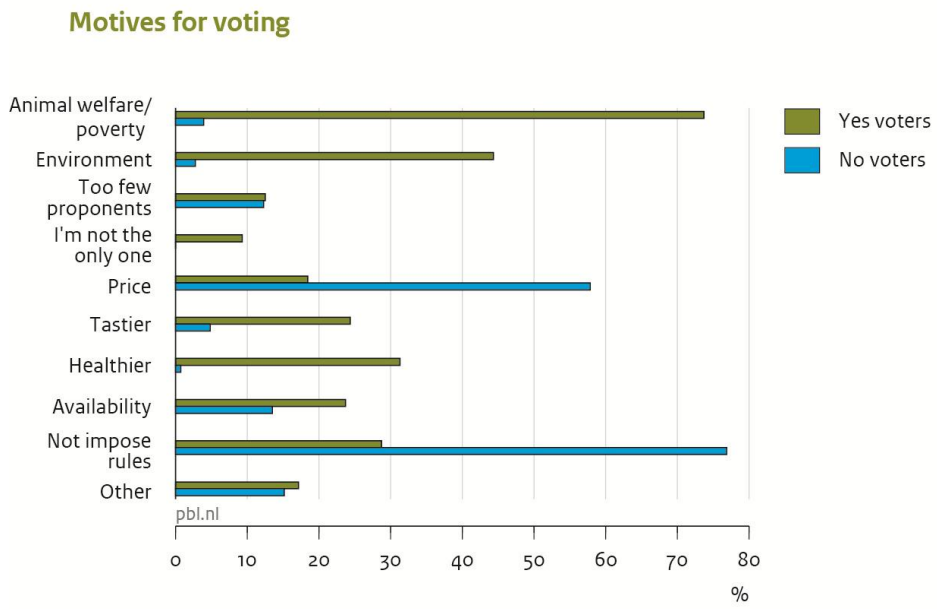
Figure 1. Percentage of participants willing to commit to buying only organic meat as a function of their expectations about voting behaviour of others in their group or treatment .



Conditionality may have also played a role in the decisions of participants in the *non*-conditional 'binding prohibition' treatments. As Figure 1 shows, participants who were willing to commit themselves as well as the other 30 or 60 members of their group if possible (like in the 'binding prohibition' treatment), to buying only organic meat, more often expected that the other members of their group would do the same. Interestingly, also participants in the single decision making treatment (i.e., with group size 1, where one's decisions had no consequences for others) expected that others in the experiment would do the same (see Figure 1). These results suggest that conditionality – perhaps unconsciously – also played a role in these non-conditional treatments.

[12] McNemar tests, comparing conditions (1,2,3) with (4,5): p=0.002-0.008. P-values for the differences between conditions (1) versus (6), (2) versus (6), and (3) versus (6) were 0.054, 0.038 and 0.093, respectively

Figure 2. Motives for voting in favour, or against, a collective agreement to buy only organic meat or Fair Trade chocolate

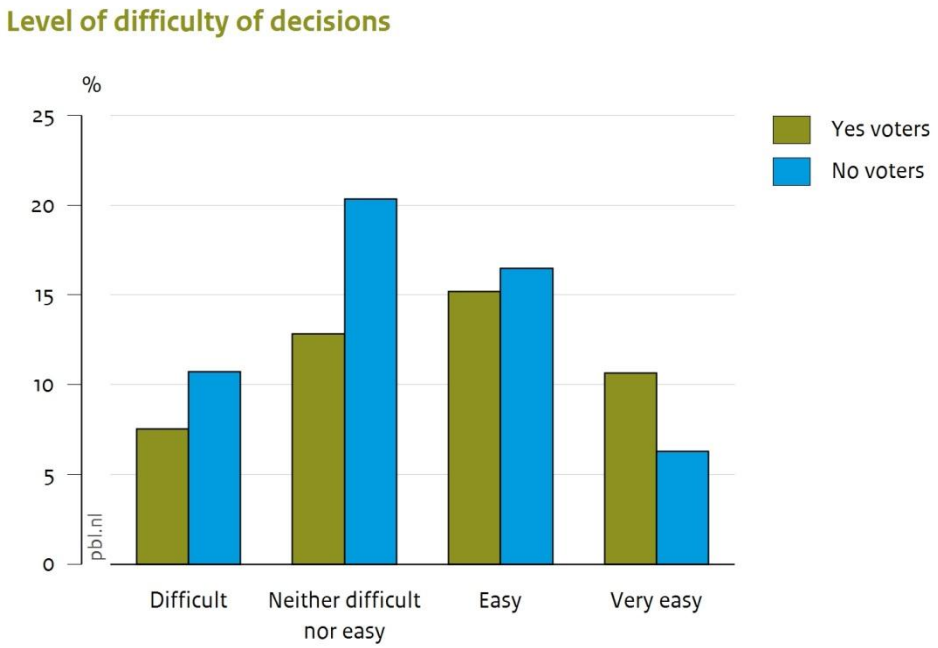


The somewhat high percentage of participants willing to cooperate (high number of Yes voters) in combination with the irrelevance of group size corresponds with earlier findings from laboratory experiments. These show that people are often willing to make a larger voluntary contribution than predicted by rational choice theory (Chauduri, 2010). A possible explanation for this altruistic behaviour, which is not accounted for in rational choice theory, is the utility gained from the act of giving (the 'warm glow': see Andreoni, 1990). Likewise, in our experiment, the Yes voters seemed to be also sensitive to the feel-good effect of being involved in a 'good cause'. As shown in Figure 2, these voters were guided mostly by the collective gains of buying organic meat or Fair Trade chocolate (environment, animal welfare, poverty reduction), and only to a lesser extent by their personal gains (health, taste). This pattern was similar across treatments.

Interestingly, the No voters were motivated not only by concerns about the higher individual cost of sustainable products, but also by *their reluctance to impose rules and regulations on others*. While they did not indicate that animal welfare and poverty reduction were unimportant to them, these motives clearly played a minor role in their decision. This reluctance to force a rule on others was also a frequently mentioned motive in 'advisory (or non-binding) prohibition' treatments. Participants who said they did not want to force a rule on others, may have been driven primarily by their dislike of being bound by rules themselves. Note that three out of the four most important motives for voting either for or against the proposition, can be regarded as 'moral motives'. These are: environment, animal welfare/poverty reduction, and reluctance to impose a rule on others.[13]

[13] Moral motives are desirable from a social perspective. They relate to the effects on other people, rather than on the decision-maker him/herself (Kirchgässner, 2009).

Figure 3. Participants' responses to the question how difficult it was for them to decide to commit or not / to vote in favour a collective agreement or not, to buy only organic meat or Fair Trade chocolate.



Taken together, these results suggest that many participants were not so much faced with a social dilemma in the narrow sense but more likely with a *moral dilemma* (see also Sen, 1974). In this dilemma they had to weigh the utility of their individual contribution to a collective good (the 'warm glow') against the higher cost of sustainable products *and* the moral cost of imposing a rule on others. Further evidence that participants found themselves in such a dilemma can be derived from their response to the question how difficult it had been for them to decide on their vote (Figure 3). These data show that No voters found it significantly more difficult to decide than Yes voters.[14]

Freedom of choice preferred over restrictive regulation

On the important question what type of policy governments might use we also included a 'subsidy' treatment. In this treatment the question was whether the credit should only be used for compensating *the additional costs* of organic meat, or whether all group members should be free to spend their credit on non-organic or organic meat, whichever they preferred. As organic meat is on average twice as expensive as non-organic meat, a decision in favour of this 'subsidy' proposition meant that participants were reimbursed only *half the cost* of their organic meat purchases (while in the main 'binding prohibition' treatment, they were reimbursed *in full*).

Clearly subsidies are preferred by our participants as a significantly higher percentage of participants voted Yes in the 'subsidy' treatment compared to the 'binding prohibition' treatment (group size 31) (Table 1). So people prefer a subsidy, even though it is financially more costly.[15] These results suggest that

[14] Chi-squared test: p=0.00.

[15] This outcome is consistent with earlier experimental evidence where participants who had to invest in more energy-saving technologies did so even if this investment would be against their own interest from a purely financial perspective (Aalbers et al., 2009).

collective measures that leave freedom of choice intact (such as subsidies) are preferred over restrictive regulations (such as a ban on selling non-organic meat). This also fits in with the moral dilemma many participants seemed to be faced with, particularly their objection to imposing rules on others (and themselves).

Another interesting (and related) finding is on the satisfaction ex post of the participant with the voting outcome of the group. As expected, participants whose group decision turned out to be different from their own votes, were less satisfied than participants who decided similar as their group. This is clear from comparing columns (1) and (4) in Table 3 on the one hand and columns (2) and (3) on the other hand. The *least* satisfied of all were those participants who had voted in favour of a ban on non-organic meat, but whose group decided against it (column 3 in Table 3). This is somewhat surprising, because they at least kept the freedom to buy organic meat, whereas 'No voters in Yes groups' (column 2) lost this freedom of choice. Apparently, it is even more disappointing to not be able to commit yourself and others to buying organic meat, than to be bound by a rule you did not want.

Table 3. Participants' satisfaction* with the voting outcome in their group, as a function of what they voted themselves.

	(1)	(2)	(3)	(4)
Majority vote was	Yes	Yes	No	No
Own vote was	Yes	No	Yes	No
Meat				
'Binding prohibition'	5.8 [a]	4.5 [a]	3.4 [a]	5.8 [b]
'Subsidy'	5.8 [b]	4.3 [b]	**	**
Chocolate				
'Binding prohibition'	6.0 [b]	4.9 [b]	**	**

* Ranging from 1 (very dissatisfied) to 7 (very satisfied); a score of 4 means neither satisfied nor dissatisfied. Standard deviations of the means: [a]= 0.1, [b]=0.2.

** The majority in all groups voted Yes.

Our finding that participants seem to face a moral dilemma including the cost of imposing a rule on others, might explain a positive view on government intervention for which they do not have to impose a rule themselves. To find out to what extent participants thought that the *government* should take measures to increase sustainability we additionally examined two post-experiment *survey* questions in which participants were asked about their opinion whether the government should impose stricter standards on production processes to improve either animal welfare or the livelihoods of cocoa farmers – depending on the treatment they participated in. As part of this question, it was explicitly pointed out that such stricter standards would improve the welfare of livestock/cocoa farmers but also result in significantly higher prices. The results (Table 4) show that about two-thirds of the participants thought that stricter rules were a (very) good idea, while a minority (6-7%) (strongly) disagreed. These results agree with a previous study (MNP, 2007), in which participants were asked the (similarly hypothetical) question whether they considered sustainability important, and who should take the lead.[16]

[16] Note that this support decreases significantly if the costs and benefits are made explicit. Compare the relatively high percentage of participants supporting stricter measures based on general information (hypothetical questions, Table 4) to the much lower percentage of Yes voters in the hypothetical treatments (Table 1),

Table 4. Opinion of participants (%) as to whether the government should impose stricter regulations to improve animal welfare and livelihoods of cocoa farmers.

Voting behaviour in experiment, resp. for group as a whole	Meat			Chocolate		
	Against	For	All	Against	For	All
Question: Should the government be more, or less, strict in order to improve animal welfare / the livelihoods of cocoa farmers? [a]						
Stricter/Much stricter	57	83	67	39	72	55
Neutral	39	17	31	57	25	42
Less strict/Much less strict	3	1	2	4	3	4
Question: What would you think if the government decided to impose stricter regulations on meat production / chocolate production? [b]						
Good/Very good idea	54	84	68	55	83	68
Neutral	36	13	26	35	14	25
Bad/Very bad idea	10	3	7	10	2	6

[a] The full question was: "Should the government be more, or less, strict in order to improve animal welfare / the livelihoods of cocoa farmers? Compared to the present situation, the government should be.....:"

[b] The full question was: "If the government decided to impose stricter regulations on meat production / chocolate production, this would have the following consequences:

- Animal welfare / Livelihoods of cocoa farmers would be improved;
- Meat / Chocolate in the supermarket would become more expensive;
- You would be sure that all the meat you buy comes from animal-friendly production systems / that the livelihoods of many more cocoa farmers will be improved.
- What would you think if the government decided to impose stricter regulations on meat production / chocolate production?"

where respondents received detailed information on the price differences between non-organic and organic meat (see the 'meat table' in Appendix 1).

4. CONCLUSIONS

The results of our experiments suggest that a sizeable group of Dutch consumers consider sustainable consumption to be very important indeed -- even though in daily life they do not usually act upon this belief. The fact that consumers themselves hardly buy sustainable products in real life cannot simply be understood as a revealed preference for less sustainable varieties. It seems more related to the fact that others do not buy either. For two familiar products with two distinct sustainability problems (animal welfare in relation to meat and poverty in relation to chocolate), we found that people are more inclined to buy sustainable product varieties if they think others would buy them too.

Remarkably, the size of collective gains seems quite irrelevant. Participants did not vote more often in favour of a collective action in larger groups, where the potential collective gains would be greater. The final outcome – the size of collective gains due to the improvement of welfare for a greater number of animals, or better livelihoods for more cocoa farmers – seems to play only a minor role in their decisions. If anything, participants in our experiment were caught in a moral dilemma where they weigh the utility of contributing to a collective good ('warm glow') against the higher costs of sustainable product varieties. These costs not only consist of the difference in market prices between the sustainable and conventional product variety, but also of the moral cost of limiting other people's room for decision making. To what extent the results for both products are also representative for other consumption goods is not straightforward, however.

The results of our experiment show that the presently low market shares of sustainable products in the Netherlands do not adequately reflect consumer support for government policy to promote sustainable consumption. To stimulate consumption of sustainable products, it appears useful to emphasize the feel-good effect of individual contributions to sustainability. Furthermore, the government could make better use of the fact that most consumers are 'conditionally cooperative' – by levying peer pressure to affect consumer behaviour. Also, our results indicate that consumers value 'soft' incentive measures (e.g. subsidies) compared to 'hard,' more restrictive regulations (such a complete ban), even if their individual financial benefit from the former will be smaller. The freedom of choice is apparently worth the cost. However, rules and regulations, even in the form of bans of less sustainable product varieties, can be acceptable and more effective – as long as the government takes the lead in setting up these rules and regulations. Obviously, it is still an open question to what extent these insights also apply to other OECD countries.

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APPENDIX 1: SETUP AND INSTRUCTIONS OF THE 'BINDING PROHIBITION' TREATMENT- THE MAIN TREATMENT

This appendix describes in detail the treatment in which participants had to vote on banning the purchase of non-organic meat — the instructions for the other treatments are similar (and available upon request). In this treatment, the majority vote was binding. In the week following the poll, participants had to buy meat in compliance with their group's decision (only organic meat; *or* whichever they preferred: organic or non-organic). Before the vote, participants were provided with the following information on organic meat:

Organic meat comes from animals that have had a better life than animals raised in intensive livestock systems (also known as bio-industry or factory farming). Pigs can go outside and root in the mud. Chickens can scratch around. Cows graze in the fields for the greater part of the year. The animal houses have windows, fresh air coming in, and straw bedding. Independent scientific research by Wageningen University has shown that animal welfare on organic farms is higher (animals are less stressed, less anxious, etc.) than on conventional factory farms.

Nowadays organic meat can be bought in most supermarkets. If more people buy organic meat, livestock production in the Netherlands will become more animal-friendly.

However, organic meat is on average about twice as expensive as conventional (non-organic) meat.

At present, the vast majority of Dutch households buy non-organic meat. As a result, animal welfare is hardly improving. If more people switch to buying organic meat, more animals will get a better life.

Next, participants were divided into groups of 31 each. This group size was deemed sufficient for a convincing gain in animal welfare if all group members were to buy organic meat, compared to the effect of just one participant buying organic meat. Before the vote took place, all participants were informed that a certain amount of money had been reserved for each of them, as a kind of shopping credit. This credit roughly covered the additional expenses of buying organic meat instead of non-organic meat, for one week, for one household. These additional costs were estimated at 7 euros for an adult and 4 euros for a child[17]. Each participant was informed how much credit was reserved for him or her based on the size and composition of their household.[18]

Next, the participants were shown the proposition to vote on:

All households shall use their credit only for buying organic meat.

Before the participants could vote on this proposition, the pros and cons of buying organic meat were explained in more detail:

If all 31 households would use their credit for buying organic meat, this would have a greater impact than if only one household would buy organic meat.

[17] Daily meat consumption was assumed to be 120 g for adults and 70 g for children.

[18] The remainder of this example is based on a two-adult household, with a credit of 2 x 7 = 14 euros.

If 1 household switches to buying organic chicken breast, then each week 1 chicken will have a better life. If all 31 households switch to buying organic chicken breast, then each week 40 chickens will have a better life.

However, organic meat is on average about twice as expensive as non-organic meat. The table below shows, for three kinds of meat, how much meat you can buy with an average week budget for a household of your size.

Amount of meat that can be bought with 14 euros [19]

	Non-organic	*Organic*
Minced beef	*2.9 kilos*	*1.3 kilos*
Shoulder chop	*2.5 kilos*	*1.3 kilos*
Chicken breast	*1.8 kilos*	*0.6 kilos*

Next, all participants were invited to cast their vote:

You are now invited to cast your vote on the following proposition:

"All 31 households shall use their credit only for buying organic meat."

□ *I vote IN FAVOUR (I think that all 31 households should use their credit only for buying organic meat).*

□ *I vote AGAINST (I think that all 31 households should be free to use their credit for buying organic or non-organic meat).*

After everyone had cast their vote, we calculated the results and informed the participants of the voting outcome in their group. The majority decision was binding. Thus, if the majority of the group was of the opinion that the credit should be used only for buying organic meat, then the credit could be spent only on organic meat. In that case, participants were reimbursed only for their purchases of organic meat, up to their credit limit. If the majority had voted *against* the proposition, then participants could decide for themselves whether to buy organic or non-organic meat. In that case they were reimbursed for all their meat purchases, up to their credit limit. We checked the receipts to ensure that participants had made their purchases in compliance with their group's decision. In the case that participants were free to choose between organic and non-organic meat, the receipts allowed us to track their purchasing choices.[20]

[19] In the actual poll, the weights in this table were adjusted to the size and composition of the household of the participant in question. This example table is based on a two-adult household.

[20] Note: Although a binding vote is the most accurate method to measure preferences, it may obscure the relation between preferences and ex post behaviour. If the majority is in favour of spending the credit only on organic meat and the vote is binding, then some members of the group will have to buy organic meat while they voted against it. As long as they value animal welfare to some degree, they are better off buying organic meat. Moreover, they might as

In this 'binding prohibition' poll, all participants had to comply with the majority decision, and therefore the optimum strategy for each individual was to vote truthfully. The poll question was 'incentive compatible' (Carson & Groves, 2007; Cummings et al., 1995). For the individual participant, the probability of his/her vote being decisive is small. However, in the case that there are already 15 votes in favour and 15 votes against the proposition, the 31st voter who votes a socially desirable 'yes' despite feeling that that the collective benefits are smaller than the individual costs, will afterwards regret his or her untruthful vote. As none of the participants will know beforehand whether their vote will be the decisive one or not, the safest strategy is to vote truthfully.

well buy organic meat because the additional costs are covered by their credit: their expenses are the same whether they buy organic or non-organic meat. Only when the majority is *against* using the credit only for organic meat, we can gain insight into the relation between preferences and purchasing behaviour; in that case, participants are free to choose whether to buy organic or non-organic meat, based on their own preferences.

APPENDIX II INFLUENCE OF SOCIOECONOMIC AND OTHER FACTORS

To investigate whether other factors also play a role in the choice between conventional and sustainable products, we examined the correlations between the voting behaviour of the participants in our experiment, and their socioeconomic and social-psychological characteristics. In terms of socioeconomic characteristics, our analysis showed that the voting behaviour of our participants did not depend on gender, household size or household income. However, significant correlations were found with age, education and region of residence. Older participants were less inclined to vote in favour of buying the sustainable alternative than younger participants. Approximately 30 percent of the participants aged 70 years and older voted in favour, versus 45 percent of 30-40 year olds.[21] In addition, participants with only lower vocational education (LBO) voted less often in favour of buying the sustainable alternative (<30%) than participants with higher professional education (HBO) or university education (WO) (~45%).[22] Participants from the south of the Netherlands and from the larger cities also voted less frequently in favour of buying the sustainable alternative (about 30% in either group) than participants from other regions (about 40%).[23]

To gain insight into the relationship between voting and purchasing behaviour on the one hand, and social-psychological characteristics on the other hand, participants were asked to do a social orientation test ('ring test') as well as a test to assess their value patterns. The ring test allows to assess whether a person is altruistic, cooperative, competitive or individualistic (Liebrand 1984). Based on this test, we found that 31% of the participants were individualistic, 14% competitive, 40% cooperative and 7% altruistic.[24] As expected, cooperative and altruistic participants voted more often in favour of buying sustainable products (52%) than individualistic and competitive participants (40%).[25]

In addition to social orientation, consumer value patterns may also influence purchasing behaviour (Vringer et al. 2007). Hessing-Couvret & Reuling (2002) distinguished eight value groups within the Dutch population: the broad-minded, the caring faithful, the socially minded, the hedonists, the materialists, the conservatives, the balanced and the professionals. The value patterns of participants in our experiment were assessed using the WIN-model of TNS-NIPO (Hessing-Couvret & Reuling 2002).[26] We found that participants who classified as broad-minded, socially-minded or caring faithful voted significantly more often in favour of buying sustainable products (47%) than participants classified as hedonist, materialist or conservative (32%).[27]

Finally, we examined whether the voting behaviour of the participants in our experiment was influenced by their general frame of mind (Figure 4). Therefore we asked participants to indicate their level

[21] Chi-squared test showed a significant difference between age groups if the age difference was 25-30 years. Linear regression over five age groups gave an r^2 of 0.93.

[22] Chi-squared tests: number of Yes voters with lower vocational education (LBO) versus intermediate vocational education (MBO) or lower secondary general education (MAVO): p=0.032; with intermediate vocational education (MBO) versus university education (WO): p=0.029; with higher professional education (HBO) versus university education (WO): p=0.93.

[23] Chi-squared tests: p=0.048 and p=0.03, respectively.

[24] Excluded from the analysis: 3% 'aggressive' and 5% 'other'.

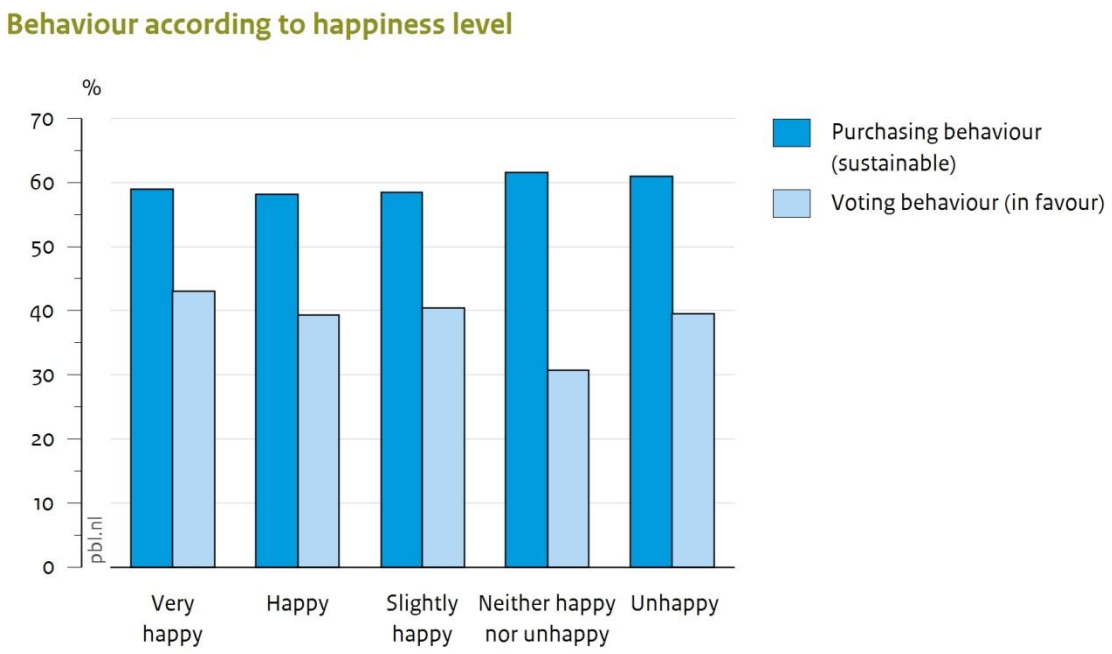
[25] Chi-squared test: p=0.00.

[26] This method is based on the value classification of Rokeach (1973) and the work of Schwartz & Bilsky (1987).

[27] Chi-squared test: p=0.00.

of happiness.[28] Statistical analysis showed that participants who felt neither happy nor unhappy had voted significantly less often in favour of buying the sustainable product, than participants in other happiness categories.[29] However, this difference may be partly explained by covariates. The average age in this group was higher (52 instead of 48 years old), a greater percentage of this group lived in the south and west (35% instead of the average 29%), and their education level was generally lower.[30] As for purchasing behaviour, we found no significant differences between happiness categories in terms of the average amount of credit spent on the sustainable product variety.[31]

Figure 4. Voting and purchasing behaviour of participants in our experiment, as a function of happiness level.



[28] We used the 7-step verbal happiness question (Table 111D) following Veenhoven (2010). Due to the low N in the categories 'unhappy' and 'very unhappy', we combined these with the category 'fairly unhappy' into one category ('unhappy') for statistical analysis.

[29] Chi-squared tests: p=0.009 – 0.027

[30] These differences in age, education and region of residence reduced the percentage of Yes voters in the category 'neither happy nor unhappy' by an estimated 5%.

[31] T-tests: p=0.24-0.93.